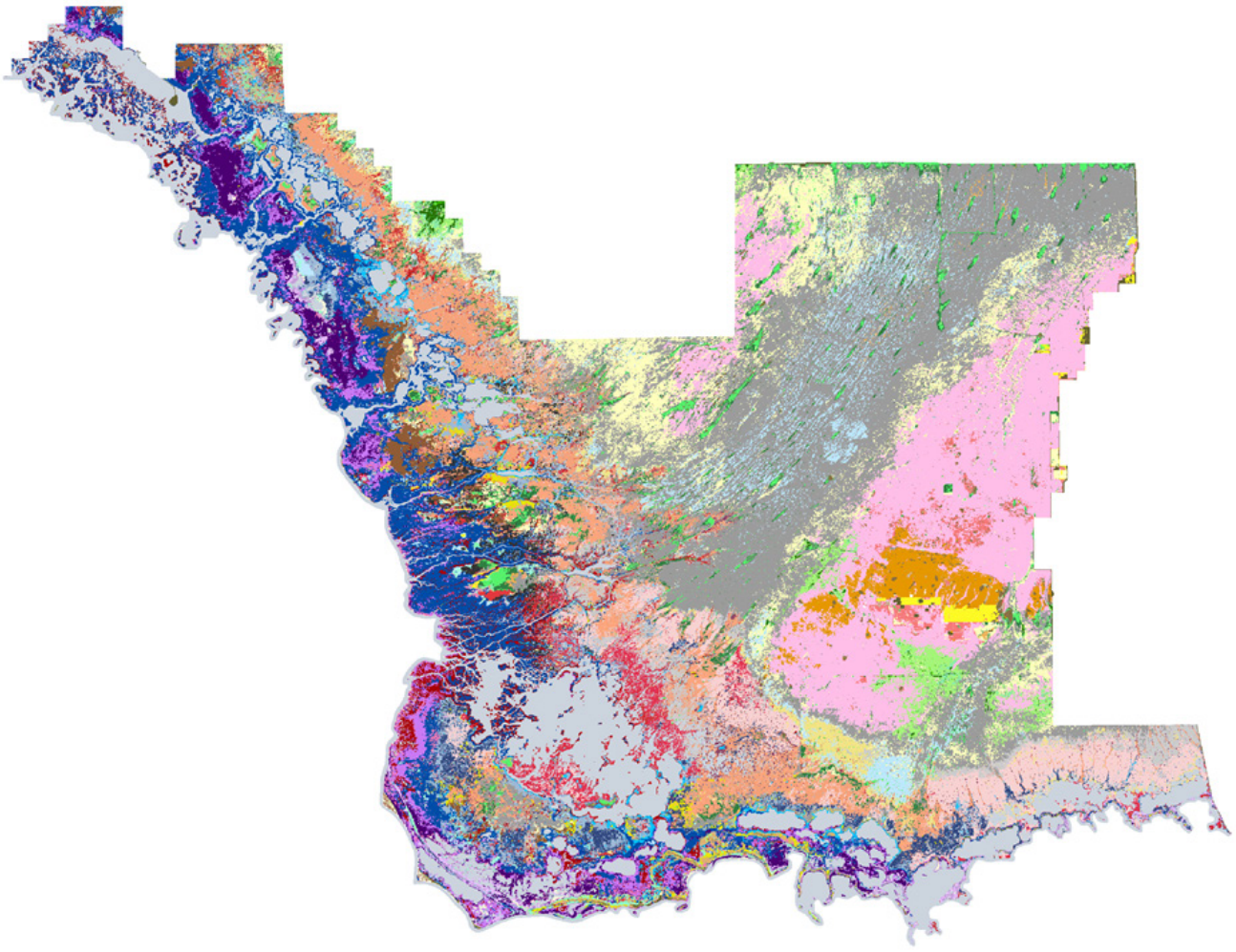
National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

The Vegetation of Everglades National Park

Final Report

Natural Resource Report NPS/SFCN/NRR—2021/2256



ON THE COVER
Vegetation map of Everglades National Park

The Vegetation of Everglades National Park

Final Report

Natural Resource Report NPS/SFCN/NRR—2021/2256

Pablo L. Ruiz[1], Theodore N. Schall[2], Robert B. Shamblin[1], and Kevin R. T. Whelan[1]

[1]South Florida Caribbean Network Inventory and Monitoring Program
18001 Old Cutler Road, Suite 419
Palmetto Bay, Florida 33157

[2]United States Army Corps of Engineers
Jacksonville District
701 San Marco Boulevard
Jacksonville, Florida 32207

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National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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Acronyms and Abbreviations

2D:	Two-dimensional
3D:	Three-dimensional
AA:	Accuracy Assessment Point
BICY:	Big Cypress National Preserve
CERP:	Comprehensive Everglades Restoration Plan
CIR:	Color infrared
EVER:	Everglades National Park
FGDC:	Federal Geographic Data Committee
GE:	Greater Everglades
GPS:	Global Positioning System
ha:	Hectare
km:	Kilometers
MAP:	Monitoring and Assessment Plan
NAD:	North American Datum
NIR:	Near-infrared
NPS:	National Park Service
NPS VMI:	National Park Service Vegetation Mapping Inventory Program
RECOVER:	REstoration COordination and VERification
RMSE:	Root mean square error
RTKGPS:	Real-time kinematics Global Positioning System
SFCN:	South Florida Caribbean Network
SFWMD:	South Florida Water Management District
TP:	Training Point
USACE:	United States Army Corps of Engineers
VCSFNA:	Vegetation Classification System for South Florida Natural Areas
VMI:	Vegetation Mapping Inventory Program
VP:	Verification Point
WCA:	Water Conservation Areas
WRDA:	Water Resource Development Act

Contributors

Pablo L. Ruiz—Biologist/NPS Project Manager

Theodore N Schall—Physical Scientist/USACE Project Manager

Robert B. Shamblin – Botanists/Accuracy Assessment Lead

Kevin R. T. Whelan—Ecologist

Executive Summary

The Everglades National Park vegetation mapping project is part of the Comprehensive Everglades Restoration Plan (CERP). It is a cooperative effort between the South Florida Water Management District (SFWMD), the United States Army Corps of Engineers (USACE), and the National Park Service Vegetation Mapping Inventory Program (NPS VMI). The goal of this project is to produce a spatially and thematically[1] accurate vegetation map of Everglades National Park (EVER) prior to the completion of restoration efforts associated with CERP. This spatial product will serve as a record of baseline vegetation conditions for the purpose of: (1) documenting changes to the spatial extent, pattern, and proportion of plant communities within EVER as they respond to hydrologic modifications resulting from the implementation of the CERP; and (2) providing vegetation and land-cover information to NPS park managers and scientists for use in resource management, research, and monitoring.

The vegetation map of EVER covers an area of 4,482.2 square kilometers (1.108 million acres [ac]) and consists of four mapping regions: Region 1 – Shark River Slough/Long Pine Key; Region 2 – The Southeast Saline Everglades; Region 3 – The Southwest Coastal Everglades; and Region 4 – The Northwest Coastal Everglades. Region 1 was mapped by the SFWMD and USACE while Regions 2-4 were mapped by the South Florida Caribbean Network (SFCN).

Photo-interpretation on the map was performed by superimposing a 50 × 50-meter (164 × 164-feet [ft] or 0.25 hectare [0.61 ac]) grid cell vector matrix over stereoscopic, 30 centimeters (11.8 inches) spatial resolution, color-infrared aerial imagery, acquired by the SFWMD in 2009, on a digital photogrammetric workstation. Photo-interpreters identified the dominant community in each cell by applying majority-rule algorithms, recognizing community-specific spectral signatures, and referencing an extensive ground-truth database. The dominant vegetation community within each grid cell was classified using a hierarchical classification system developed for this project. Additionally, photo-interpreters categorized the absolute cover of invasive species and cattails (*Typha* sp.) detected as either: Sparse (10–49%), Dominant (50–89%), or Monotypic (90–100%).

The map contains a total of 286 discreet thematic classes with Short Sawgrass Marsh (75,956 ha, [19.7%]); Graminoid Freshwater Prairie (62,076 ha [12.3%]) and Mixed Mangrove Forest-Mixed (47,599 ha [5.3%] being the most common vegetation types mapped. Marsh vegetation classes are the most common community types found withing the vegetation map. They account for 186,551 ha (48.3%) of the terrestrial mapped area[2]. Forest communities (18.0%), followed by Scrub (17.8%) and Shrublands (12.8%) are the next most common community types mapped. Map accuracy, based on 1,014 randomly selected accuracy assessment points, is estimated at 89.2% with a lower 90th Percentile Confidence Interval of 87.4%.

[1] Accuracy of the map label to the reference data.

[2] A total of 620.8 square kilometers (153,394 ac) of bays, lakes, and other open water features are not included in the percent area calculation for each thematic class.

Acknowledgments

The map of Everglades National Park could not have been completed without the dedication and commitment of all the photo-interpreters from the National Park Service (NPS), the US Army Corps of Engineers (USACE), the South Florida Water Management District (SFWMD), Florida International University (FIU), and Avineon, Inc. that worked on the project. Many thanks to Craig P. Perry, Alejandro Arteaga Garcia, Cynthia Irving, David McFee, Magali Guichardot, Michelle C. Prats, Helena C. Giannini, Michael Foguer, Joseph Ingram, Kristen Caldecutt, Becky Maholland, Viktoria Bogina, Clay McCoy, Mary-Joe Hernandez, and Carlos Pulido.

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Introduction

The EVER vegetation mapping project is a component of the Comprehensive Everglades Restoration Plan (CERP). It is a cooperative effort between the South Florida Water Management District (SFWMD), the United States Army Corps of Engineers (USACE), and the National Park Service Vegetation Mapping Inventory Program (NPS VMI). The goal of the project is to produce a spatially and thematically accurate vegetation map of EVER that would serve as record of baseline conditions to: (1) document changes to the spatial extent, pattern, and proportion of plant communities in response to management driven hydrologic modifications resulting from the implementation of the CERP; and (2) providing vegetation and land-cover information to NPS park managers and scientists for use in resource management, research, and monitoring.

The EVER vegetation map covers an area of 4,482.2 square kilometers (1.108 million acres [ac]) and consist of four mapping regions: Region 1 – Shark River Slough/Long Pine Key (Schall et al. 2020); Region 2 – The Southeast Saline Everglades (Ruiz et al. 2017); Region 3 – The Southwest Coastal Everglades (Ruiz et al. 2018); and Region 4 – The Northwest Coastal Everglades (Ruiz et al. 2020, Figure 1).

This project was initiated in 2009 by the SFWMD where they mapped a 406-square kilometer (156.7-sq mi) section of the northernmost portion of Region 1 (Figure 1). In 2010, the mapping effort for the entire project was transferred to the USACE Jacksonville District office in Jacksonville, Florida, and project data collection and field support were delegated to the South Florida/Caribbean Network (SFCN) in Palmetto Bay, south Florida. In 2015, the SFCN took on the mapping responsibilities associated with Regions 2–4 of this project (Figure 1). This change allowed the project to take advantage of the SFCN's institutional knowledge of botany, community ecology, and remote sensing as well as efficiencies afforded by the network's proximity to EVER and Big Cypress National Preserve. The USACE priorities then shifted towards the completion of Region 1, assisting the network with the final quality assurance and quality control (QA/QC) of mapped products, and the production of a final report.

This document is the final report for the vegetation map of EVER. It combines the methods and results of all four mapping regions within EVER into one comprehensive product. It also marks the completion of the USACE, SFCN, SFWMD, RECOVER, and NPS cooperative effort to map EVER.

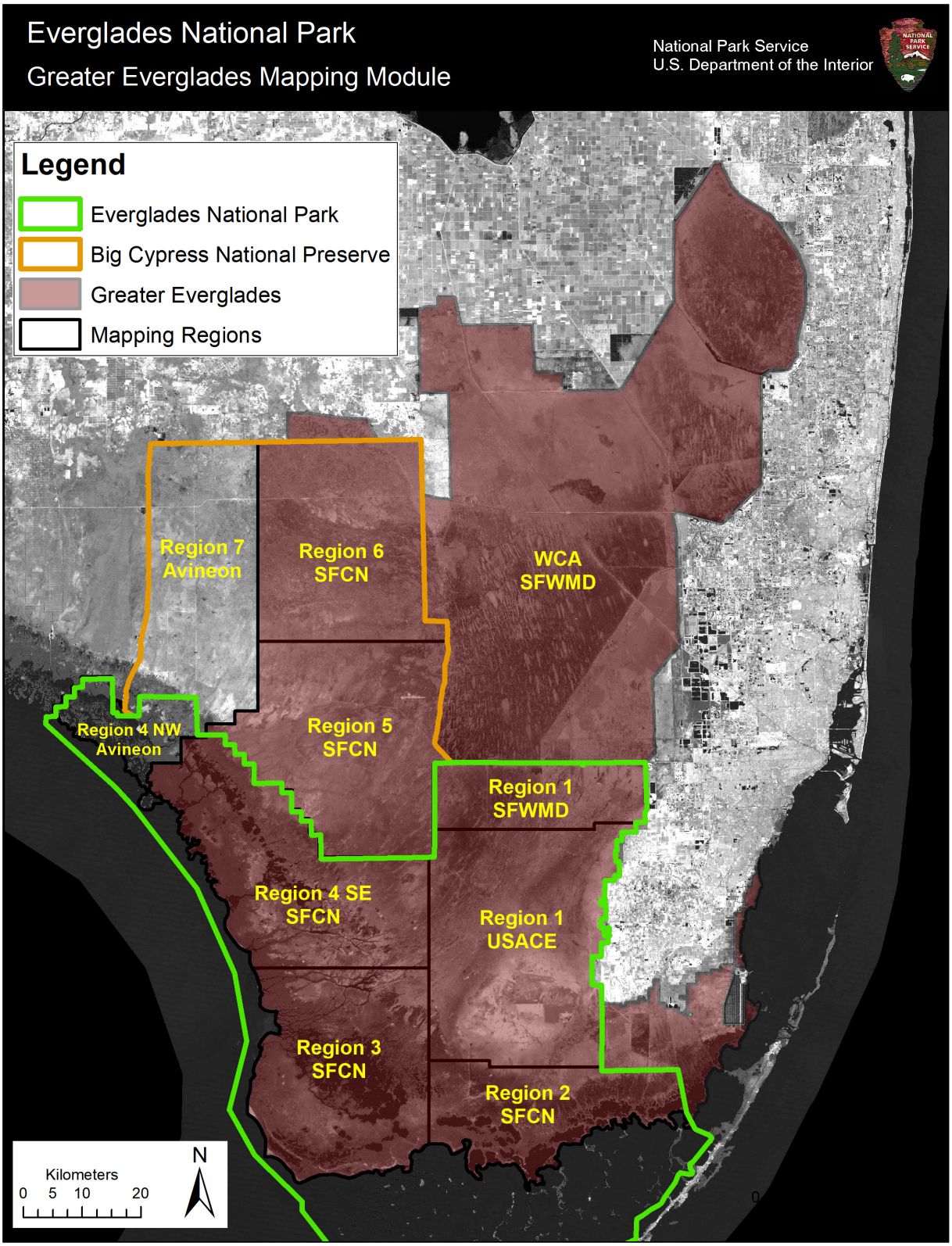


Figure 1. Greater Everglades mapping module and location of mapping regions within Everglades National Park and Big Cypress National Preserve. SFWMD = South Florida Water Management District; USACE = US Army Corps of Engineers; SFCN = South Florida Caribbean Network.

Comprehensive Everglades Restoration Plan

Title VI Sec 601 of the Water Resource Development Act (WRDA) of 2000 authorized the Comprehensive Everglades Restoration Plan (CERP) as the framework for the modifications and operational changes needed to restore, preserve, and protect the south Florida ecosystem (Water Resource Development Act 2000). As part of the CERP, Congress authorized the **RE**storation **CO**ordination and **VER**ification (RECOVER) program to: (1) organize and provide scientific and technical support to the interagency body of scientists and managers implementing the CERP, and (2) provide a mechanism, through the Monitoring and Assessment Plan (MAP), for assessing the performance of the CERP (RECOVER 2004). The goal of the CERP MAP is to have a system-wide monitoring and assessment plan that is supported and used by all CERP participants, including tribal nations, to track and measure system wide responses to the implementation of the CERP (RECOVER 2004).

The MAP consists of six monitoring modules designed to document and establish pre-restoration reference conditions for the Greater Everglades (GE) region, which includes EVER and Big Cypress National Preserve (Figure 1). Monitoring and Assessment Plan Module Number 3.1.3.4 specifically calls for the creation of a spatially and thematically accurate vegetation map of the entire GE project area that would serve, along with other metrics, as baseline conditions to assess the system-wide performance of the CERP over the next several decades (RECOVER 2004).

For more information regarding the CERP, please visit the Comprehensive Everglades Restoration Plan website.

The National Park Service Vegetation Mapping Inventory Program

The NPS VMI is a national program designed to classify, describe, and map the vegetation communities within all U.S. national park units except Alaska[3]. The NPS VMI program is designed to address the local management needs of each park unit and provide vegetation inventory data for regional and national level management decisions. This program sets guidelines by which all NPS vegetation mapping products must adhere. This ensures consistency throughout park units and that all VMI mapping projects meet Federal Geographic Data Committee (FGDC) standards on vegetation classification system, metadata, minimum mapping unit, spatial accuracy, and minimum acceptable map accuracy (Owens 1999; Studd et al. 2013).

The NPS Biological Resource Management Division located in Fort Collins, Colorado manages the VMI and maintains a collaborative partnership with the United States Geological Survey Center for Biological Informatics, which provides scientific and technical oversight (Owens 1999). Since its inception in 1992, the NPS VMI has overseen 185 NPS VMI mapping projects. All NPS VMI mapping products are expected to be completed by 2022. For more information regarding the NPS VMI program, please visit the NPS Vegetation Mapping Inventory website.

[3] National parks in Alaska are being mapped by the Alaska Landcover Inventory Program (https://www.nps.gov/subjects/aknatureandscience/aklandcover.htm).

Study Area

Everglades National Park

Everglades National Park is the third-largest national park within the contiguous United States, and the largest park east of the Mississippi River. Congress authorized the establishment of the park in 1934 to protect an ecosystem threatened by drainage, poaching, agricultural development, and urbanization. This was the first time that Congress authorized a national park for the protection of an ecosystem and its biological value, rather than a geographic or scenic feature.

Located on the southern tip of the Florida peninsula at about 2° north of the Tropic of Cancer (25.5° N Latitude), the climate of EVER is more similar to those of tropical regions than that of the continental United States (Duever et al. 1994). Mean daily temperatures range from 17–25°C (62.6–77°F) with average mean daily temperatures rarely falling below 10°C (50°F) during the winter months (Duever et al. 1994; Obeysekera et al. 1999). However, temperatures at or below freezing do occur. There is a well-defined rainy season, May through October, and a dry season, November through April. Rainfall during the summer rainy season typically accounts for nearly 60% of the annual rainfall, which ranges between 119–157 centimeters (46.8–61.8 inches [in]) per year (Duever et al. 1994).

Ground surface elevations within EVER range from at or below sea level near the coast, to 4.3 meters (14.1 ft) in interior forests and tree islands (Redwine et al. 2019). Vegetation communities are arranged along this narrow elevation gradient creating a patch mosaic of mangrove swamps, graminoid marshes and prairies, hammocks and pine woodlands, where elevational differences in millimeters not only determine inundation frequency and duration, but also the vegetation community type (Redwine et al. 2019).

Because of its geographic location, ~2° north of the Tropic of Cancer, and mild climate, EVER is home to a unique assemblage of both tropical and temperate species. It is home to about 400 species of birds, 800 species of vertebrates, several hundred species of vascular plants and fish; of which 202 are federally- or state-listed species (Patterson et al. 2008). The park is also the only place in the world where alligators (*Alligator mississippiensis*) and crocodiles (*Crocodylus acutus*) coexist (Mazzotti et al. 2009)

Many of the external pressures and challenges that prompted the creation of EVER are still present today. Management decisions and restoration efforts are tied to water quantity and quality issues. Additional stresses from invasive species like the Brazilian pepper (*Schinus terebinthifolius*), Old-world Climbing Fern (*Lygodium* sp.), and others, as well as climate change, sea-level rise, windstorms and hurricanes, and a host of other issues continue to challenge park managers and biologists

Methods

The vegetation map of EVER was sectioned into four mapping Regions (Figure 1). Region 1 was mapped by the SFWMD and USACE while Regions 2-4 where mapped by the SFCN. Individual regional reports are available from the USACE Jacksonville District office for Region 1 and from the NPS Integrated Resource Management Application (IRMA; https://irma.nps.gov/Portal/) data store for Regions 2-4:

Region 1 – Shark River Slough/Long Pine Key (report):
https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/16045

Region 2 – The Southeast Saline Everglades (report & geospatial data):
https://irma.nps.gov/Datastore/Reference/Profile/2243281

Region 3 – The Southwest Coastal Everglades (report & geospatial data):
https://irma.nps.gov/Datastore/Reference/Profile/2280044

Region 4 – The Northwest Coastal Everglades (report & geospatial data):
https://irma.nps.gov/DataStore/Reference/Profile/2280039

These individual reports provide more information regarding the methods, results, and accuracy assessment for each individual region. For instance, the image spectral channel assignment combinations used and how mean canopy height and cover were determined at each grid-cell differed slightly between the USACE/SFWMD and the NPS. Additionally, Region 4, the Northwest Coastal Everglades, consisted of two mapping sections: Region 4 NW, mapped by Avineon Inc., and Region 4 SE, mapped by SFCN. The integration of these two map products into one seamless map is described in the Region 4 report but not discussed in this document.

Imagery

The imagery used for this vegetation map, consists of 30 centimeters (11.8 inches) spatial resolution multispectral digital color-infrared imagery, procured by the SFWMD in April 2009. The imagery was acquired using a Microsoft-Vexcel UltraCam-X large format digital aerial camera, which provides high resolution multispectral images (red, green, blue, and near-infrared). Image acquisition occurred at an average flight altitude of 4,163 meters (13,658 ft or 2.6 mi) with an average forward overlap of 60% to allow for stereoscopic visualization and estimation of vegetation height through a digital photogrammetric workstation.

A network of 12 aerial targets deployed throughout EVER was used to verify the accuracy of the Airborne Global Positioning System (GPS) and Internal Measurement Unit onboard the aircraft collecting the 2009 imagery. The horizontal and vertical location of each target was determined by using 1-hour static GPS sessions and post-processing using National Geodetic Survey Opus Rapid Static procedures (https://www.ngs.noaa.gov/OPUS/about.jsp). In addition, for each image exposure location a real-time kinematic GPS (RTKGPS) observation was acquired. The location of the 12 static targets and the 2,106 RTKGPS image exposure locations were adjusted by the SFWMD using standard least-squares method (weighted average), where the locations of the aerial targets were

given weighted preference over the RTKGPS image exposure location measurements. Each target and image were referenced relative to the North American Datum (NAD) 1983 High Accuracy Reference Network, State Plane Coordinate System, Florida East Zone 901, and North American Vertical Datum of 1988 (NAVD88). A correlation analysis between the horizontal and vertical location of each aerial target and the imagery indicated that the horizontal and vertical accuracy of the image dataset met or exceeded FGDC standards for horizontal Second Order Class II (Root Mean Square Error [RMSE] of 0.445 m) and vertical Third Order (RMSE of 0.372 m) control points.

Photo-interpretation

This project employs a grid-based, 50 × 50-meter (164 × 164-ft.) grid (.25-hectare [.61-ac]) cell, majority rule mapping approach (Rutchey et al. 2008). In contrast to traditional vector mapping methods, where vegetation communities are delineated based on observable boundaries and a set minimum mapping unit (e.g., 10 square meters [107.76 sq ft] or 50 square meters [538.1 sq ft]), grid-based mapping relies on the determination of the dominant[4] (majority) community or land cover type present within each grid cell.

At each grid cell, photo-interpreters determine and classify the dominant vegetation community to species level, wherever possible, using the *Vegetation Classification System for South Florida Natural Areas* (Rutchey et al. 2006), as modified in Appendix A. Photo-interpreters additionally categorize the absolute cover of cattail (*Typha* sp.) and any exotic species present in each grid cell as either: Sparse (10–49%), Dominant (50–89%), or Monotypic (90–100%).

Grid-based mapping has significant advantages over the traditional vector mapping approach. For example, it: (1) reduces mapping cost on a per-area basis; (2) reduces photo-interpreter variability; and (3) produces vegetation maps with more landscape heterogeneity since the photo-interpreter must view and classify the dominant vegetation or land cover type within each cell individually and independently of its neighbors (Rutchey and Godin 2009). Grid-based maps are generally better suited for vegetation change analysis and complex map algebra than vector maps (Rutchey and Godin 2009) and provide a standardized method for spatial data collection at multiple scales (Ramsdale et al. 2017). However, because of the aggregative nature of the majority rule, dominant features tend to increase in overall abundance while smaller features tend to decrease in overall abundance becoming less common within the map (He et al. 2002). Consequently, if a grid cell contains two or more community types of nearly equal cover, the less abundant, rare community within the region is selected over a more common community type. For example, in Shark River Slough, American white waterlily (*Nymphaea odorata*) sloughs are less abundant than sawgrass (*Cladium jamaicense*) marshes or Gulf Coast spikerush (*Eleocharis cellulose*) sloughs. Thus, a split cell containing waterlily and another community type like sawgrass or Gulf Coast spikerush, having equal cover within the grid cell, is classified as waterlily to ensure this community is not underrepresented or missed entirely from the mapping product. Similarly, grid cells dominated by non-vegetative classes (e.g., water, mud, tidal flat, etc.) or invasive species (e.g., Australian pine

[4] The community with the greatest percent cover (majority) in the grid cell.

[*Casuarina equisetifolia*] or Brazilian pepper) with at least 40% (natural) vegetation cover are classified based on the natural vegetation class and not the dominant non-vegetative or invasive species class within the cell (invasive species are captured as a modifier class as described in the previous paragraph). Lastly, grid cells containing linear features like roads and canals are classified based on the vegetation community south of east-west running linear features (e.g., US Highway 41, Loop Road, and I-75 in Big Cypress) and to the east for linear features oriented north to south of the non-vegetative feature within the grid cell. This ensures consistency between neighboring grid cells and across the entire map.

Photogrammetric Workstation

Photo-interpreters utilized a digital photogrammetric workstation, running Summit Evolution v7.4, to analyze the 2009 4-band multispectral aerial imagery (Photo 1). Summit Evolution is a software package designed for viewing, capturing, and analyzing three-dimensional (3D) information from stereoscopic imagery. This photogrammetric software package integrates seamlessly with ESRI ArcGIS allowing for, but not limited to, the visualization of 3D data, vector data visualization and editing, and attribute population.

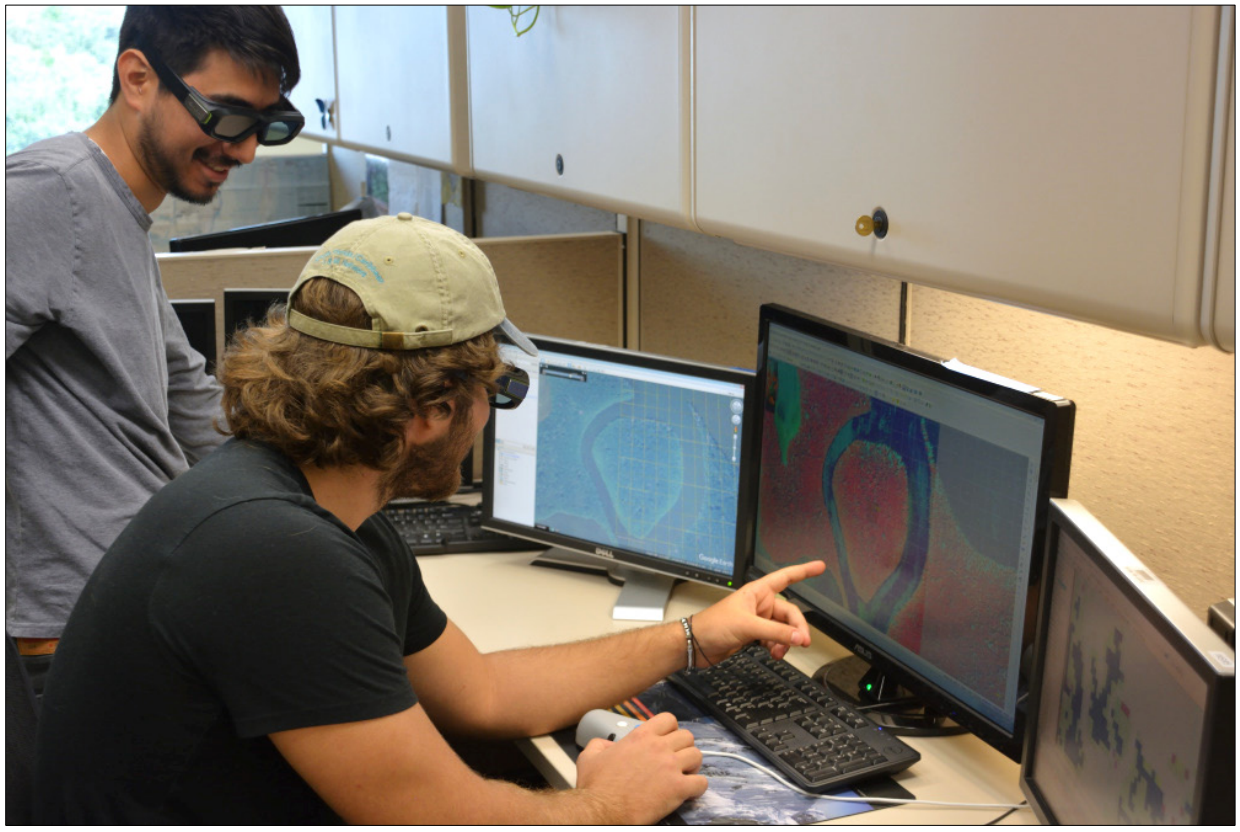


Photo 1. Photo-interpreters (Michael Foguer, left, and Alejandro Arteaga Garcia, right) working on a photogrammetric workstation.

Band Combinations

Photo-interpreters analyzed the spectral signature of each grid cell using one of 11 different customizable channel assignments in Summit Evolution (Table 1). Channel assignments 0, 1, 3, and 5, were the most frequently used to differentiate community types and species within each grid cell. For instance, channel assignment 0 (Natural Color), which used the Red, Green, and Blue spectral bands, was effective at indicating the presence of buttonwood (*Conocarpus erectus*) within a grid cell; channel assignment 3 was effective in the identification of Transitional Bayhead Swamp Forest or Transitional Bayhead Swamp Shrubland communities; and, channel assignment 5, consisting of the NIR, Blue, and Green spectral bands, excelled at identifying red mangrove (*Rhizophora mangle*) within a grid cell (Table 1).

Table 1. Designation of channel assignments and their corresponding spectral band (Red, Green, Blue, Near-Infrared [NIR]) combinations used on the Summit Evolution photogrammetric workstation to identify vegetation communities. Numbers in parentheses correspond to the Summit Evolution assigned image band number. Superscript (1) indicates channels used specifically by USACE/SFWMD.

Summit Channel Assignment	Band Combination
0[1]	Red(0), Green(1), Blue(2)
1[1]	NIR(3), Red(0), Green(1)
2	NIR(3), Green(1), Blue(2)
3	NIR(3), Red(0), Blue(2)
4	Red(0), NIR(3), Green(1)
5	NIR(3), Blue(2), Green(1)
6	Red(0), Blue(2), Red(0)
7[1]	Blue(2), Green(1), NIR(3)
8	NIR(3), Green(1), NIR(3)
9	Red(0), Blue(2), NIR(3)
10	NIR(3), Red(0), Red(0)

Vegetation Cover Estimation

Vegetation cover for each discrete community type present within a grid cell is determined by partitioning the photogrammetric workstation's cursor into 100 equal-sized squares, each 25 square meters (269 sq ft) or 1% of the entire 0.25-hectare (0.61-ac) grid cell. The parameters for the photogrammetric workstation cursor are set to: Grid size = 16.25; Columns = 11; and Rows = 11. This cursor arrangement allows photo-interpreters to count the total number of 25 square meter (269 sq ft) squares occupied by each discrete community type within each grid cell and determine the dominant/majority class present within the 0.25-hectare (0.61-ac) grid cell.

Canopy Height Estimation

The vegetation height of the dominant community type within each grid cell is determined by averaging the vegetation height at a minimum of 10 randomly located points for the dominant

community type within each grid cell. Additionally, the zoom factor on the photogrammetric workstation was set to 4x to ensure consistency in canopy height estimation by all photo-interpreters. Canopy height estimation of digital images is scale-dependent, due to the way the imagery is stored as hierarchical, low to high resolution, copies or image pyramids. Thus, using a lower (e.g., 2x or 1x) zoom factor could lead to a less precise estimate of canopy height since a lower resolution image pyramid would be used to estimate canopy height.

Vegetation Data Collection

The vegetation data collected on this project include Training Points (TP), Botanical Training (BT) points, Verification Points (VP), and Accuracy Assessment (AA) data points. A total of 7,997 TP, BT, and VP data points were collected to assist photo-interpreters (Figure 2). The AA points are discussed later in this document.

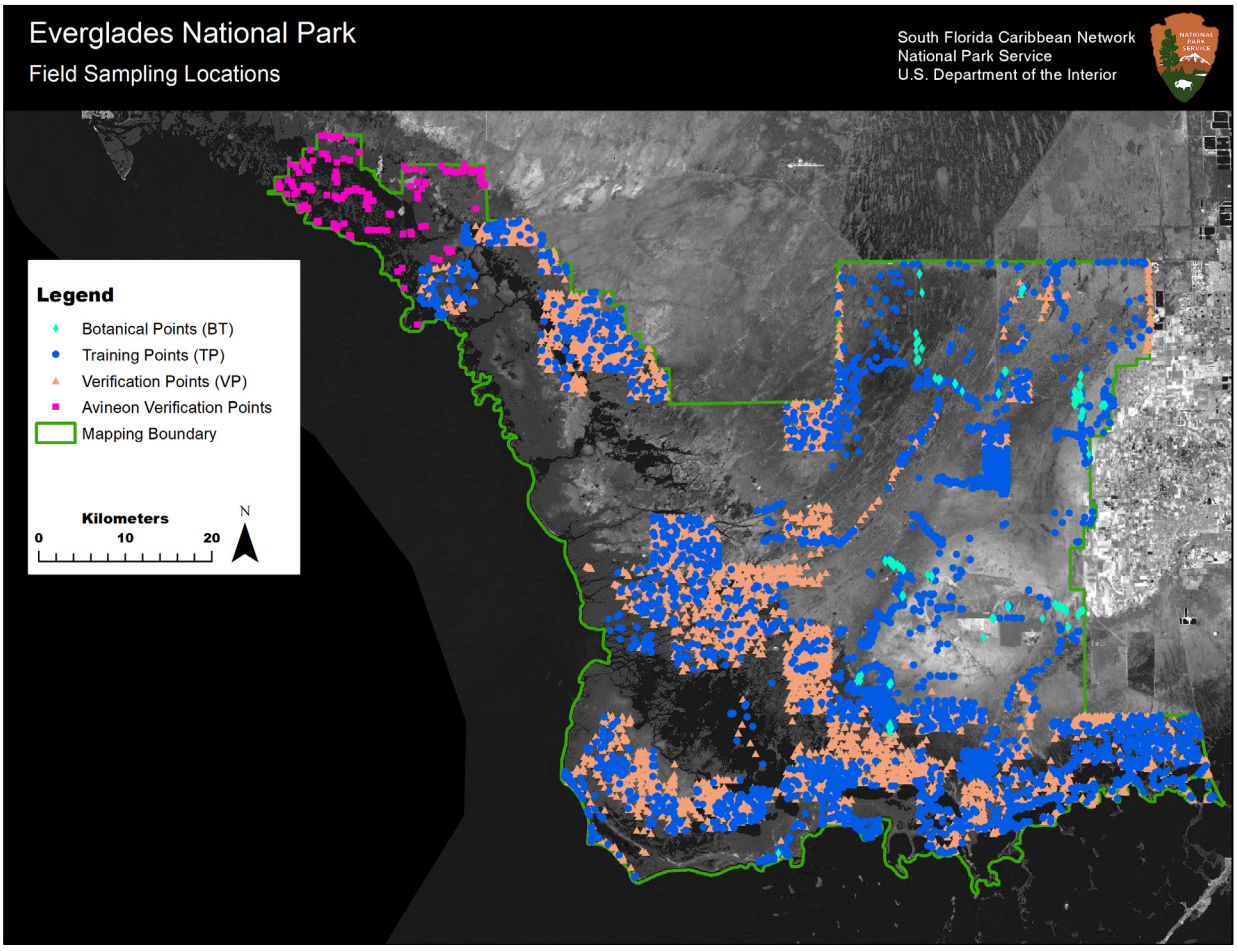


Figure 2. Location of Botanical Training Points (BT), Training Points (TP) and Verification Points (VP) collected within Everglades National Park to assist with photo-interpreter training and mapping.

The TP and BT data points provide species-specific compositional data and structural information. These two geospatial databases assist in the identification of the dominant community within each grid cell (TP points) or for botanical training (BT). In most cases, TP points characterize the

dominant community within each grid cell. In some instances, however, they represent plant communities smaller than the 0.25-hectare (0.61-ac) grid cell, e.g., patches of cattails, water lily, or other species-specific community type. Botanical training points are used to teach staff and photo-interpreters the flora and vegetation communities. These data points are intended to characterize community types that extended beyond a single grid-cell, e.g., Bayhead Forests, Sawgrass Marshes, Black Mangrove Forests, or Cypress Swamps, even though they typically represent units smaller than the 0.25-hectare (0.62-ac) mapping grid cell.

The data collection method for TP and the AA (see Accuracy Assessment section below) data points is identical. Field staff record data on a pre-printed datasheet showing an aerial image of the area being sampled (Figure 3). Data recorded includes visual estimation of canopy height and vegetation cover, the relative cover of each strata (Tree, Shrub, and Herb), the relative cover of the dominant species within each stratum, and the maximum canopy height for each stratum. In addition, digital oblique photos taken at each TP or AA site document the structure and characteristics of the area sampled.

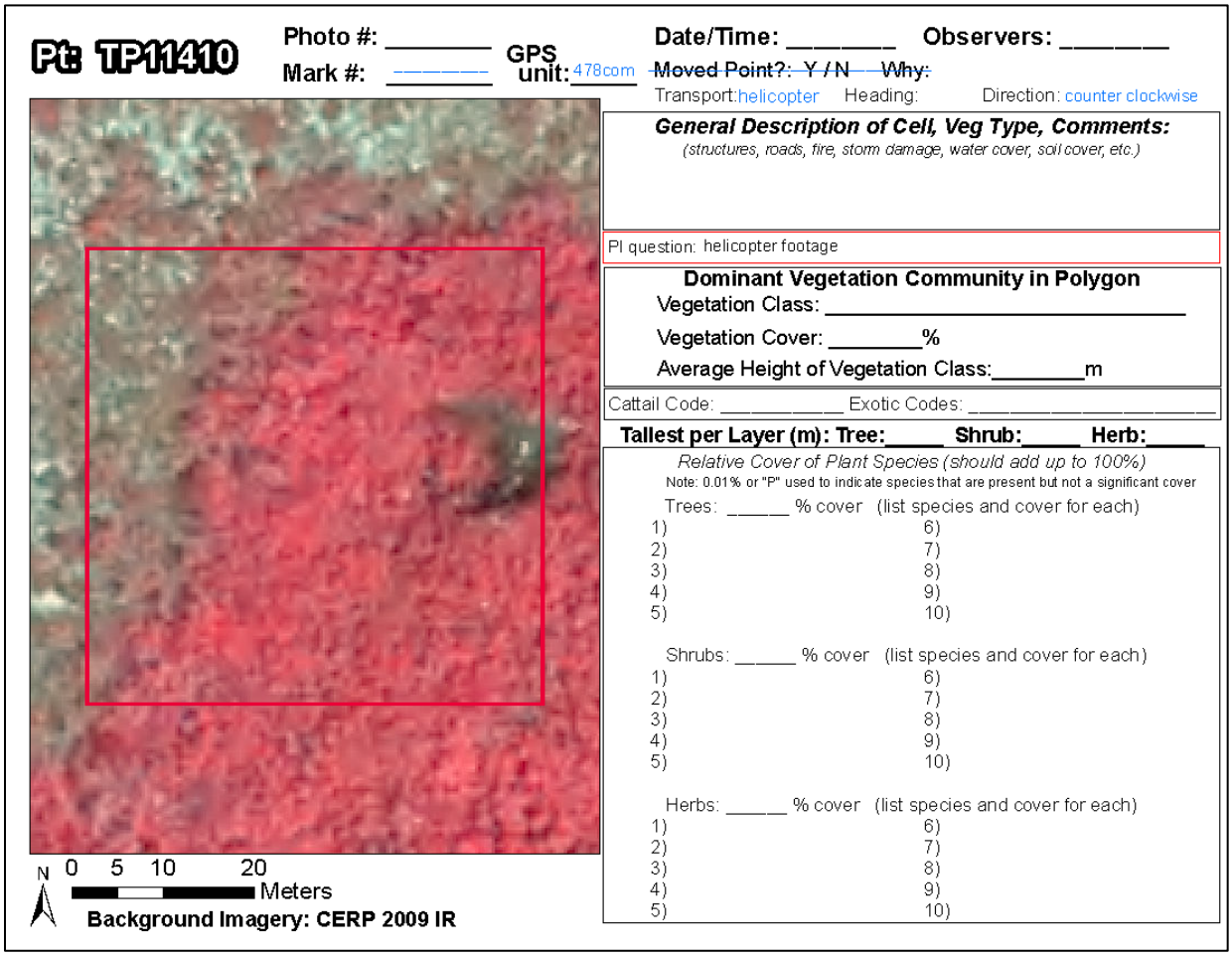


Figure 3. Example of a datasheet used to collect vegetation data on this project.

The other type of field data collected are VP Points. These points complement the TP data collection process and serve two purposes: (1) confirm a common, typically homogeneous, spectral signature within the landscape, e.g., Temperate Hardwood Hammock or Cypress Forest; and (2) document field observed vegetation information, e.g., clumps of Sand Cordgrass (*Spartina bakeri*) or Black-topped Sedge (*Schoenus nigricans*) within a contrasting vegetation type. Typically, structural and composition data is not collected. However, information about key species and canopy height are often recorded to assist photo-interpreters in recognizing species within the area of interest. The VP points are also used to document past disturbance history, invasive species presence, or any other natural phenomena encountered while conducting data collection missions. These data points take significantly less time to collect than TP points and significantly reduce the cost associated with data collection.

These data, including the AA data points, are stored in an ESRI ArcGIS personal geodatabase and are referenced to the Universal Transverse Mercator (UTM) Zone 17N, North American Datum of 1983 (NAD83).

Vegetation Classification System

The Vegetation Classification System for South Florida Natural Areas (VCSFNA) is a multi-tiered, hierarchical classification system developed specifically to map the natural areas occurring within the Greater Everglades (GE) restoration footprint, including the Florida Keys (Rutchey et al. 2006). Creation of the VCSFNA was a multi-year collaborative effort that included many of the top scientists, botanists, and experts in south Florida community ecology and botany. This classification system fills the gap in the level of detail and lack of specificity found within the U.S. National Vegetation Classification System when it comes to the classification of south Florida plant communities (Rutchey et al. 2006). The latest version of the VCSFNA is v6.10.09.

The VCSFNA is a living, dynamic document; open to modification as new classes or communities not listed in the classification system are observed in the field. For example, in version v2.1.07 several modifications to the classification system were made in response to field observations and data collected by Ross et al. (2006). Similarly, Ruiz et al. (2008) suggested the inclusion of 21 new classes to the classification system based on their observations while mapping Biscayne National Park. Since plant associations can be fluid combinations of many species, keeping the VCSFNA open to modification ensures that the classification system remains a useful and comparable way of recording plant assemblages over successive generations of vegetation mapping.

The classification system used in this project (Appendix A) is a derivative of the VCSFNA. It differs from its parent system in several ways:

1. The hierarchical pathways between levels were modified to help photo-interpreters consistently reach the same vegetation class and reduce photo-interpreter variability.
2. Several vegetation class definitions were modified to clarify meaning and to reflect regional differences in species composition.
3. Vegetation classes not occurring within the mapping area were removed, while region-specific observed and documented vegetation classes were added.

4. The vegetation classification key for invasive plant species was not included in this document because it includes all possible known invasive plant species present within South Florida.

The top of the classification system, **Level 1** (Class), provides the lowest level of detail about plant communities and is based on dominant physiognomy (physical structure) as follows:

- **Forest (F)**—Stands of trees (5 meters [16.4 ft] or taller) that are of high density (50–100% cover).
- **Woodland (W)**—Stands of trees (5 meters [16.4 ft] or taller) that are of low density (10–49% cover). Trees are evenly spaced out and often in a matrix of sparse shrubs, graminoids, and/or herbaceous vegetation.
- **Shrubland (S)**—Stands of shrubs (shorter than 5 meters [16.4 ft]) that are of high density (50–100% cover).
- **Scrub (C)**—Stands of shrubs (shorter than 5 meters [16.4 ft]) that are of low density (10–49% cover). Shrubs are evenly spaced out and often in a matrix of graminoids and/or herbaceous vegetation.
- **Marsh (M)**—Graminoid and/or herbaceous, emergent, or floating vegetation in shallow water that stands at or above the ground surface for much of the year. Prairie habitat is included in this class. A marsh can have low density (0–9%) tree and shrub cover.
- **Dune (D)**—Shrub, graminoid and/or herbaceous vegetation associated with a mound or ridge of sediment formed by wind and/or storm deposits.
- **Exotic (E)**—Non-native plant species assemblages.
- **Other (O)**—Anthropogenic or non-vegetative features.

At the next level, **Level 2** (Subclass), the physiognomically defined **Level 1** classification is modified with a hydrologic designation, e.g., Wetland Forest versus Upland Forest; this is a new modification to the classification system not present in v6.10.09. The next tier, **Level 3** (Group), replaces the hydrologically defined **Level 2** with a community designation based on additional physiognomic and environmental factors, e.g., Mangrove Forest, Swamp Forest, or Hardwood Hammock. At **Level 4** (Alliance), communities are defined based on the dominant diagnostic species in the upper most stratum, e.g., Black Mangrove Forest, Buttonwood Forest, or Live Oak Hammock. The remaining three levels of the classification system, **Level 5** (Sub alliance), **Level 6** (Association), and **Level 7** (Sub association), continue to subdivide the previous community types by dominant canopy species composition and the understory species assemblages; for example, a **Level 7** mixed-mangrove scrub community in a matrix of sawgrass would have the following nomenclature: Buttonwood-Red Mangrove Scrub-Sawgrass Marsh.

Taxonomic references in the classification system and this document utilize the Integrated Taxonomic Information System.

Quality Assurance and Accuracy Assessment

Classification errors are a reality in all mapping projects. They are typically caused by confusion associated with one or more of the following factors: the spectral and spatial resolution of the imagery, the spectral separability of the feature(s) or attribute(s) being classified, the classification system, or the skill set of the photo-interpreter team. In a large, complex project with multiple photo-interpreters, managing for errors is critically important to ensure the product meets expectations. Developing tools and techniques to help mitigate and reduce errors is an important aspect of this project.

Photo-interpreter Assessment

Photo-interpreter classification skills and their understanding of South Florida vegetation communities was assessed by having photo-interpreters classify five randomly distributed mapping clusters, consisting of 100 grid cells each, within each region. This procedure allowed for an evaluation of how well each photo-interpreter understands the mapping methodology as well as the vegetation communities within the region being mapped. It also facilitated an open discussion between all photo-interpreters, creating a peer-to-peer learning environment.

QA/QC of Mapped Products

Quality assurance and quality control (QA/QC) of photo-interpreter mapped products follows the protocol outlined in Rutchey et al. (2008). Two QA/QC photo-interpreters, supervised by the project manager, verified each grid cell in the stereo environment to ensure that no cell was misclassified due to clerical errors, majority rule determination including class exceptions, and that no artificial edges existed between photo-interpreter mapped products and previously checked areas. Mapping inconsistencies were addressed in an open discussion with all photo-interpreters to ensure that these types of errors would be minimized or eliminated in the future.

Accuracy Assessment

The thematic accuracy of the EVER vegetation map was assessed using 1,014 randomly selected grid cells across all four mapping regions. The AA points for Region 4 NW Avineon were collected in 2008 while the AA data for Regions 1-4 were collected between 2010 and 2013. However, the AA points for Region 4 NW were not used to determine the final accuracy of the comprehensive EVER vegetation map (see Ruiz et al. 2020). The AA data contains the same type of information collected in the TP and BT points discussed previously in this document (see Vegetation Data Collection section), thus its timely collection ensured that temporal vegetation change resulting from natural community succession or perturbation events, like fires and windstorms, would not affect final map accuracy.

The thematic accuracy of the final EVER vegetation map was calculated as the total number of AA points considered acceptable divided by the total number of AA points collected (1,014) within the mapping area (Figure 4). In addition, a 1-tailed 90% confidence level was calculated using Zar (1999; p. 527) to determine whether the overall map accuracy was equal to or greater than 80% with 90% confidence as required by the NPS Vegetation Mapping Inventory Program. The project manager, lead photo-interpreter, and the photo-interpreters working on the project did not have access to the AA data collected.

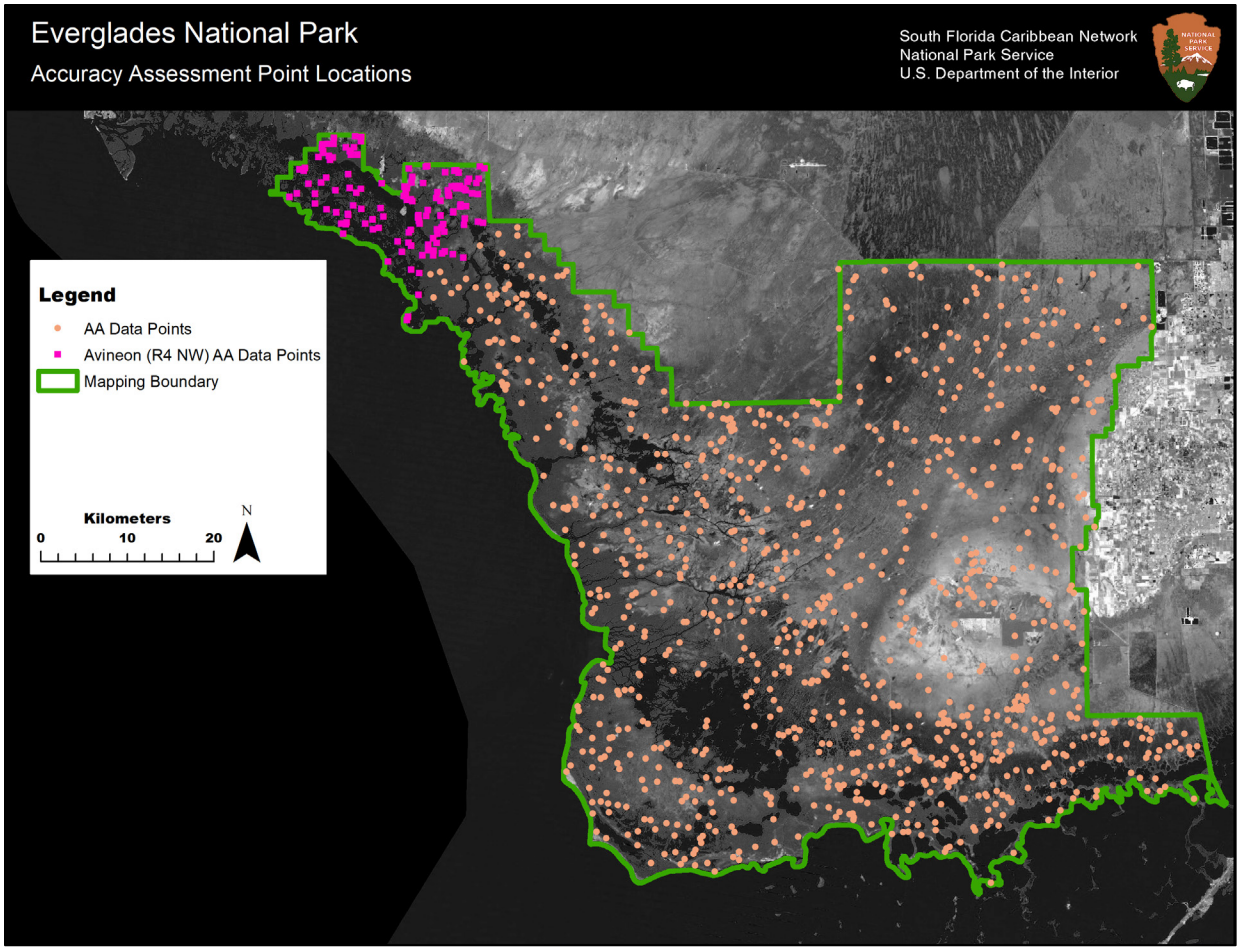


Figure 4. Location of all accuracy assessments (AA) points collected within Everglades National Park. The yellow AA data points were used to determine the accuracy of the Everglades National Park portion of the map not mapped by Avineon, Inc. The magenta-colored points are the AA points used to assess the accuracy of the Region 4 NW Avineon vegetation map (see Ruiz et al. 2020 for more detail).

Grid cells were accepted or rejected based on a thorough review of the AA data, including the photos collected. Acceptable AA points included: (1) those that had a one-to-one match between the vegetation class on the map and the field collected AA point data, and (2) those for which the vegetation class differed from the AA data set, but were considered acceptable because:

1. The vegetation map class was at a more detailed level than the AA classification, and the field notes supported the more detailed label as correct.
2. The AA data indicated that the vegetation label was at the boundary between two classes due to height or cover cutoff parameters, i.e., 5-meters (16.4-ft) height between Shrubland and Forest or 50% cover for Scrub and Shrubland. For example, if a Red Mangrove Shrubland was misclassified as a Red Mangrove Forest, the Red Mangrove Forest was accepted because the species composition was correct. This reasoning would apply to Forest versus Woodland that have a 50% cover cutoff, or Marsh versus Scrub that have a 10% woody cover cutoff, or for understory graminoid cover.

3. The class modifier for sawgrass, which includes short-dense, short-sparse, tall-dense, and tall-sparse, was misclassified due to cover or height cutoff parameters.
4. The discrepancy between the AA point and the vegetation map classification resulted from the presence of two co-dominant communities, split cell/majority-rule decision, within the grid-cell.

Integration of Regional Vegetation Maps

The final comprehensive vegetation map of EVER was created by combining all four Regional vegetation maps, Regions 1-4, of EVER into one product. However, since each map was produced somewhat independently of each other, the level of detail between maps differed. For example, in Region 1 the Woodland and Scrub classes were generally mapped to a very precise level of detail, Level 8 and 9, to account for the density and height of sawgrass when present. This level of detail was not incorporated in Regions 2, 3, and 4. Additionally, as each region was mapped, the classification system changed slightly to reflect new observed classes, discontinued classes, or renamed classes.

To account for these subtle differences and to standardize the final vegetation map of EVER, the following decisions/steps were taken:

1. All vegetation codes represented by nine or fewer grid-cells were reevaluated to determine if they could be reclassified into a different vegetation class.
2. All Region 1 Level 8 and Level 9 coded classes were reclassified to match the level of detail mapped for the same class in Regions 2-4.
3. All OATr (Road) coded grid-cells in Regions 1 and 2 were recoded to OAR (Road) to streamline the Anthropogenic class structure and match the designation used in the Region 4 vegetation map of EVER and eastern Big Cypress National Preserve vegetation map (Ruiz et al. 2019).
4. All OAR coded grid-cells were reevaluated to determine if they could be reclassified into a vegetation class.
5. All Sawgrass Prairie (MFGPc) and Muhly Prairie (MFGPm) coded grid-cells in Region 2 were reclassified to Graminoid Freshwater Prairie (MFGP). However, Black Sedge Prairie (MFGPh) was not changed since it was consistently mapped in all four regions within the EVER vegetation map and in the eastern Big Cypress National Preserve vegetation map (Ruiz et al. 2019).
6. All Grid-cells classified as Cypress Forest (FSt) in Regions 1 and 2 were reevaluated to see if they could be classified as either FStD (Cypress Dome) or FStS (Cypress Strand). Unchanged grid-cells were then re-coded to FStM (Cypress Forest-Monotypic) to match the Cypress Forest hierarchical structure in the classification system used in the Region 4 vegetation map of EVER (Ruiz et al. 2020) and in the eastern Big Cypress National Preserve vegetation map (Ruiz et al. 2019).

Results

Vegetation

The EVER vegetation map consists of 1,792,886 0.25-hectare (0.61-ac) grid-cells and is made up of 286 thematic classes (Figure 5). These thematic classes fell into six vegetative community types (Forests, Woodlands, Shrublands, Scrubs, Marshes, and Invasive Species) and a miscellaneous category (Other) that captures non-vegetative and anthropogenic classes.

The majority of classes, 264 out of 286 (91.9% of all the thematic classes), account for less than 1% each of the total area mapped, and combined for approximately 19.2% (74,088 hectares [183,075.4 ac]) of the terrestrial (non-open water) area mapped (Appendix B). The most common vegetative thematic classes are Short Sawgrass Marsh-Dense, Graminoid Freshwater Prairie, and Mixed Mangrove Forest-Mixed. These three classes account for over a third (37.2%) of the terrestrial area mapped (Appendix B). Water accounts for 13.8% of the entire mapping area (62,076.2 ha [153,388.3 ac]) and is the second most dominant thematic class on the map. Its area, however, is not included in the percentage calculations of the terrestrial thematic classes on the map.

Forests

Forested communities account for 18.0% (69,649 ha [172,100 ac]) of the terrestrial area mapped and are the second most dominant community types found within the mapping area. Forest types include Mangrove Forest, Swamp Forest, Cypress Forest, and Hardwood Hammocks (Table 2).

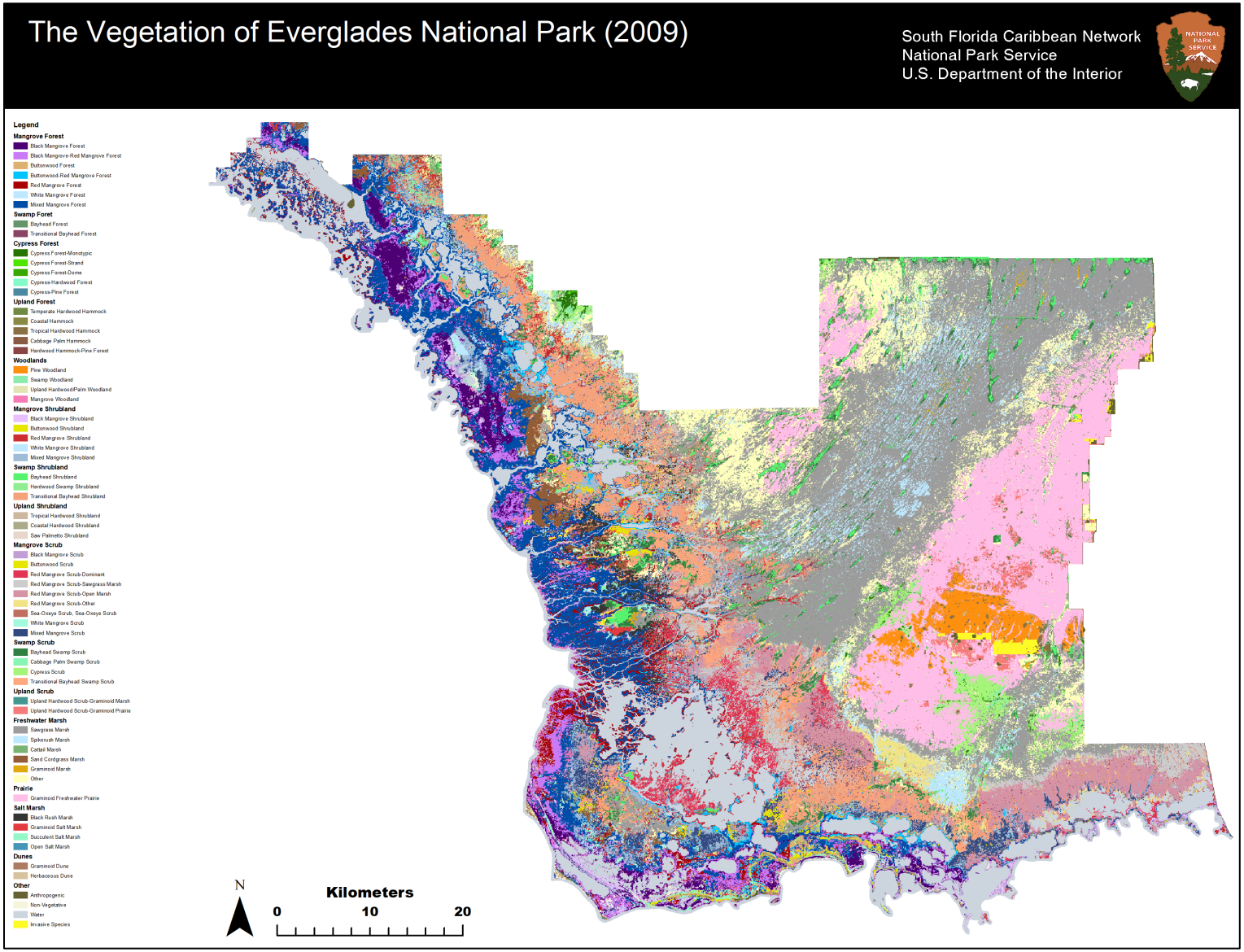


Figure 5. Vegetation map of Everglades National Park based on aerial imagery collected in 2009.

Table 2. Total area in hectares (ha) and acres (ac) and percent total area mapped of Forest communities in Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Hardwood Hammock	Hardwood Hammock Total	2,201	5,438	0.57%
	Buttonwood Hammock	283	699	0.07%
	Cabbage Palm Hammock	3	8	< 0.01%
	Coastal Dune Hammock	69	170	0.02%
	Coastal Hardwood Hammock	176	435	0.05%
	Fan Palm Hammock	11	26	< 0.01%
	Hardwood Hammock-Pine Forest	1	2	< 0.01%
	Temperate Hardwood Hammock	2	4	< 0.01%
	Tropical Hardwood Hammock	1,618	3,997	0.42%
	West Indian Mahogany Hammock	39	96	0.01%
Mangrove Forest	Mangrove Forest Total	62,720	154,978	16.24%
	Black Mangrove Forest	9,471	23,401	2.45%
	Black Mangrove-Buttonwood Forest	965	2,383	0.25%
	Black Mangrove-Red Mangrove Forest	9,684	23,928	2.51%
	Black Mangrove-White Mangrove Forest	1,411	3,486	0.37%
	Buttonwood Forest	1,213	2,997	0.31%
	Buttonwood-Red Mangrove Forest	2,883	7,123	0.75%
	Buttonwood-White Mangrove Forest	274	676	0.07%
	Mixed Mangrove Forest-Mixed	20,285	50,124	5.25%
	Red Mangrove Forest	7,298	18,032	1.89%
	White Mangrove Forest	807	1,994	0.21%
	White Mangrove-Red Mangrove Forest	8,432	20,835	2.18%
Swamp Forest	Swamp Forest Total	3,891	9,615	1.01%
	Bayhead Forest	1,339	3,309	0.35%
	Hardwood Swamp Forest	21	52	0.01%
	Paurotis Palm Forest	1	2	< 0.01%
	Pond Apple Forest	13	31	< 0.01%
	Transitional Bayhead Forest	2,517	6,219	0.65%
	Transitional Hardwood Swamp Forest	0.25	0.6	< 0.01%
Cypress Forest	Cypress Forest Total	837	2,069	0.22%
	Cypress Forest-Dome	93	229	0.02%
	Cypress Forest-Monotypic	675	1,667	0.17%
	Cypress Forest-Strand	21	53	0.01%
	Cypress-Hardwood Forest	46	114	0.01%
	Cypress-Pine Forest	3	6	< 0.01%
Forest Total	–	**69,649**	**17,2100**	**18.04%**

Mangrove Forests, consisting of 11 different community types, account for 16.2% (62,720 ha [154,978 ac]) of the terrestrial mapping area (Table 2). The dominant Mangrove Forest type is Mixed Mangrove Forest-Mixed, which accounts for 5.3% (20,285 ha [50,124 ac]) of the terrestrial area mapped (Table 2). This community is followed by Black Mangrove Forest (2.5%), Black Mangrove-Red Mangrove Forest (2.5%), White Mangrove-Red Mangrove Forest (2.2%), and Red Mangrove Forest (1.9%). These five mangrove forest communities account for 88.3% of the total Mangrove Forest area mapped.

Swamp Forests consists of six community types: Bayhead Forest; Hardwood Swamp Forest; Paurotis Palm Forest; Pond Apple Forest; Transitional Bayhead Forest; and Transitional Hardwood Swamp Forest (Table 2). These six community types account for 1.0% (3,891 ha [9,615 ac]) of the total terrestrial area mapped (Table 2). The dominant Swamp Forest community type within the mapping area is Transitional Bayhead Forest (0.7% of the terrestrial area mapped; Table 2).

Cypress Forests, a subcategory of Swamp Forests, account for 0.2% (837 ha [2,069 ac]) of the terrestrial area mapped (Table 2). Cypress Forests consist of: Cypress Strands; Domes; Monotypic Stands (pure stands of Cypress trees that don't fall under the category of Dome or Strands); Cypress-Hardwood Forest; and Cypress-Pine Forests (Table 2).

The last forest type, Hardwood Hammock Forests, account for 0.6% (2,201 ha [5,48 ac]) of the terrestrial area mapped and consists of nine community types, with the Tropical Hardwood Hammock community being the most abundant with an overall areal extent of 1,618 ha (3.997 ac, Table 2).

Woodlands

Woodland communities account for only 2.3% (8,902 hectares [21,997 ac]) of the total terrestrial area mapped. They consist of Mangrove Woodlands, Pine Woodlands, Swamp Woodlands, and Upland Hardwood/Palm Woodlands (Table 3). Pine Woodlands, consisting primarily of Pine Rocklands (5,571 ha, [14,211 ac]) are the dominant Woodland community type mapped (Table 3). Mangrove Woodlands are the most divers with 25 discrete classes (Table 2). However, they account for only 0.5% (1,905 ha [4,708 ac]) of the total area mapped (Table 3).

Table 3. Total area in hectares (ha) and acres (ac) and percent total area mapped of Woodland communities in Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Mangrove Woodland	**Mangrove Woodland Total**	**1,905**	**4,708**	**0.49%**
	Black Mangrove Woodland-Graminoid Marsh	253	626	0.07%
	Black Mangrove Woodland-Open Marsh	232	573	0.06%
	Black Mangrove Woodland-Succulent Marsh	479	1,183	0.12%
	Black Mangrove-Buttonwood Woodland-Graminoid Marsh	38	93	0.01%
	Black Mangrove-Buttonwood Woodland-Herbaceous Marsh	2	4	< 0.01%
	Black Mangrove-Buttonwood Woodland-Succulent Marsh	38	94	0.01%
	Black Mangrove-Red Mangrove Woodland-Graminoid Marsh	66	162	0.02%
	Black Mangrove-Red Mangrove Woodland-Open	255	630	0.07%
	Black Mangrove-Red Mangrove Woodland-Succulent Marsh	80	197	0.02%
	Black Mangrove-White Mangrove Woodland-Graminoid Marsh	67	165	0.02%
	Black Mangrove-White Mangrove Woodland-Succulent Marsh	7	18	< 0.01%
	Buttonwood Woodland-Graminoid Marsh	16	38	< 0.01%
	Buttonwood Woodland-Open Marsh	7	18	< 0.01%
	Buttonwood Woodland-Succulent Marsh	85	209	0.02%
	Buttonwood-Reg Mangrove Woodland-Succulent Marsh	4	11	< 0.01%
	Mixed Mangrove Woodland-Mixed-Graminoid Marsh	27	67	0.01%
	Mixed Mangrove Woodland-Mixed-Open Marsh	21	51	0.01%
	Mixed Mangrove Woodland-Mixed-Succulent Marsh	19	46	< 0.01%
	Red Mangrove Woodland-Graminoid Marsh	18	45	< 0.01%
	Red Mangrove Woodland-Open Marsh	139	342	0.04%
	Red Mangrove Woodland-Succulent Marsh	20	49	0.01%
	White Mangrove Woodland-Graminoid Marsh	8	19	< 0.01%
	White Mangrove Woodland-Open Marsh	6	15	< 0.01%
	White Mangrove-Red Mangrove Woodland-Graminoid Marsh	20	48	0.01%
	White Mangrove-Red Mangrove Woodland-Open Marsh	2	4	< 0.01%

Table 3 (continued). Total area in hectares (ha) and acres (ac) and percent total area mapped of Woodland communities in Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Pine Woodland	**Pine Woodland Total**	**5,758**	**14,227**	**1.49%**
	Pine Flatwoods-Shrubs	2	5	< 0.01%
	Pine Lowland-Graminoid	1	1	< 0.01%
	Pine Lowland-Mixed	1	3	< 0.01%
	Pine Lowland-Shrubs	3	7	< 0.01%
	Pine Rockland-Graminoids	591	1,460	0.15%
	Pine Rockland-Mixed	1,690	4,177	0.44%
	Pine Rockland-Saw Palmetto	42	104	0.01%
	Pine Rockland-Shrubs	3,428	8,470	0.89%
Swamp Woodland	**Swamp Woodland Total**	**428**	**1,058**	**0.11%**
	Cabbage Palm Lowland-Graminoid Marsh	8	20	< 0.01%
	Cabbage Palm Lowland-Mixed	204	505	0.05%
	Cabbage Palm Lowland-Shrubs	216	532	0.06%
Cypress Woodland	**Cypress Woodland Total**	**712**	**1,759**	**0.18%**
	Cypress Woodland-Graminoid Marsh	240	592	0.06%
	Cypress Woodland-Graminoid Prairie	269	664	0.07%
	Cypress Woodland-Mixed	44	108	0.01%
	Cypress Woodland-Mixed Graminoid Marsh	42	103	0.01%
	Cypress Woodland-Sawgrass Marsh	65	160	0.02%
	Cypress Woodland-Shrubs	50	124	0.01%
	Cypress-Pine Woodland-Graminoid	3	6	< 0.01%
	Cypress-Pine Woodland-Mixed	1	1	< 0.01%
Upland Hardwood/Palm Woodland	**Upland Hardwood/Palm Woodland Total**	**99**	**245**	**0.03%**
	Cabbage Palm Upland-Graminoid Prairie	53	130	0.01%
	Coastal Hardwood Woodland	18	44	< 0.01%
	Tropical Hardwood Woodland	29	72	0.01%
Woodland Total	–	**8,902**	**21,997**	**2.31%**

Shrublands

Shrublands account for 12.8% (49,307 hectares [121,835 ac]) of the total terrestrial and consist of Coastal Hardwood Shrublands, Mangrove Shrublands, Saw Palmetto Shrublands, Swamp Shrublands, and Tropical Hardwood Shrublands (Table 4). Swamp Shrublands are the dominant Shrubland community type found in EVER (Table 4). They account for 6.7% (26,038 ha [64,338 ac]) of the total area mapped. The dominant Swamp Shrubland community is Transitional Bayhead Shrubland—a shrubland community consisting of a mix of mangrove and bayhead species (Table 4). This community accounts for 5.2% (20,175 ha [49,851 ac]) of the total area mapped (Table 4).

Mangrove Shrublands are the second dominant Shrubland community type mapped. They account for 5.9% (22,631 ha [55,920 ac]) of the area mapped and consist of 12 discrete community types (Table 4). The dominant Mangrove Shrubland community is Buttonwood-Red Mangrove Shrubland followed by Red Mangrove Shrubland (Table 4).

Table 4. Total area in hectares (ha) and acres (ac) and percent total area of Shrublands within Everglades National Park.

Community	Community Type	Area (ha)	Area (Ac)	% Area
Coastal Hardwood Shrubland	**Coastal Hardwood Shrubland Total**	**99**	**245**	**0.03%**
Mangrove Shrubland	**Mangrove Shrubland Total**	**22,631**	**55,920**	**5.86%**
	Black Mangrove Shrubland	1,726	4,265	0.45%
	Black Mangrove-Buttonwood Shrubland	338	835	0.09%
	Black Mangrove-Red Mangrove Shrubland	385	951	0.10%
	Black Mangrove-White Mangrove Shrubland	786	1,941	0.20%
	Buttonwood Shrubland	850	2,100	0.22%
	Buttonwood-Red Mangrove Shrubland	6,124	15,133	1.59%
	Buttonwood-White Mangrove Shrubland	613	1,515	0.16%
	Mixed Mangrove Shrubland-Mixed	2,699	6,669	0.70%
	Red Mangrove Shrubland	5,403	13,350	1.40%
	Red Mangrove-Cocoplum Shrubland	1	3	< 0.01%
	White Mangrove Shrubland	834	2061	0.22%
	White Mangrove-Red Mangrove Shrubland	2,872	7096	0.74%
Saw Palmetto Shrubland	**Saw Palmetto Shrubland Total**	**4**	**9**	**< 0.01%**
Swamp Shrubland	**Swamp Shrubland Total**	**26,038**	**64,338**	**6.74%**
	Bayhead Shrubland	4,174	10,314	1.08%
	Buttonbush Shrubland	4	9	< 0.01%
	Cocoplum Shrubland	187	463	0.05%
	Dahoon Holly Shrubland	16	38	< 0.01%
	Falsewillow Shrubland	1	2	< 0.01%
	Hardwood Swamp Shrubland	12	28	< 0.01%
	Pond Apple Shrubland	18	44	< 0.01%
	Transitional Bayhead Shrubland	20,175	49,851	5.22%
	Wax Myrtle Shrubland	9	22	< 0.01%
	Willow Shrubland	1,443	3,565	0.37%
Tropical Hardwood Shrubland	**Tropical Hardwood Shrubland Total**	**536**	**1,323**	**0.14%**
	Tropical Hardwood Shrubland	536	1,323	0.14%
Shrubland Total	**–**	**49,307**	**121,835**	**12.77%**

Scrub and Dunes

Scrub and Dune communities account for 17.8% (68,751 hectares [169,881 ac]) of the total terrestrial area mapped and consist of six different Scrub communities: Cabbage Palm Upland Scrub, Coastal Hardwood Scrub, Mangrove Scrub, Swamp Scrub, Cypress Scrub, Saw Palmetto Scrub, and Upland Hardwood Scrub; and two Dune communities: Graminoid Dune and Herbaceous Dune (Table 5).

Table 5. Total area in hectares (ha) and acres (ac) and percent total area of Scrub and Dune communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Cabbage Palm Upland Scrub	**Cabbage Palm Upland Scrub Total**	**43**	**106**	**0.01%**
Coastal Hardwood Scrub	**Coastal Hardwood Scrub Total**	**86**	**212**	**0.02%**
Mangrove Scrub	**Mangrove Scrub Total**	**45,720**	**112,971**	**11.84%**
	Black Mangrove Scrub-Black Rush Marsh	1	3	< 0.01%
	Black Mangrove Scrub-Dominant	6	15	< 0.01%
	Black Mangrove Scrub-Graminoid Marsh	31	77	0.01%
	Black Mangrove Scrub-Herbaceous Marsh	3	8	< 0.01%
	Black Mangrove Scrub-Open Marsh	501	1,239	0.13%
	Black Mangrove Scrub-Succulent Marsh	1251	3,090	0.32%
	Black Mangrove-Buttonwood Scrub-Dominant	2	5	< 0.01%
	Black Mangrove-Buttonwood Scrub-Graminoid Marsh	6	14	< 0.01%
	Black Mangrove-Buttonwood Scrub-Open Marsh	4	9	< 0.01%
	Black Mangrove-Buttonwood Scrub-Saltgrass Marsh	3	6	< 0.01%
	Black Mangrove-Buttonwood Scrub-Succulent Marsh	111	274	0.03%
	Black Mangrove-Red Mangrove Scrub-Dominant	28	69	0.01%
	Black Mangrove-Red Mangrove Scrub-Graminoid Marsh	18	44	< 0.01%
	Black Mangrove-Red Mangrove Scrub-Open Marsh	247	610	0.06%
	Black Mangrove-Red Mangrove Scrub-Saltgrass Marsh	4	10	< 0.01%
	Black Mangrove-Red Mangrove Scrub-Sawgrass Marsh	2	6	< 0.01%
	Black Mangrove-Red Mangrove Scrub-Succulent Marsh	29	72	0.01%

Table 5 (continued). Total area in hectares (ha) and acres (ac) and percent total area of Scrub and Dune communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Mangrove Scrub (continued)	Black Mangrove-White Mangrove Scrub-Cordgrass Marsh	21	52	0.01%
	Black Mangrove-White Mangrove Scrub-Dominant	4	11	< 0.01%
	Black Mangrove-White Mangrove Scrub-Open Marsh	122	301	0.03%
	Black Mangrove-White Mangrove Scrub-Saltgrass Marsh	90	222	0.02%
	Black Mangrove-White Mangrove Scrub-Succulent Marsh	80	198	0.02%
	Buttonwood Scrub-Black Rush Marsh	201	497	0.05%
	Buttonwood Scrub-Cordgrass Marsh	130	320	0.03%
	Buttonwood Scrub-Dominant	2	6	< 0.01%
	Buttonwood Scrub-Fimbry Marsh	1	1	< 0.01%
	Buttonwood Scrub-Open Marsh	8	20	< 0.01%
	Buttonwood Scrub-Saltgrass Marsh	70	173	0.02%
	Buttonwood Scrub-Sawgrass Marsh	747	1,845	0.19%
	Buttonwood Scrub-Spikerush Marsh	33	80	0.01%
	Buttonwood Scrub-Succulent	182	450	0.05%
	Buttonwood-Red Mangrove Scrub-Black Rush Marsh	214	528	0.06%
	Buttonwood-Red Mangrove Scrub-Cordgrass Marsh	270	667	0.07%
	Buttonwood-Red Mangrove Scrub-Dominant	244	602	0.06%
	Buttonwood-Red Mangrove Scrub-Graminoid Marsh	17	42	< 0.01%
	Buttonwood-Red Mangrove Scrub-Kissimmee Grass Marsh	14	33	< 0.01%
	Buttonwood-Red Mangrove Scrub-Open Marsh	1,499	3,703	0.39%
	Buttonwood-Red Mangrove Scrub-Saltgrass Marsh	117	289	0.03%
	Buttonwood-Red Mangrove Scrub-Sawgrass Marsh	2,625	6,486	0.68%
	Buttonwood-Red Mangrove Scrub-Spikerush Marsh	105	259	0.03%
	Buttonwood-Red Mangrove Scrub-Succulent Marsh	5	12	< 0.01%

Table 5 (continued). Total area in hectares (ha) and acres (ac) and percent total area of Scrub and Dune communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Mangrove Scrub (continued)	Buttonwood-White Mangrove Scrub-Black Rush Marsh	41	102	0.01%
	Buttonwood-White Mangrove Scrub-Cordgrass Marsh	142	350	0.04%
	Buttonwood-White Mangrove Scrub-Dominant	18	44	< 0.01%
	Buttonwood-White Mangrove Scrub-Kissimmee Grass Marsh	4	9	< 0.01%
	Buttonwood-White Mangrove Scrub-Saltgrass Marsh	42	104	0.01%
	Buttonwood-White Mangrove Scrub-Sawgrass Marsh	66	162	0.02%
	Buttonwood-White Mangrove Scrub-Succulent Marsh	10	24	< 0.01%
	Mixed Mangrove Scrub-Mixed-Black Rush Marsh	26	64	0.01%
	Mixed Mangrove Scrub-Mixed-Cordgrass Marsh	50	124	0.01%
	Mixed Mangrove Scrub-Mixed-Dominant	15	37	< 0.01%
	Mixed Mangrove Scrub-Mixed-Graminoid Marsh	3	7	< 0.01%
	Mixed Mangrove Scrub-Mixed-Open Marsh	44	107	0.01%
	Mixed Mangrove Scrub-Mixed-Saltgrass Marsh	55	135	0.01%
	Mixed Mangrove Scrub-Mixed-Sawgrass Marsh	44	108	0.01%
	Mixed Mangrove Scrub-Mixed-Succulent Marsh	9	22	< 0.01%
	Red Mangrove Scrub-Black Rush Marsh	536	1,325	0.14%
	Red Mangrove Scrub-Cattail Marsh	149	369	0.04%
	Red Mangrove Scrub-Cordgrass Marsh	70	172	0.02%
	Red Mangrove Scrub-Dominant	4,596	11,357	1.19%
	Red Mangrove Scrub-Mixed Graminoid Marsh	2	4	< 0.01%
	Red Mangrove Scrub-Open Marsh	16,354	40,411	4.24%
	Red Mangrove Scrub-Saltgrass Marsh	39	96	0.01%
	Red Mangrove Scrub-Sawgrass Marsh	8,481	20,957	2.20%
	Red Mangrove Scrub-Spikerush Marsh	4,292	10,606	1.11%
	Red Mangrove Scrub-Succulent Marsh	10	23	< 0.01%
	Sea-Oxeye Scrub	1	1	< 0.01%

Table 5 (continued). Total area in hectares (ha) and acres (ac) and percent total area of Scrub and Dune communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Mangrove Scrub (continued)	White Mangrove Scrub-Black Rush Marsh	220	544	0.06%
	White Mangrove Scrub-Cordgrass Marsh	374	924	0.10%
	White Mangrove Scrub-Dominant	42	104	0.01%
	White Mangrove Scrub-Open Marsh	101	248	0.03%
	White Mangrove Scrub-Saltgrass Marsh	132	325	0.03%
	White Mangrove Scrub-Sawgrass Marsh	155	383	0.04%
	White Mangrove Scrub-Succulent Marsh	114	282	0.03%
	White Mangrove-Red Mangrove Scrub-Black Rush Marsh	189	468	0.05%
	White Mangrove-Red Mangrove Scrub-Cattail Marsh	1	1	< 0.01%
	White Mangrove-Red Mangrove Scrub-Cordgrass Marsh	90	223	0.02%
	White Mangrove-Red Mangrove Scrub-Dominant	19	47	< 0.01%
	White Mangrove-Red Mangrove Scrub-Open Marsh	15	36	< 0.01%
	White Mangrove-Red Mangrove Scrub-Saltgrass Marsh	6	15	< 0.01%
	White Mangrove-Red Mangrove Scrub-Sawgrass Marsh	117	288	0.03%
	White Mangrove-Red Mangrove Scrub-Succulent Marsh	5	13	< 0.01%
Swamp Scrub	**Swamp Scrub Total**	**14,756**	**36,461**	**3.82%**
	Bayhead Swamp Scrub-Black Rush Marsh	21	51	0.01%
	Bayhead Swamp Scrub-Cattail Marsh	30	73	0.01%
	Bayhead Swamp Scrub-Cordgrass Marsh	33	82	0.01%
	Bayhead Swamp Scrub-Herbaceous Marsh	25	62	0.01%
	Bayhead Swamp Scrub-Mixed Graminoid Marsh	30	74	0.01%
	Bayhead Swamp Scrub-Sawgrass Marsh	4,878	12,053	1.26%
	Bayhead Swamp Scrub-Spikerush Marsh	13	33	< 0.01%
	Buttonbush Scrub-Mixed Graminoid Marsh	1	3	< 0.01%
	Buttonbush Scrub-Sawgrass Marsh	74	182	0.02%
	Cabbage Palm Swamp Scrub-Sawgrass Marsh	116	287	0.03%
	Dahoon Holly Scrub-Mixed Graminoid Marsh	44	109	0.01%
	Falsewillow Scrub-Herbaceous Marsh	6	14	< 0.01%

Table 5 (continued). Total area in hectares (ha) and acres (ac) and percent total area of Scrub and Dune communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Swamp Scrub (continued)	Falsewillow Scrub-Mixed Graminoid Marsh	1	2	< 0.01%
	Falsewillow Scrub-Sawgrass Marsh	2	5	< 0.01%
	Pond Apple Scrub-Beakrush Marsh	10	25	< 0.01%
	Pond Apple Scrub-Mixed Graminoid Marsh	6	14	< 0.01%
	Pond Apple Scrub-Sawgrass Marsh	59	145	0.02%
	Transitional Bayhead Swamp Scrub-Black Rush Marsh	179	443	0.05%
	Transitional Bayhead Swamp Scrub-Cordgrass Marsh	91	225	0.02%
	Transitional Bayhead Swamp Scrub-Open Marsh	67	164	0.02%
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh	7,575	18,718	1.96%
	Transitional Bayhead Swamp Scrub-Spikerush Marsh	38	93	0.01%
	Wax Myrtle Scrub-Cattail Marsh	1	3	< 0.01%
	Wax Myrtle Scrub-Graminoid Prairie	3	8	< 0.01%
	Wax Myrtle Scrub-Herbaceous Marsh	0	1	< 0.01%
	Wax Myrtle Scrub-Sawgrass Marsh	33	81	0.01%
	Willow Scrub-Cattail Marsh	180	444	0.05%
	Willow Scrub-Common Reed Marsh	1	2	< 0.01%
	Willow Scrub-Emergent Marsh	1	3	< 0.01%
	Willow Scrub-Herbaceous Marsh	3	7	< 0.01%
	Willow Scrub-Mixed Graminoid Marsh	56	139	0.01%
	Willow Scrub-Sand Cordgrass Marsh	4	9	< 0.01%
	Willow Scrub-Sawgrass Marsh	1,176	2,905	0.30%
	Willow Scrub-Spikerush Marsh	0	1	< 0.01%
Cypress Scrub	**Cypress Scrub Total**	**5,069**	**12,525**	**1.31%**
	Cypress Scrub-Beakrush Marsh	1	3	< 0.01%
	Cypress Scrub-Cattail Marsh	1	1	< 0.01%
	Cypress Scrub-Graminoid Marsh	83	205	0.02%
	Cypress Scrub-Graminoid Prairie	2,350	5,806	0.61%
	Cypress Scrub-Mixed Graminoid Marsh	617	1,523	0.16%
	Cypress Scrub-Sawgrass Marsh	1,964	4,852	0.51%
	Cypress Scrub-Spikerush Marsh	38	93	0.01%
	Cypress-Hardwood Scrub-Graminoid Prairie	12	30	< 0.01%
	Cypress-Hardwood Scrub-Sawgrass Marsh	4	11	< 0.01%

Table 5 (continued). Total area in hectares (ha) and acres (ac) and percent total area of Scrub and Dune communities within Everglades National Park.

Saw Palmetto Scrub	**Saw Palmetto Scrub Total**	**38**	**94**	**0.01%**
Upland Hardwood Scrub	**Upland Hardwood Scrub Total**	**2,949**	**7,286**	**0.76%**
	Upland Hardwood Scrub-Graminoid Prairie	2,930	7,239	0.76%
	Upland Hardwood Scrub-Sawgrass Marsh	19	46	< 0.01%
Graminoid Dune	**Graminoid Dune Total**	**90**	**222**	**0.02%**
Herbaceous Dune	**Herbaceous Dune Total**	**2**	**4**	**< 0.01%**
Scrub & Dune Total	–	**68,751**	**169,881**	**17.80%**

Mangrove Scrubs are the dominant and most diverse Scrub communities (Table 5). They consist of 82 different community types, of which Red Mangrove Scrub-Open Marsh is the dominant type (4.24%, 16,354 ha [40,411 ac]). The combination of the 10 subclasses of Red Mangrove Scrub mapped (e.g., Red Mangrove Scrub-Sawgrass, Red Mangrove Spikerush Marsh, etc.,) account for about 9% (34,529 ha [85,321 ac]) of the terrestrial area mapped (Table 5). Swamp Scrub communities are the second most dominant scrub communities mapped (Table 5). They account for 5.1% of the map and consist of 34 broadleaf dominated communities and nine needleleaf (Cypress) dominated communities. Of these, the Transitional Bayhead Swamp Scrub-Sawgrass Marsh class, a scrub community consisting of a mix of mangroves and bayhead species with sawgrass, is the overall dominant Swamp Scrub community mapped.

Several upland scrub communities are represented on the map as well. However, they account for < 1.0% of the total terrestrial area mapped (Table 5). The Dune communities mapped, Graminoid Dune and Herbaceous Dune, are a minor component of the landscape; only accounting for about 0.02% of the terrestrial mapped area (Table 5).

Marshes

Marsh communities account for 48% (186,511 ha [460, 961 ac]) of the map and consist of ten discrete types: Broadleaf Emergent Marsh, Floating Emergent Marsh, Graminoid Freshwater Marsh, Graminoid Freshwater Prairie, Herbaceous Freshwater Marsh, Mixed Graminoid-Broadleaf Freshwater Marsh, Open Freshwater Marsh, Graminoid Salt Marsh, Open Salt Marsh, and Succulent Salt Marsh (Table 6). Graminoid Freshwater Marshes are the dominant marsh communities mapped (Table 6). They account for 34% (132,607 ha [327,666 ac]) of the total terrestrial area map and consist of 16 different community types (Table 6). Of these, Short Sawgrass marsh (Sparse and Dense) accounts for 20% (77,738 ha [192,087 ac]) of the marsh area mapped and is the dominant marsh community (Table 6). Mixed Graminoid Freshwater Marsh (5%) is the second most common marsh type mapped followed Spikerush Marsh (3.4%) and Tall Sawgrass Marsh Dense (2.3%, Table 6). Salt Marsh communities consisting of Graminoid Salt Marsh, Open Salt Marsh, and Succulent Salt Marsh account for 1.4% of the terrestrial area mapped with Black Rush Marsh being the dominant Graminoid Salt Marsh community mapped (Table 6).

Table 6. Total area in hectares (ha), acres (ac), and percent total area of Marsh communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Broadleaf Emergent Marsh	**Broadleaf Emergent Marsh Total**	**14**	**35**	**< 0.01%**
	Arrowhead Marsh	5	12	< 0.01%
	Broadleaf Emergent Marsh	9	23	< 0.01%
Floating Emergent Marsh	**Floating Emergent Marsh Total**	**199**	**490**	**0.05%**
	Spatterdock	10	25	< 0.01%
	Waterlily Marsh	188	465	0.05%
Graminoid Freshwater Marsh	**Graminoid Freshwater Marsh Total**	**132,607**	**327,666**	**34.34%**
	Beakrush Marsh	427	1,056	0.11%
	Cattail Marsh	624	1,543	0.16%
	Common Reed Marsh	17	41	< 0.01%
	Kissimmee Grass Marsh	21	51	0.01%
	Mixed Graminoid Freshwater Marsh	19,562	48,336	5.07%
	Panicgrass Marsh	1	3	< 0.01%
	Sand Cordgrass Marsh	4,022	9,938	1.04%
	Sawgrass-Beakrush Marsh	5,895	14,565	1.53%
	Sawgrass-Black Rush Marsh	674	1,665	0.17%
	Sawgrass-Cattail Marsh	1,148	2,837	0.30%
	Sawgrass-Sand Cordgrass Marsh	633	1,564	0.16%
	Short Sawgrass Marsh-Dense	75,956	187,683	19.67%
	Short Sawgrass Marsh-Sparse	1,782	4,403	0.46%
	Spikerush Marsh	13,045	32,233	3.38%
	Tall Sawgrass Marsh-Dense	8,759	21,643	2.27%
	Tall Sawgrass Marsh-Sparse	43	107	0.01%
Graminoid Freshwater Prairie	**Graminoid Freshwater Prairie Total**	**47,979**	**118,553**	**12.42%**
	Graminoid Freshwater Prairie	47,599	117,614	12.33%
	Black Sedge Prairie	380	939	0.10%
Herbaceous Freshwater Marsh	**Herbaceous Freshwater Marsh Total**	**71**	**175**	**0.02%**
Mixed Graminoid-Broadleaf Freshwater Marsh	**Mixed Graminoid-Broadleaf Freshwater Marsh Total**	**48**	**119**	**0.01%**
Open Freshwater Marsh	**Open Freshwater Marsh Total**	**380**	**938**	**0.10%**

Table 6 (continued). Total area in hectares (ha), acres (ac), and percent total area of Marsh communities within Everglades National Park.

Community	Community Type	Area (ha)	Area (ac)	% Area
Graminoid Salt Marsh	**Graminoid Salt Marsh Total**	**4,215**	**10,414**	**1.09%**
	Black Rush Marsh	3,219	7,955	0.83%
	Black Rush-Sand Cordgrass Marsh	41	102	0.01%
	Graminoid Salt Marsh	7	18	< 0.01%
	Mixed Graminoid Salt Marsh	289	713	0.07%
	Saltgrass Marsh	503	1,242	0.13%
	Saltgrass-Sand Cordgrass Marsh	156	384	0.04%
Open Salt Marsh	**Open Salt Marsh Total**	**48**	**119**	**0.01%**
Succulent Salt Marsh	**Succulent Salt Marsh Total**	**992**	**2,451**	**0.26%**
Marsh Total	–	**186,551**	**460,961**	**48.31%**

A total of 624 ha (1,543 ac) of Cattail Marsh was mapped as the dominant community (Table 6). However, 11,440 ha (28,268 ac) were found to contain cattail in densities greater than 10% (Table 7). Cattail was found throughout EVER in coastal and interior marshes (Figure 6). When present, cattail densities were generally below 50% (10,651 ha [26,319 ac]), with Region 3 (Southwest Coastal Everglades) having the lowest overall coverage of cattail regardless of density (362 ha, Table 7). Densities exceeding 50% occurred in about 7% (789 ha [1,950 ac]) of the area mapped with more than half occurring in Region 4 (Table 7).

Table 7. Total area (ha) of cattail (Typha spp.) by cover class in Everglades National Park.

	Area (ha) of Cattail by Cover Class Percentage			
Region	Sparse (10-50%)	Dominant (50-89%)	Monotypic (>89%)	Total Area (ha)
1	4,369	278	11	4,658
2	433	5	1	438
3	347	13	2	362
4	5,503	420	61	5,983
Total	10,651	715	75	11,440

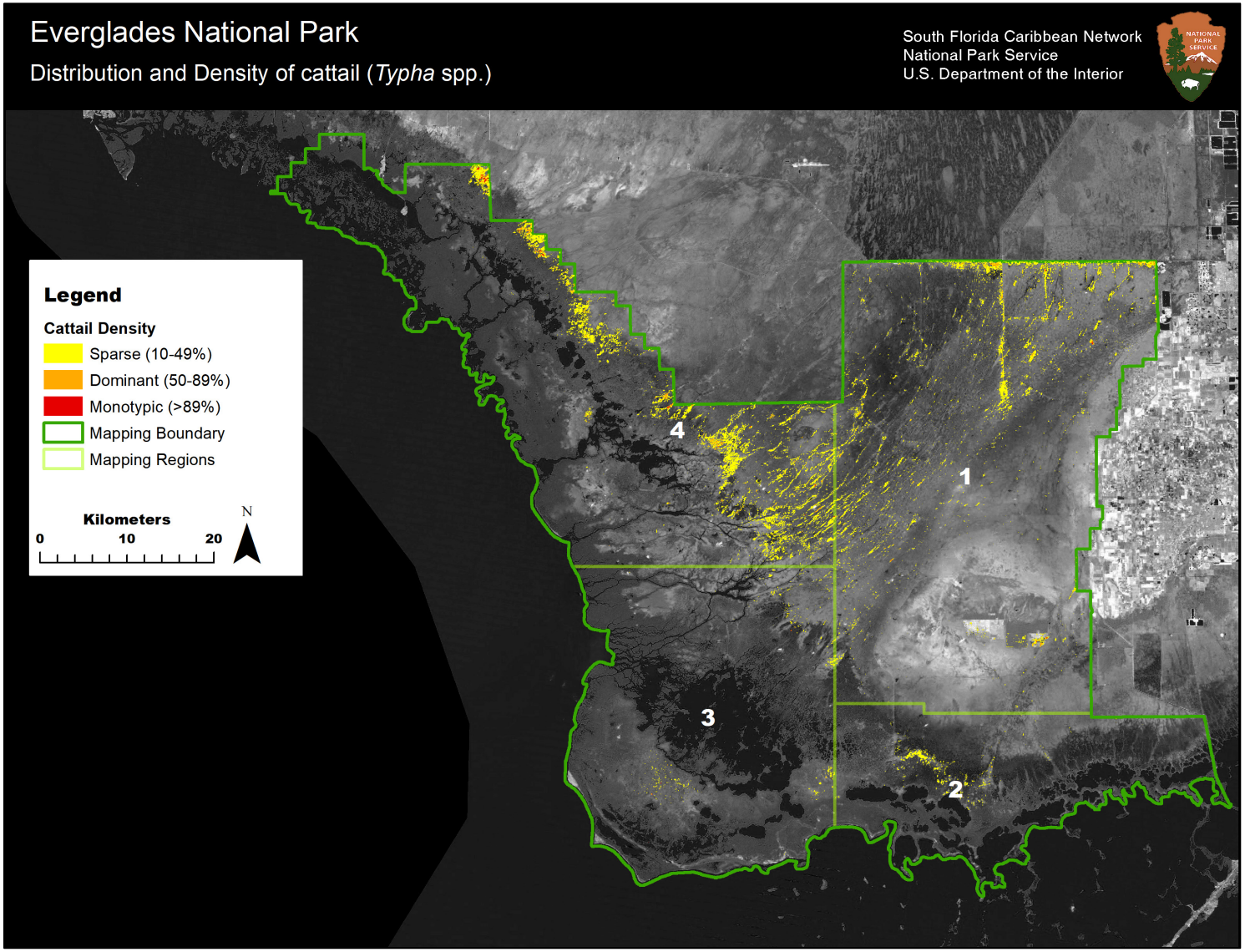


Figure 6. Distribution and density of cattail (Typha spp.) by cover classes within Everglades National Park in 2009.

Invasive Species

Several invasive species were found throughout the mapping area (Table 8). The number of hectares infested by non-native species ranged from < 1.0 ha (< 2.45 ac) for Java Plum (*Syzygium cumini*) to nearly 14,000 ha (34,595 ac) for Brazilian pepper (*Schinus terebinthifolia*, Table 8); the latter having the widest distribution and infestation of all the invasive species detected (Figure 7). Brazilian pepper was mostly found along the banks of rivers and creeks, and in the interior coastal marshes and shrublands within the Northwest Coastal Everglades (Region 4, Figure 7). Its infestation was generally below 50% (11,897 ha [29,398 ac], Table 8). However, infestations greater than 50% were documented (Figure 7). This higher infestation was generally associated with the Hole-in-the-Donut restoration area within Shark River Slough/Long Pine Key (Region 1)[5]. Melaleuca (*Melaleuca quinquenervia*) was the second most dominant invasive species detected, with a total areal coverage of 542 ha (1,339 ac, Table 8). The distribution of Melaleuca is limited to the NE boundary of Shark River Slough/Long Pine Key (Region 1, Figure 8). Its infestation was generally below 50% (484 ha [1,196 ac]). However, about 60 ha (148 ac) were found to have an infestation greater than 50% (Table 7). Australian Pine (*Casuarina* spp.) was found in Shark River Slough/Long Pine Key (Region 1) and in the Southeast Saline Everglades (Region 2, Figure 9). The infestation of Australian pine was generally below 50% (195 ha [482 ac]) with only 33 ha (82 ac) having infestation greater than 50% (Table 7). Old-world climbing fern (*Lygodium* spp.) was difficult to detect on the 2009 aerial imagery. However, the field data collected, TP and VP data points, indicate that Old-world climbing fern is common along the interior coastal marshes of the Southwest Coastal Everglades (Regions 3) and the Northwest Coastal Everglades (Region 4, Figure 10). In most instance Old-world climbing fern was found with an infestation between 10 and 50% (Table 8) and intermixed with sawgrass or overtopping tree islands. Old-world climbing fern is also present, in trace amounts (<10%), within the tree islands of Shark River Slough in Region 1. Similarly, Shoebutton Ardisia (*Ardisia elliptica)* was difficult to detect because of its occurrence within the understory of forested communities. As a result, its reported infestation of four hectares is likely an underestimate of its true infestation (Table 8). Giant grasses, consisting primarily of *Neyraudia* spp. and *Pennisetum* spp., were detected along the northeast boundary of Region 1. These invasive grasses, associated with abandon agriculture fields and previously disturbed areas with the park's boundary, have a total infestation of 212 ha (524 ac, Table 8)

[5] Most of the area documented as being infested with Brazilian pepper (*S. terebinthifolia)* in the Hole-in-the-Donut in the 2009 imagery has been cleared.

Table 8. Infestation density for mapped invasive species in Everglades National Park.

Species	Infestation Density (ha)			
	Sparse (10-49%)	Dominant (50-89%)	Monotypic (>89%)	Total Infestation Density (ha)
Ardisia elliptica	4	0	0	4
Casuarina ssp.	195	30	3	228
Lygodium spp.	20	0	0	20
Melaleuca quinquenervia	484	37	22	542
Schinus terebinthifolia	11,897	1,849	84	13,830
Syzygium cumini	0.25	0	0	0.25
Neyraudia spp. & *Pennisetum* spp.	145	58	9	212

Anthropogenic and Non-vegetative Classes (Other)

Anthropogenic and Non-vegetative classes account for 0.4% of the total mapping area (Table 9). Anthropogenic features like roads, buildings, campgrounds, etc., account for 0.24% of the entire mapped area while Non-Vegetative classes like Salt Flats, Beaches, Tidal Flats, and Soil account 0.14% of the map area.

Table 9. Total area in hectares (ha) and acres (ac) and percent total area mapped of Anthropogenic and Non-Vegetative classes in Everglades National Park.

Class	Class Type	Area (ha)	Area (ac)	% Area
Anthropogenic	**Anthropogenic Total**	**914**	**2,257**	**0.24%**
	Agriculture	59	146	0.02%
	Anthropogenic	537	1,326	0.14%
	Campground	55	136	0.01%
	Canal	44	109	0.01%
	Levee	94	231	0.02%
	Road	64	157	0.02%
	Spoil	62	153	0.02%
Non-Vegetative	**Non-Vegetative Total**	**544**	**1,343**	**0.14%**
	Barren Salt Flat	105	258	0.03%
	Beach	48	119	0.01%
	Soil	190	470	0.05%
	Tidal Flat	201	495	0.05%
Other Total	–	**1,457**	**3,600**	**0.38%**

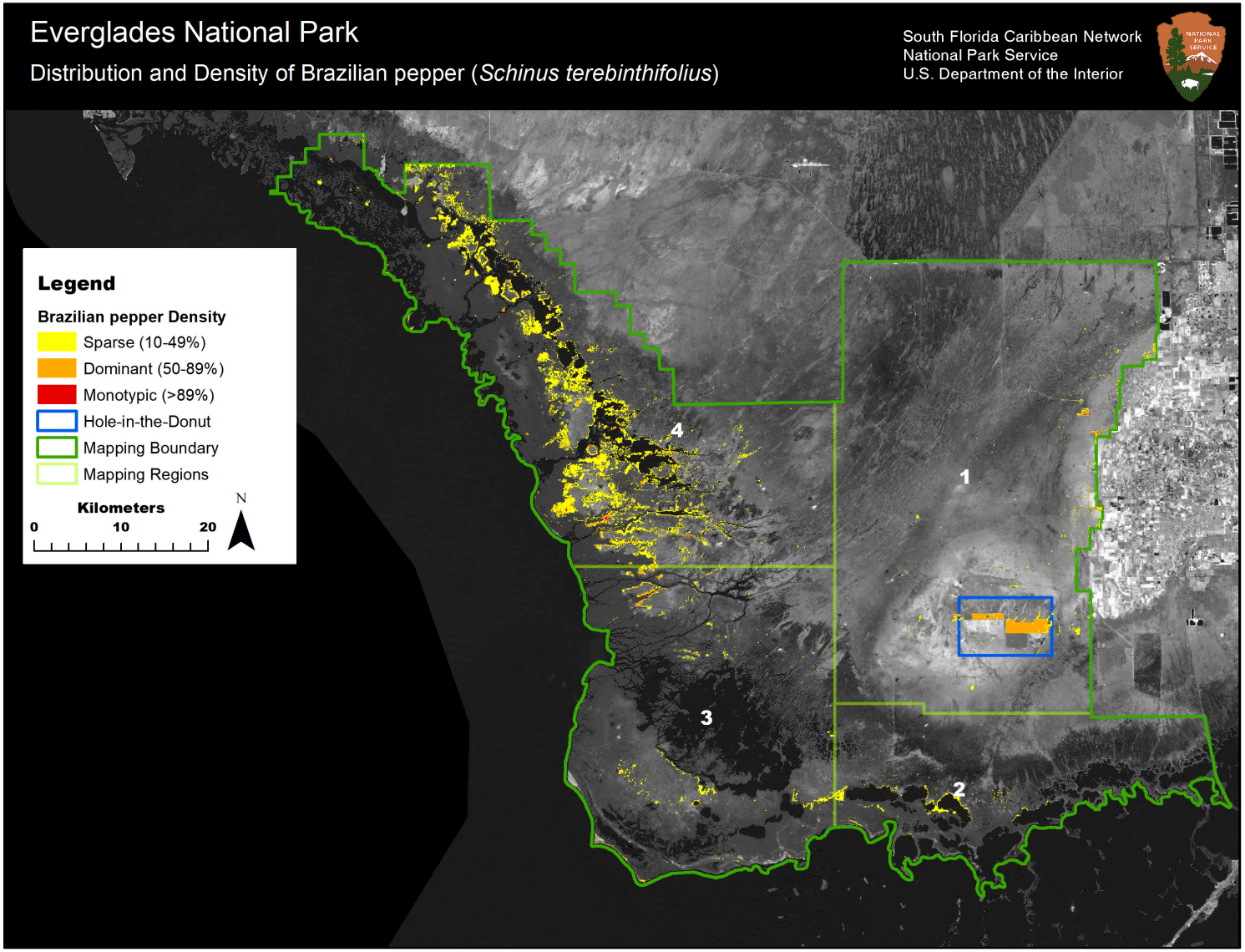


Figure 7. Distribution and density of Brazilian pepper (*Schinus terebinthifolius*) in 2009 for Everglades National Park. As of this report, most of the Brazilian pepper found within the Hole-in-the-Donut (blue box) has been treated and removed.

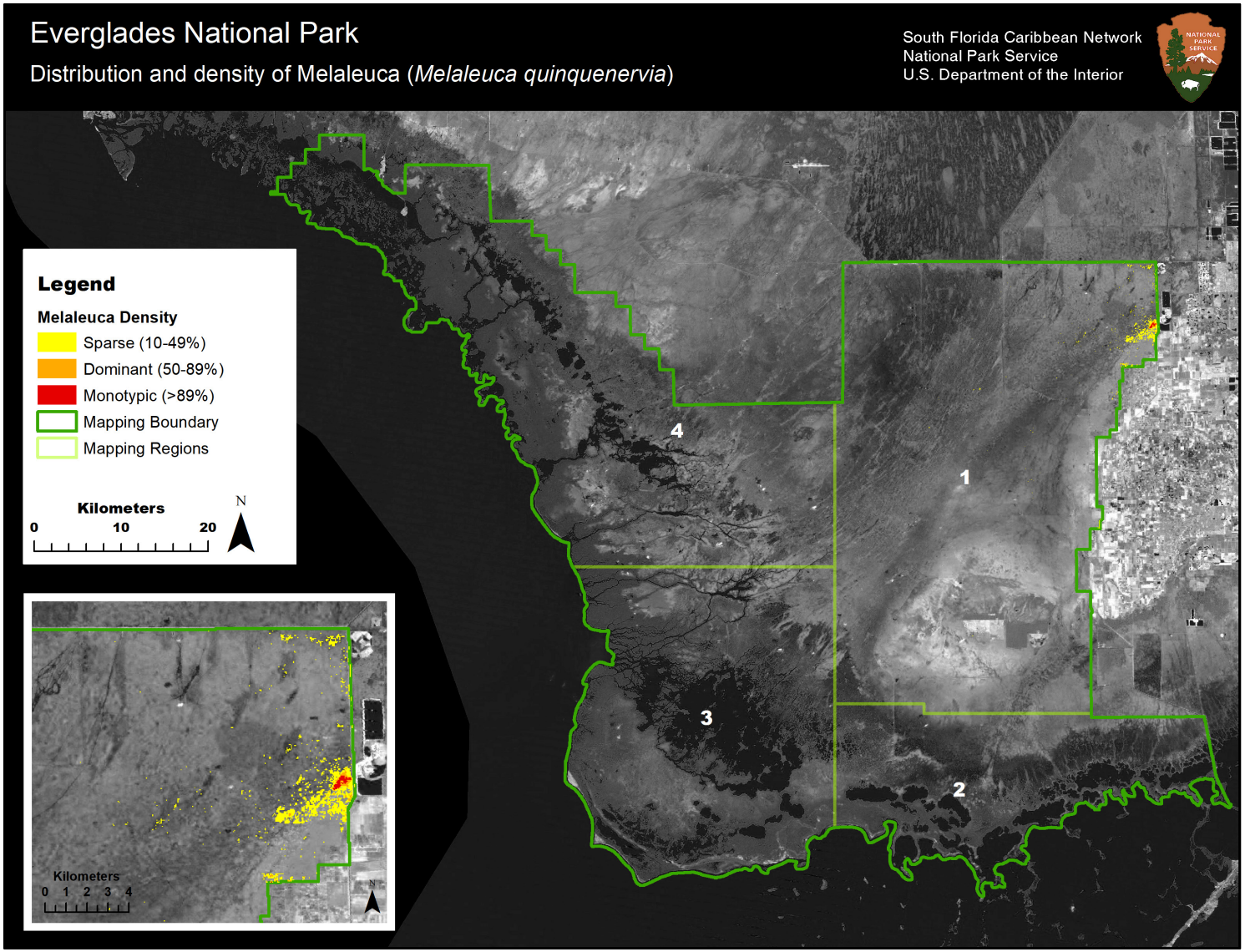


Figure 8. Distribution and density of Melaleuca (*Melaleuca quinquenervia*) in 2009 for Everglades National Park. The distribution of Melaleuca is limited to the northeastern boundary of the park in Region 1, Shark River Slough/Long Pine Key (lower left map inset).

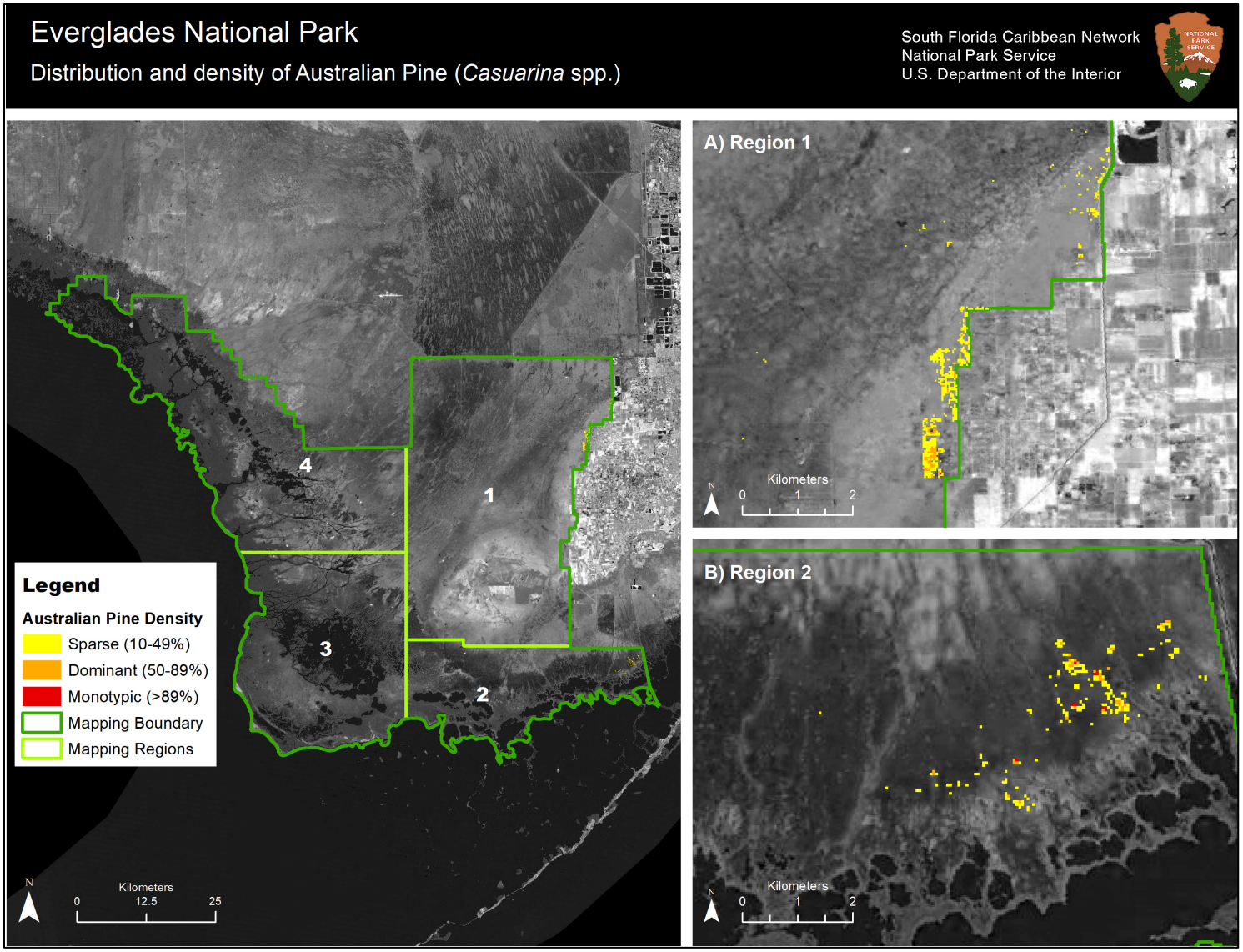


Figure 9. Distribution and density of Australian Pine (Casuarina spp.) in 2009 for Everglades National Park. Australian pine is found in just two small patches along the eastern urban interface in (A) Region 1 and (B) Region 2.

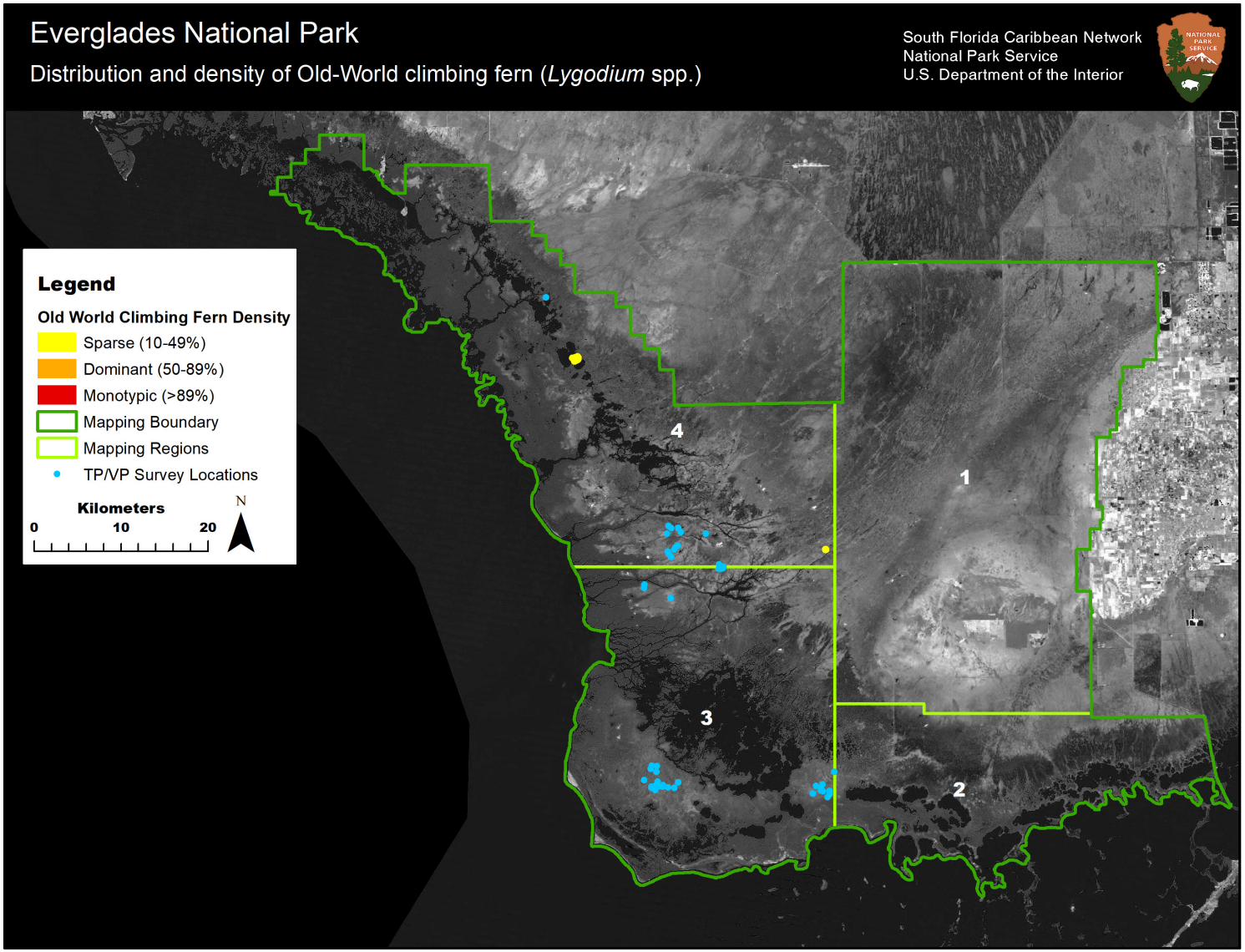


Figure 10. Locations where field crews and photo-interpreters documented the presence (>10% cover) of Old-World climbing fern (*Lygodium* spp.). This is an incomplete census, not indicative of the true range and distribution within Everglades National Park.

Fire and Windstorm

Multiple fires covering 23,613 ha (58,349 ac) were detected on the 2009 imagery (Figure 11). Most fires were restricted to the eastern marl prairies and cordgrass (Spartina spp.) coastal marshes of EVER (Figure 11). However, several fires were observed in Shark River Slough and in the western marl prairies near the Big Cypress National Preserve boundary (Figure 11). In some cases, the fire scars observed on the 2009 imagery tended to be smaller than the actual fire perimeter recorded at the time of the fire. For example, the area burned by the 2008 Mustang Corner fire was much larger than the fire scar observed on the 2009 imagery. However, in most instances, like the Pho North fire, the fire scar observed on the imagery is nearly identical to the fire perimeter established five years earlier (Figure 11).

Approximately 22,200 ha (54,857 ac) of coastal forests exhibited evidence of windstorm damage. Windstorm damage was mostly restricted to the coastal mangrove communities and hammocks between Little Blackwater Sound, Southeast Saline Everglades (Region 2), and the mangrove islands west of Chokoloskee Bay, on the Gulf of Mexico, Northwest Coastal Everglades (Region 4, Figure 11). The most severe damage observed occurred between Monroe Lake (Region 2) and Broad River (Region 3), where mangrove damage was observed several kilometers inland (Figure 11). The windstorm damage recorded is believed to be the result of the 2005 Hurricane season when two hurricanes, Hurricane Katrina and Hurricane Wilma, made landfall over south Florida.

Accuracy Assessment

An exact one-to-one match between the Accuracy Assessment (AA) points and the vegetation codes (complete agreement between the AA classified point and the grid cell label) occurred for 465 of the 1014 AA points (46.9%) selected. The 549 grid cells that did not have a one-to-one correlation were re-examined to determine whether they could be deemed acceptable based on the conditions defined in the methods section (Appendix C). This review yielded an additional 438 matching points, increasing the total number of acceptable points to 904. The majority of points were deemed acceptable because they were at the cutoff boundary, either cover percentage or canopy height, between two similar classes, e.g., Black Mangrove Shrubland versus Black Mangrove Forest or Woodland, or Short Sawgrass Marsh-Dense versus Tall Sawgrass Marsh-Dense.

Based on the total number of accepted AA points (904), the accuracy of the map, regardless of categorical level, is 89.2% with a lower 90th Percentile Confidence Interval of 87.4% (Table 10). Map accuracy decreased as a function of classification level, with less detailed levels (Levels 1–5) having greater accuracy than more detailed levels (Levels 6 and 7, Table 10). Classification level accuracy was at or above 88% for all levels except Level 6 and Level 7 (Table 10).

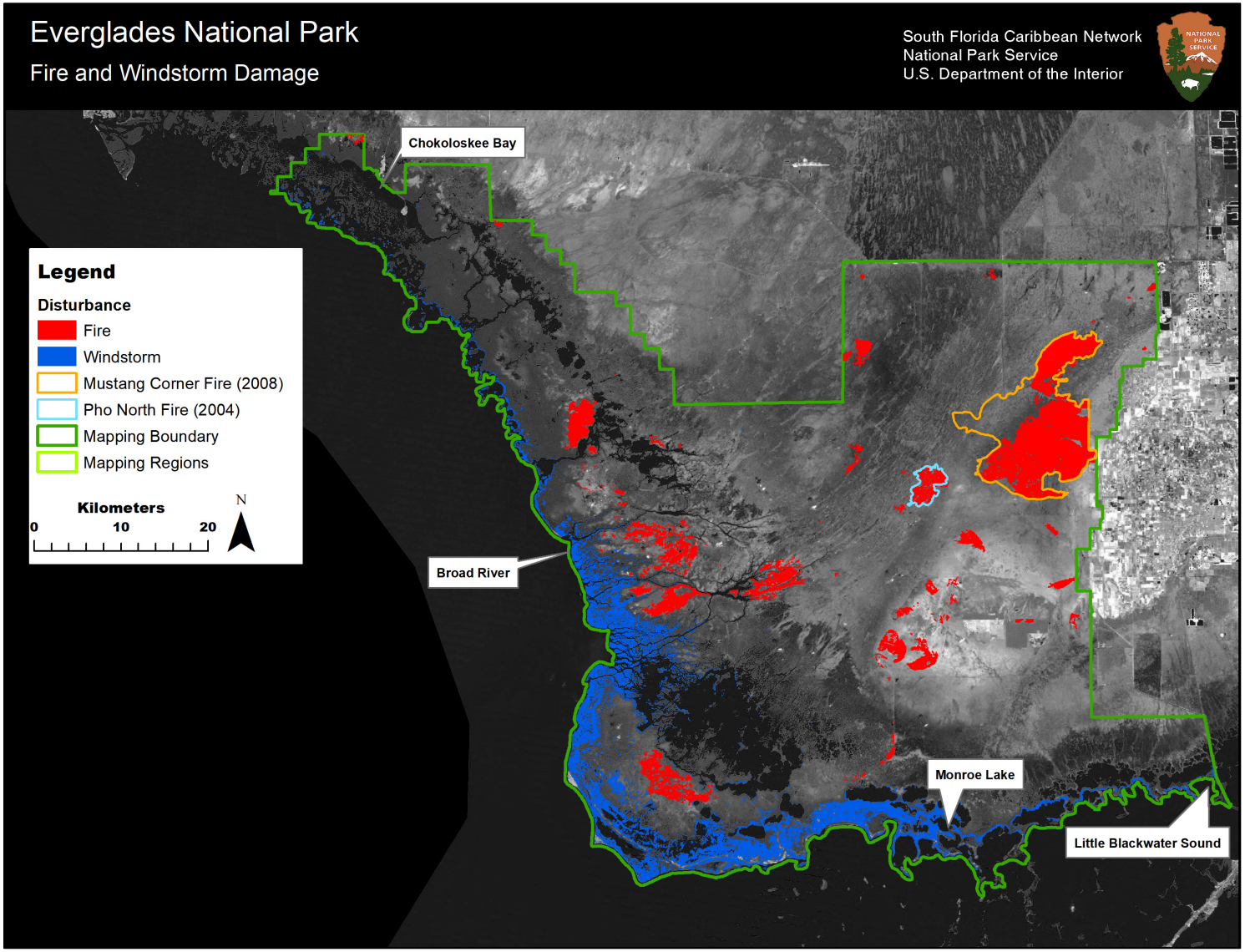


Figure 11. Grid cells showing evidence of fire (red) or windstorm damage (blue). Windstorm damage is presumed to have occurred during the 2005 Atlantic hurricane season. Fire scars are from multiple years.

Table 10. Accuracy assessment results for each level in the classification system and of the vegetation map over all.

Classification Level	Number of Points Acceptable	Number of AA Points	Percent Correct	Lower 90th Percentile Confidence Interval
Level 1	959	1014	94.6%	93.3%
Level 2	938	1014	92.5%	91.0%
Level 3	923	1012	91.2%	89.6%
Level 4	791	892	88.7%	86.8%
Level 5	505	564	89.5%	87.2%
Level 6	267	310	86.1%	82.5%
Level 7	13	15	86.7%	63.7%
Overall	**904**	**1014**	**89.2%**	**87.4%**

Out of the 286 thematic classes used on the map, 91 (31.8%) could be verified with at least one AA point (Table 11). These 91 classes account for nearly 97% of the area mapped. The thematic class accuracy of these assessed classes ranged from 0% to 100%, with most classes (74 out of 91, 81.3%) having an estimated class accuracy of 80% or greater (Table 11). Five classes were found to have an estimated accuracy of 0%: Black Mangrove-Red Mangrove Scrub-Graminoid Marsh; Tidal Flat; Transitional Bayhead Swamp Scrub-Spikerush Marsh; White Mangrove Scrub-Sand Cordgrass Marsh, and White Mangrove Shrubland (Table 11). These five classes were assessed with a single assessment location each, thus any inferences about their true accuracy within the map is not appropriate. Fourteen out of the 17 classes whose accuracy fell below 80% were assessed with six or fewer assessment locations (Table 11). The exception being the following three classes that were assess with 20 or more AA points each: Transitional Bayhead Shrubland; Transitional Bayhead Swamp Scrub-Sawgrass Marsh; and Bayhead Swamp Scrub-Sawgrass Marsh (Table 11). The mapping and discrimination of the two Transitional Bayhead classes was challenging because of their floristic, structural, and spectral similarity to Red Mangrove Scrub-Sawgrass, Buttonwood-Red Mangrove Scrub-Sawgrass, and Buttonwood-Red Mangrove Shrubland. This made classification difficult due to subtle difference in the percent cover of several freshwater hardwood species like Poisonwood (*Metopium toxiferum*) and Dahoon (*Ilex cassine*), whose spectral signatures are very similar to that of Buttonwood (*Conocarpus erectus*). Discriminating between these classes was particularly difficult at the freshwater-coastal interface where both freshwater hardwood species and mangrove species coexists and intermix to form these mixed community types.

Table 11. Number of accuracy assessment (AA) points, class accuracy percentage, and percent map area for all thematic classes assessed within Everglades National Park.

Thematic Class	Number of AA Points	Class Accuracy (%)	Percent Map Area
Short Sawgrass Marsh-Dense (MFGcSD)	158	93.0%	19.67%
Graminoid Freshwater Prairie (MFGP)	80	85.0%	12.33%
Transitional Bayhead Shrubland (SSBT)	61	57.4%	5.22%
Mixed Graminoid Freshwater Marsh (MFGX)	58	94.8%	5.07%
Red Mangrove Scrub-Open Marsh (CMrO)	56	98.2%	4.24%
Water (ONW)	44	100.0%	–
Mixed Mangrove Forest-Mixed (FMXX)	43	97.7%	5.25%
Spikerush Marsh (MFGe)	36	91.7%	3.38%
Transitional Bayhead Swamp Scrub-Sawgrass Marsh (CSBTGc)	27	59.3%	1.96%
Red Mangrove Scrub-Sawgrass Marsh (CMrGc)	25	100.0%	2.20%
Black Mangrove-Red Mangrove Forest (FMXar)	22	100.0%	2.51%
Red Mangrove Scrub-Spikerush Marsh (CMrGe)	21	95.2%	1.11%
Red Mangrove Scrub-Dominant (CMrD)	20	90.0%	1.19%
Bayhead Swamp Scrub-Sawgrass Marsh (CSBGc)	20	75.0%	1.26%
Red Mangrove Forest (FMr)	20	100.0%	1.89%
Black Mangrove Forest (FMa)	19	100.0%	2.45%
Red Mangrove Shrubland (SMr)	19	94.7%	1.40%
Buttonwood-Red Mangrove Shrubland (SMXcr)	19	84.2%	1.59%
Tropical Hardwood Hammock (FHS)	15	93.3%	0.42%
Buttonwood Forest (FMc)	15	100.0%	0.31%
Tall Sawgrass Marsh-Dense (MFGcTD)	15	86.7%	2.27%
Bayhead Forest (FSB)	13	92.3%	0.35%
Black Mangrove Shrubland (SMa)	12	100.0%	0.45%
Pine Rockland-Shrubs (WUpRS)	11	90.9%	0.89%
Sand Cordgrass Marsh (MFGn)	10	80.0%	1.04%
Bayhead Shrubland (SSB)	10	90.0%	1.08%
White Mangrove-Red Mangrove Forest (FMXlr)	9	88.9%	2.18%
Black Rush Marsh (MSGj)	8	87.5%	0.83%
Cypress Scrub-Sawgrass Marsh (CStGc)	7	85.7%	0.51%
Sawgrass-Beakrush Marsh (MFGXcr)	7	100.0%	1.53%
Buttonwood Shrubland (SMc)	7	100.0%	0.22%
Upland Hardwood Scrub-Graminoid Prairie (CUWGP)	6	66.7%	0.76%

Table 11 (continued). Number of accuracy assessment (AA) points, class accuracy percentage, and percent map area for all thematic classes assessed within Everglades National Park.

Thematic Class	Number of AA Points	Class Accuracy (%)	Percent Map Area
Buttonwood-Red Mangrove Forest (FMXcr)	6	83.3%	0.75%
Short Sawgrass Marsh-Sparse (MFGcSS)	6	83.3%	0.46%
Buttonwood-Red Mangrove Scrub-Sawgrass Marsh (CMXcrGc)	5	80.0%	0.68%
White Mangrove-Red Mangrove Shrubland (SMXlr)	5	100.0%	0.74%
Black Mangrove Scrub-Succulent Marsh (CMaS)	4	100.0%	0.32%
Cypress Scrub-Graminoid Prairie (CStGP)	4	75.0%	0.61%
Sawgrass-Cattail Marsh (MFGXct)	4	75.0%	0.30%
Black Mangrove-Buttonwood Shrubland (SMXac)	4	75.0%	0.09%
Mixed Mangrove Shrubland-Mixed (SMXX)	4	50.0%	0.70%
Black Mangrove Woodland-Graminoid Marsh (WMaG)	4	100.0%	0.07%
Buttonwood Scrub-Black Rush Marsh (CMcGj)	3	100.0%	0.05%
Buttonwood-Red Mangrove Scrub-Dominant (CMXcrD)	3	66.7%	0.06%
White Mangrove Forest (FMl)	3	100.0%	0.21%
Sawgrass-Black Rush Marsh (MFGXcj)	3	66.7%	0.17%
Pine Rockland-Mixed (WUpRX)	3	66.7%	0.44%
Buttonwood-Red Mangrove Scrub-Open Marsh (CMXcrO)	2	100.0%	0.39%
Brazilian Pepper (Es)	2	100.0%	0.36%
Black Mangrove-Buttonwood Forest (FMXac)	2	100.0%	0.25%
Black Mangrove-White Mangrove Forest (FMXal)	2	100.0%	0.37%
Transitional Bayhead Forest (FSBT)	2	100.0%	0.65%
Cypress Forest-Monotypic (FStM)	2	100.0%	0.17%
Beakrush Marsh (MFGr)	2	100.0%	0.11%
Succulent Salt Marsh (MSS)	2	100.0%	0.26%
Black Mangrove-White Mangrove Shrubland (SMXal)	2	100.0%	0.20%
Black Mangrove-Red Mangrove Shrubland (SMXar)	2	100.0%	0.10%
Willow Shrubland (SSs)	2	100.0%	0.37%
Cocoplum Shrubland (SSy)	2	100.0%	0.05%
Tropical Hardwood Shrubland (SUH)	2	50.0%	0.14%
Black Mangrove Woodland-Open Marsh (WMaO)	2	100.0%	0.06%
Black Mangrove Woodland-Succulent Marsh (WMaS)	2	100.0%	0.12%
Pine Rockland-Graminoids (WUpRG)	2	100.0%	0.15%
Black Mangrove Scrub-Graminoid Marsh (CMaG)	1	100.0%	0.01%

Table 11 (continued). Number of accuracy assessment (AA) points, class accuracy percentage, and percent map area for all thematic classes assessed within Everglades National Park.

Thematic Class	Number of AA Points	Class Accuracy (%)	Percent Map Area
Black Mangrove Scrub-Open Marsh (CMaO)	1	100.0%	0.13%
Buttonwood Scrub-Cordgrass Marsh (CMcGn)	1	100.0%	0.03%
White Mangrove Scrub-Sawgrass Marsh (CMlGc)	1	100.0%	0.04%
White Mangrove Scrub-Black Rush Marsh (CMlGj)	1	100.0%	0.06%
White Mangrove Scrub-Cordgrass Marsh (CMlGn)	1	0.0%	0.10%
White Mangrove Scrub-Open Marsh (CMlO)	1	100.0%	0.03%
Black Mangrove-Red Mangrove Scrub-Graminoid Marsh (CMXarG)	1	0.0%	< 0.01%
Pond Apple Scrub-Sawgrass Marsh (CSaGc)	1	100.0%	0.02%
Transitional Bayhead Swamp Scrub-Spikerush Marsh (CSBTGe)	1	0.0%	0.01%
Willow Scrub-Sawgrass Marsh (CSsGc)	1	100.0%	0.30%
Cypress Scrub-Graminoid Marsh (CStG)	1	100.0%	0.02%
Cypress Scrub-Spikerush Marsh (CStGe)	1	100.0%	0.01%
Cypress Scrub-Mixed Graminoid Marsh (CStGX)	1	100.0%	0.16%
Coastal Hardwood Scrub (CUC)	1	100.0%	0.02%
Buttonwood Hammock (FHCc)	1	100.0%	0.07%
Buttonwood-White Mangrove Forest (FMXcl)	1	100.0%	0.07%
Sawgrass-Sand Cordgrass Marsh (MFGXcn)	1	100.0%	0.16%
Saltgrass-Sand Cordgrass Marsh (MSGXdn)	1	100.0%	0.04%
Open Salt Marsh (MSO)	1	100.0%	0.01%
Barren Salt Flat (ONS)	1	100.0%	0.03%
Tidal Flat (ONT)	1	0.0%	0.05%
White Mangrove Shrubland (SMl)	1	0.0%	0.22%
Buttonwood-White Mangrove Shrubland (SMXcl)	1	100.0%	0.16%
Black Mangrove-Buttonwood Woodland-Graminoid Marsh (WMXacG)	1	100.0%	0.01%
Black Mangrove-Red Mangrove Woodland-Graminoid Marsh (WMXarG)	1	100.0%	0.02%
Black Mangrove-Red Mangrove Woodland-Open Marsh (WMXarO)	1	100.0%	0.07%
Cypress Woodland-Graminoid Prairie (WStGP)	1	100.0%	0.07%

Summary

The Everglades National Park vegetation map consists of 1,792,886 0.25-hectare (.61-ac) grid-cells and 286 thematic classes. The majority of classes, 264 out of 286, account for less than 1% each of the total area mapped, and combine for approximately 19.2% (74,088 hectares [183,075.4 ac]) of the terrestrial area mapped. Marsh vegetation classes are the most common community types found within the vegetation map. They account for 48.3% of the terrestrial mapped area. Forest communities (18.0%), followed by Scrubs (17.8%), and Shrublands (12.8%) are the next most common community types mapped.

A total of 624 ha (1,543 ac) was mapped as Cattail Marsh. However, 11,440 ha (28,268 ac) were found to contain cattail in densities greater than 10% (see Table 7). Cattail was found in coastal and interior marshes, with the Northwest Coastal Everglades having the greatest concentration of cattail (see Figure 6).

Approximately 14,800 ha (36,572 ac) of invasive species were detected and document (see Table 8). Brazilian pepper (*Schinus terebinthifolia*) was the dominant invasive species. It was predominately found along the banks of rivers and creeks, and in the interior coastal marshes and shrublands within the Northwest Coastal Everglades (see Figure 7).

Windstorm damage resulting from the 2005 hurricane season was documented for approximately 22,200 ha (54,857 ac) of coastal forests between Little Blackwater Sound and Chokoloskee (see Figure 11). The most severe damage observed occurred between Monroe Lake and Broad River, where mangrove damage was observed several kilometers inland (see Figure 11).

Multiple fire scars covering 23,613 ha (58,349 ac) were observed and documented (see Figure 11). In most cases, the fire scars observed on the imagery were smaller than the actual fire perimeter recorded at the time of the fire, indicative of post-fire recovery. However, in a few cases the fire scar observed on the imagery was nearly identical to the fire perimeter, even though the fire occurred many years prior.

The map has a thematic accuracy of 89.2% with a lower 90th Percentile Confidence Interval of 87.4%. The majority of all thematic classes assessed had an estimated accuracy greater than or equal to 80%. Map accuracy decreased as a function of classification level, with less detailed levels (Levels 1–5) having greater accuracy than more detailed levels (Levels 6 and 7).

Conclusion

This document is the final report for the vegetation map of EVER. It combines the previous four maps of EVER into one comprehensive, all-inclusive map and report. It also marks the completion of the USACE, SFCN, SFWMD, RECOVER, and NPS cooperative effort to map EVER.

The vegetation map of EVER, along with those previously produced as part of this project, provide land-cover information to NPS park managers and scientists for use in park management, resource management, research, and monitoring. It serves as a baseline map of plant communities in 2009, prior to the implementation the CERP and restoration efforts. It provides a cost-effective tool by which managers can track and document the rate and direction of vegetation change resulting from natural successional processes, disturbance events, sea level rise, and/or management, by allowing for the systematic monitoring of individual grid-cells overtime. In addition, this map and those previously produced are ideally suited for landscape modeling since each 0.25-hectare grid-cell can be assigned additional environmental or physical attributes (e.g., mean hydroperiod, ground surface elevation, soil type, fire frequency, etc.). These attributes can then be used to create landscape level models independent of the vegetation or through correlation.

Summary of Final Product and Deliverables

This report and the geospatial products developed are available for download from the NPS Integrated Resource Management Applications Data Store (https://irma.nps.gov/DataStore/). In addition, a digital product containing the report and all of the digital data, including the field data, photographs, and META data, is available upon request from the South Florida/Caribbean Network[6].

The geospatial data collected and created are stored in an ESRI ArcGIS file geodatabase (EVER_VegMap_v20200930) and are referenced to the Universal Transverse Mercator (UTM) Zone 17N, North American Datum of 1983 (NAD83).

The geospatial product consists of eight feature classes and four raster datasets:

- *EVER_VegMap_Boundary*
- *EVER_VegMap_Cattails_v20200930*
- *EVER_VegMap_Disturbance_v20200930*
- *EVER_VegMap_Invasives_v20200930*
- *EVER_VegMap_Land_v20200930*
- *EVER_VegMap_Mapping_Regions*
- *EVER_VegMap_Vegetation_20200930*
- *EVER_VegMap_Vegetation_Dissolve_v20200930*
- *Region1_CERP2009_Image*
- *Region2_CERP2009_Image*
- *Region3_CERP2009_Image*
- *Region4_CERP2009_Image*

The *EVER_VegMap_Boundary* feature class contains one record delineating the mapping boundary for the EVER vegetation mapping project. The *EVER_VegMap_Cattails* feature class shows the distribution of cattails (*Typha* spp.) within EVER and quantifies the absolute cover of cattails within each grid cell as either Sparse (10%-49%), Dominant (50%-89%), or Monotypic (90%-100%). Blank grid cells indicate that cattails are either not present within the grid cell or below the minimum detectable 10% threshold value. The *EVER_VegMap_Disturbance* feature class documents any evidence of disturbance as either anthropogenic, fire, treatment (invasive species management), or windstorm. Blank grid cells indicate that the grid cell showed no evidence of disturbance. The *EVER_VegMap_Exotics* feature class shows the distribution of Brazilian pepper (*Schinus terebinthifolia*), Australian Pine (*Casuarina sp.*), Melaleuca (*Melaleuca quinquenervia)*, Java Plum (*Syzygium cumini*), Old World climbing fern (*Lygodium* spp.), Shoebutton Ardisia (*Ardisia elliptica*), and Giant grasses (*Neyraudia* spp. and *Pennisetum* spp.) within EVER, and quantifies the absolute cover of these species within each grid cell as either Sparse (10%-49%), Dominant (50%-89%), or

[6] South Florida/Caribbean Network, 18001 Old Cutler Road, Suite 419, Palmetto Bay, Florida, 33157-6435. Phone: 305.252.0347

Monotypic (90%-100%). Blank grid cells indicate that the species was not present or below the minimum detectable threshold value of ten percent. The *EVER_VegMap_Land* feature class contains one record delineating the terrestrial portion (land area) of the mapping region. The *EVER_VegMap_Vegetation* feature class contains the vegetation data for each grid cell within the bounding area. It contains 1,792,886 records and 18 attributes (Table 12). The attributes represent grid cell specific information regarding the dominant community type identified. The *EVER_VegMap_Vegetation_Dissolve* represent the same vegetation information stored in the previously described feature class (see Table 12). However, vegetation codes were merged (dissolved) to reduce the number of total records to 286 (unique vegetation classes) and to speed up the geoprocessing time needed to load the vegetation map for display purposes. The four raster datasets are 2-meter spatial resolution images of the mapping area. These rasters are managed within the geodatabase.

Table 12. Description of attributes in the *EVER_VegMap_Vegetation* feature class.

Attribute	Description
OBJECTID	ESRI default (ID).
SHAPE	ESRI default (polygon).
Region	Map region (1-4) associated with the grid cell ID
Cell_ID	Grid cell unique identification.
VegCode	Vegetation code from classification system.
VegCode Level	Indicates the level of detail (hierarchy) associated with the vegetation code within the classification system. Community specificity increases with increasing level of detail.
Name	The long name associated with the vegetation code (VegCode) attribute (see classification system).
L1_name	Level 1 classification name (see classification system).
L2_name	Level 2 classification name (see classification system).
L3_name	Level 3 classification name (see classification system).
L4_name	Level 4 classification name (see classification system).
L5_name	Level 5 classification name (see classification system).
L6_name	Level 6 classification name (see classification system).
L7_name	Level 7 classification name (see classification system).
Area_Ha	Area in hectares for each grid-cell.
Area_Ac	Area in acres for each grid-cell
Shape_Length	ESRI default (shape perimeter m)
Shape_Area	ESRI default (shape area m^2)

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Appendix A. Vegetation Classification Key for Everglades National Park



Version EVERNP-2020.0928

On the Cover

Landscape scene showing tree islands within a mixed-graminoid freshwater marsh in Everglades National Park. Photo credit Pablo L Ruiz (20 October 2018).

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Introduction

This vegetation classification key is designed to be used in the Everglades National Park (EVER) and Big Cypress National Preserve (BICY) vegetation mapping project to help photo-interpreters determine the appropriate vegetation class within 0.25 ha vegetation mapping cells, the minimum mapping unit (MMU) in this project. This key is modeled after the *Vegetation Classification System for South Florida Natural Areas v6.15.09* (Rutchey et al. 2006)[7] which was developed and used to map wetland and upland plant communities in other regions of the Greater Everglades (Rutchey et al. 2008). The classification key presented herein differs from its parent system in several ways: (1) the hierarchical pathway has been streamlined to help photo-interpreters consistently reach the same vegetation class and reduce photo-interpreter variability; (2) vegetation class definitions have been modified to clarify meaning and to reflect regional differences in species composition; (3) vegetation classes not occurring within the mapping area have been removed while region-specific vegetation classes have been added; and (4) the vegetation classification key for exotic plant species is currently not included in this version—users are asked to reference the exotic plant species section in the *Vegetation Classification System for South Florida Natural Areas* (Rutchey et al. 2006) for now. A more detailed list of modifications can be found in the Appendix section at the end of this document.

It is expected that all users of this key will be familiar with most, if not all, of the plant species listed herein and have a general knowledge of the vegetation communities within EVER and their general distribution. It is expected that all users will have comparable abilities to accurately and precisely estimate vegetation cover and height within the MMU. Discrepancies of ± 5% in vegetation cover and height estimates are acceptable between photo-interpreters.

This key is not perfect and is a work in progress. A photo-interpreter should confirm the final keyed answer by reading the vegetation class description and determining whether the answer is plausible. If it is not, the photo-interpreter should revise the answer by examining other possible pathways in the key based on their best professional judgment of possible community types and on the structural and spectral information available. This key should be used hand-in-hand with the photo-interpreter's key, a tool similar to this key but specifically designed to assist in the photo-interpretation of vegetation communities directly from aerial photography based on a community's specific spectral and structural signature.

The taxonomic references in the classification system utilize the Integrated Taxonomic Information System.

[7] The *Vegetation Classification System for South Florida Natural Areas* is a majority rule, hierarchical, and structurally driven classification system. Using this system, community types are keyed out based on their majority cover, average vegetation height, and vegetation density within a minimum mapping unit. This classification system is best applied when using a photogrammetric 3D workstation that allows optimal visualization of the three-dimensional imagery to assist in determination of vegetation height and density.

Glossary

Cover (absolute)—The area covered by the vertical projection of a plant's crown, or community, expressed as a percentage of the total area it occupies within a region of finite size. The absolute cover for all species present shall always add up to 100%.

Cover (density)—The percentage of the area being classified that is occupied by an individual plant species or multiple plant species.

Co-dominant (mixed)—Two or more species that are equally distributed throughout a region of finite size with no significant difference in their absolute cover.

Dominant (dominated by)—The individual species having the highest cover of any species within the area being classified.

Dominant—Species cover between 50-89%. This term is typically used to classify cattail and exotic species cover.

Graminoids—Grasses and grass-like plant species such as sedges and rushes.

Herbaceous—Non-woody vascular plants species (graminoids excluded) typically persisting for only one growing season.

Monotypic—Species cover 90-100%. This term is typically used to classify cattail and exotic species cover.

Tree—Woody plant that is at least 5 meters tall.

Shrub—Woody plant that is shorter than 5 meters.

Sparse—Species cover 10-49%. This term is typically used to classify cattail and exotic species cover. In the marsh context it usually means less than 15%.

Uplands—Rarely flooded communities consisting of semi-flood-tolerant or flood-intolerant plant species.

Wetlands—Regularly flooded communities consisting of flood-tolerant plant species.

Vegetation Classification Key

L1 – Forest (F) – Stands of trees (5 meters or taller) that are of high density (50-100% cover). For exceptions to this rule please refer to Appendix A-1.

L1 – Woodland (W) – Stands of trees (5 meters or taller) that are of low density (10-49% cover). Trees are evenly spaced out and often in a matrix of sparse shrubs, graminoids, and/or herbaceous vegetation. For exceptions to this rule please refer to Appendix A-1.

L1 – Shrubland (S) – Stands of shrubs (shorter than 5 meters) that are of high density (50-100% cover). For exceptions to this rule please refer to Appendix A-1.

L1 – Scrub (C) – Stands of shrubs (shorter than 5 meters) that are of low density (10-49% cover). Shrubs are evenly spaced out and often in a matrix of graminoids and/or herbaceous vegetation. For exceptions to this rule please refer to Appendix A-1.

L1 – Marsh (M) – Graminoid and/or herbaceous emergent or floating vegetation in shallow water that stands at or above the ground surface for much of the year. Prairie habitat is included in this class. A marsh can have low density (0-9%) tree and shrub cover.

L1 – Exotic (E) – Non-native plant species assemblages.

L1 – Other (O) – Anthropogenic or non-vegetative features.

L1 – Forest (F)

Stands of trees (5 meters or taller) that are of high density (50-100% cover). For exceptions to this rule please refer to Appendix A-1.

I. Regularly flooded forest consisting of flood tolerant tree species. Most common forest type found in the Everglades.

L2 – <u>Wetland Forest</u> (FW)

1. Regularly flooded forests consisting of salt tolerant tree species. These communities are typically found along saltwater shorelines, interior tidal rivers and creeks, or estuarine zones.

L3 – <u>Mangrove Forest</u> (FM)

2. Seasonally to semi-permanently flooded freshwater forests primarily found in interior wetlands but may extend well into coastal areas.

L3 – <u>Swamp Forest</u> (FS)

II. Rarely flooded forests consisting of flood intolerant hardwood tree species of both temperate and tropical origins. These communities are found throughout the Everglades along coastal areas and offshore islands, pine woodlands, and interior marshes.

L2 – <u>Upland Forest</u> (FU)

1. Rarely flooded forest associated with flood intolerant trees of both temperate and tropical origins. Species composition is highly diverse but varies throughout the region.

L3 – <u>Hardwood Hammock</u> (FH)

L2 – Wetland Forest (FW)

<u>L3 – Mangrove Forest (FM)</u>

1a. Black Mangrove (*Avicennia germinans*) dominant forest. This community is usually characterized by a minimum of 50% Black Mangrove (*A. germinans*) trees and shrubs found in a matrix of other species.

L4 – Black Mangrove Forest (FMa)

1b. Buttonwood (*Conocarpus erectus*) dominant forest. This community is usually characterized by a minimum of 50% Buttonwood (*C. erectus*) trees and shrubs found in a matrix of other species.

L4 – Buttonwood Forest (FMc)

1c. White Mangrove (*Laguncularia racemosa*) dominant forest. This community is usually characterized by a minimum of 50% White Mangrove (*L. racemosa*) trees and shrubs found in a matrix of other species.

L4 – White Mangrove Forest (FMl)

1d. Red Mangrove (*Rhizophora mangle*) dominant forest. This community is usually characterized by a minimum of 50% Red Mangrove (*R. mangle*) trees and shrubs found in a matrix of other species.

L4 – Red Mangrove Forest (FMr)

1e. Mix of mangrove tree species with no particular species having dominance.

L4 – Mixed Mangrove Forest (FMX)

1e.1. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) trees.

L5 – Black Mangrove-Buttonwood Forest (FMXac)

1e.2. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) trees.

L5 – Black Mangrove-White Mangrove Forest (FMXal)

1e.3. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) trees.

L5 – Black Mangrove-Red Mangrove Forest (FMXar)

1e.4. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and White Mangrove (*Laguncularia racemosa*) trees.

L5 – Buttonwood-White Mangrove Forest (FMXcl)

1e.5. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) trees.

L5 – Buttonwood-Red Mangrove Forest (FMXcr)

1e.6. Co-dominant mix (20% or less difference in percent cover) of White Mangrove (*Laguncularia racemosa*) and Red Mangrove (*Rhizophora mangle*) trees.

L5 – White Mangrove-Red Mangrove Forest (FMXlr)

1e.7. Co-dominant mix consisting of three or more mangrove tree species. This community is characterized by having no particular species in dominance, meaning there is 20% or less difference in percent cover between the most and least abundant mangrove tree species.

L5 – Mixed Mangrove Forest-Mixed (FMXX)

<u>L3 – Swamp Forest (FS)</u>

2a. Seasonally to semi-permanently flooded dominant to monotypic stands of Willow (*Salix caroliniana*) trees and shrubs in association with Leather Fern (*Acrostichum danaeifolium*), Cattail (*Typha* spp.), Sawgrass (*Cladium jamaicense*), Arrowhead (*Sagittaria* spp.), as well as other freshwater marsh species. This community is usually characterized by a minimum of 50% Willow (*Salix caroliniana*) trees and shrubs. This is an exception to the Forest class because even in the case of Forest height (5 meters or taller) this community is still considered **L1 – <u>Shrubland</u> (S)**.

L4 – Willow Shrubland (SSs)

2b. Seasonally flooded, dominant to monotypic (≥ 50% cover) stands of Cocoplum (*Chrysobalanus icaco*) trees (≥ 5 meters) and shrubs in association with other wetland species, e.g., Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Dahoon Holly (*Ilex cassine*), Willow (*Salix caroliniana*), Wax Myrtle (*Morella cerifera*), Sweetbay (*Magnolia virginiana*), Cypress (*Taxodium* spp.), and/or

Pond Apple (*Annona glabra*), or upland tree species like Poisonwood (*Metopium toxiferum*) and/or Pigeon Plum (*Coccoloba diversifolia*). This community is an exception to the L1 – Forest Class and falls under **L1 – Shrubland (S)**.

L4 – Cocoplum Shrubland (SSy)

1c. Pond-Apple (*Annona glabra*) dominant forest. This community is usually characterized by a minimum of 50% Pond-Apple (*Annona glabra*) trees and shrubs.

L4 – Pond Apple Forest (FSa)

2d. Cypress (*Taxodium* spp.) dominant forest with understory vegetation consisting of Pond Apple (*Annona glabra*), Wax Myrtle (*Morella cerifera*), Pop Ash (*Fraxinus caroliniana*), Cocoplum (*Chrysobalanus icaco*), and Leather Fern (*Acrostichum danaeifolium*).

L4 – Cypress Forest (FSt)

2d.1. Cypress (*Taxodium* spp.) forest with at least 90% cypress cover (relative).

L5 – Cypress Forest-Monotypic (FStM)

2d.2. Cypress (*Taxodium* spp.) dominant forest typically found in a pond-like depression.

L5 – Cypress Forest-Dome (FStD)

2d.3. Cypress (*Taxodium* spp.) dominant forest typically found in an elongated slough-like or open-ended depression.

L5 – Cypress Forest-Strand (FStS)

2d.4. Co-dominant mix (20% or less difference in percent cover) of Cypress (*Taxodium* spp.) with other lowland hardwood trees such as Red Maple (*Acer rubrum*), Pond Apple (*Annona glabra*), Pop Ash (*Fraxinus caroliniana*), Willow (*Salix caroliniana*), and Cabbage Palm (*Sabal palmetto*) with common understory vegetation consisting of Pond Apple (*Annona glabra*), Wax Myrtle (*Morella cerifera*), Pop Ash (*Fraxinus caroliniana*), Cocoplum (*Chrysobalanus icaco*), and Leather Fern (*Acrostichum danaeifolium*).

L5 – Cypress-Hardwood Forest (FStH)

2d.5. Co-dominant mix (20% or less difference in percent cover) of Cypress (*Taxodium* spp.) with Slash Pine (*Pinus elliottii*). Common understory vegetation can include mixed hardwood shrubs and/or graminoids.

L5 – Cypress-Pine Forest (FStp)

2e. Mix of Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Cocoplum (*Chrysobalanus icaco*), Dahoon Holly (*Ilex cassine*), Willow (*Salix caroliniana*), Wax Myrtle (*Morella cerifera*), Sweetbay (*Magnolia virginiana*), Cypress (*Taxodium* spp.), Pond Apple (*Annona glabra*), and occasionally Buttonwood (*Conocarpus erectus*).

L4 – Bayhead Forest (FSB)

2f. Mix of trees characterized by Buttonwood (*Conocarpus erectus*), Red Mangrove (*Rhizophora mangle*), Cocoplum (*Chrysobalanus icaco*), Wax Myrtle (*Morella cerifera*), Poisonwood (*Metopium*

toxiferum), and occasionally West Indian Mahogany (*Swietenia mahagoni*), Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Sweetbay (*Magnolia virginiana*), and Dahoon Holly (*Ilex cassine*). The signatures for Buttonwood (*C. erectus*) and Dahoon Holly (*I. cassine*) are often confused in regions where the two species co-exist, leaving Red Mangrove (*R. mangle*) as the distinguishing component between the Transitional Bayhead and Bayhead classes in regions where both classes are likely to be found. The significant presence (at least 30% cover) of Buttonwood (*C. erectus*) or Red Mangrove (*R. mangle*) evenly distributed throughout the vegetation matrix sets this class apart from the Bayhead Forest class. Note that when these species are confined to the outside fringe, they are not considered indicative of a Transitional Bayhead.

L4 – Transitional Bayhead Forest (FSBT)

2g. Mix of lowland hardwood trees such as Red Maple (*Acer rubrum*), Pop Ash (*Fraxinus caroliniana*), Swamp Bay (*Persea palustris*) and/or Red Bay (*P. borbonia*), Sweetbay (*Magnolia virginiana*), Pond Apple (*Annona glabra*), Willow *(Salix caroliniana)*, Laurel Oak (*Quercus laurifolia*), and cabbage Palm (*Sabal palmetto*). Cocoplum (*Chrysobalanus icaco*) commonly found in the understory.

L4 – Hardwood Swamp Forest (FSH)

2h. Mix of lowland hardwood trees such as Red Maple (*Acer rubrum*), Pop Ash (*Fraxinus caroliniana*), Swamp Bay (*Persea palustris*) and/or Red Bay (*P. borbonia*), Sweetbay (*Magnolia virginiana*), Pond Apple (*Annona glabra*), Willow *(Salix caroliniana)*, Laurel Oak (*Quercus laurifolia*), and cabbage Palm (*Sabal palmetto*) with at least 30% mangrove cover. Mangrove species may include Red mangrove (*Rhizophora mangle*), White mangrove (*Laguncularia racemosa*), Black mangrove (*Avicennia germinans*) and/or Buttonwood (*Conocarpus erectus*).

L4 – Transitional Hardwood Swamp Forest (FSHT)

2i. Paurotis Palm (*Acoelorraphe wrightii*) dominant forest. This community is usually characterized by a minimum of 50% Paurotis Palm (*A. wrightii*) trees and shrubs found in a matrix of other species.

L4 – Paurotis Palm Forest (FSw)

L2 – Upland Forest (FU)

L3 – Pine Upland (WUp)

Stands of Slash Pine (*Pinus elliottii*) trees (10-100% cover) in a matrix composed of upland graminoids, herbs, and/or shrubs. Also known as a mesic pine flatwoods. This is an exception to the Woodland class because even in the case of Forest density (50-100% cover) this community is still considered **L1 – Woodland (W)**.

L3 – Hardwood Hammock (FH)

1a. Coastal hardwood forest containing a species rich assemblage of tropical and temperate broad-leaved trees typified by the presence of Pigeon Plum (*Coccoloba diversifolia*), False Mastic (*Sideroxylon foetidissimum*), Gumbo Limbo (*Bursera simaruba*), Strangler Fig (*Ficus aurea*), White Stopper (*Eugenia axillaris*), Jamaican Dogwood (*Piscidia piscipula*), Buttonwood (*Conocarpus erectus*), Spanish Stopper (*E. foetida*), West Indian Mahogany (*Swietenia mahagoni*), Cabbage Palm

(*Sabal Palmetto*), Soapberry (*Sapindus saponaria*), Satinleaf (*Chrysophyllum olivoforme*), Wild Lime (*Zanthoxylum fagara*), Blackbead (*Pithecellobium keyense*), Spanish Bayonet (*Yucca aloifolia*), Catclaw Blackbead (*P. unguis-cati*), Triangle Cactus (*Acanthocereus tetragonus*), Prickly Pear (*Opuntia stricta*), Wild Cinnamon (*Canella winterana*), Sea Grape (*C. uvifera*), Geigertree (*Cordia sebestena*), Milk Bark (*Drypetes lateriflora*), Seven Year Apple (*Genipa clusiifolia*), Crabwood (*Gymnanthes lucida*), Manchineel (*Hippomane mancinella*), Joewood (*Jacquinia keyensis*), Thatch Palm (*Thrinax radiata*), Poisonwood (*Metopium toxiferum*), and Coma (*Sideroxylon celastrinum*), among other species.

L4 – Coastal Hammock (FHC)

1a.1. Coastal hardwood hammock forest dominated by Buttonwood (*Conocarpus erectus*) in a matrix of tropical hardwood species like Jamaican Dogwood (*Piscidia piscipula*), Sea Grape (*Coccoloba uvifera*), Blackbead (*Pithecellobium keyense*), Spanish Bayonet (*Yucca aloifolia*), Catclaw Blackbead (*P. unguis-cati*), Triangle Cactus (*Acanthocereus tetragonus*), Prickly Pear (*Opuntia stricta*), and Spanish Stopper (*Eugenia foetida*), among others.

L5 – Buttonwood Hammock (FHCc)

1a.2. Coastal upland forest containing a mixture of tropical and temperate broad-leaved trees such as Pigeon Plum (*Coccoloba diversifolia*), False Mastic (*Sideroxylon foetidissimum*), Gumbo Limbo (*Bursera simaruba*), Strangler Fig (*Ficus aurea*), White Stopper (*Eugenia axillaris*), Jamaican Dogwood (*Piscidia piscipula*), Spanish Stopper (*E. foetida*), West Indian Mahogany (*Swietenia mahagoni*), Cabbage Palm (*Sabal Palmetto*), Soapberry (Sapindus saponaria), Satinleaf (Chrysophyllum olivoforme), Wild Lime (*Zanthoxylum fagara*), Spanish Bayonet (*Yucca aloifolia*), Triangle Cactus (*Acanthocereus tetragonus*), Prickly Pear (*Opuntia stricta*), Wild Cinnamon (*Canella winterana*), Thach Palm (*Thrinax radiata*), Poisonwood (*Metopium toxiferum*), and Coma (*Sideroxylon celastrinum*) among other. This community is generally found along coastal creeks and interior mangrove forest on calcerous substrate and/or shells.

L5 – Coastal Hardwood Hammock (FHCC)

1a.3. Hammock forests containing a mixture of tropical broad-leaved trees such as False Mastic (*Sideroxylon foetidissimum*), Gumbo Limbo (*Bursera simaruba*), Strangler Fig (*Ficus aurea*), White Stopper (*Eugenia axillaris*), Jamaican Dogwood (*Piscidia piscipula*), Spanish Stopper (*E. foetida*), Wild Lime (*Zanthoxylum fagara*), Blackbead (*Pithecellobium keyense*), Spanish Bayonet (*Yucca aloifolia*), Catclaw Blackbead (*P. unguis-cati*), Triangle Cactus (*Acanthocereus tetragonus*), and Prickly Pear (*Opuntia stricta*), among others found along coastal areas on sandy dunes.

L5 – Coastal Dune Hammock (FHCD)

1a.4. Coastal hardwood hammock forest dominated by West Indian Mahogany (*Swietenia mahagoni*) in a matrix of Jamaican Dogwood (*Piscidia piscipula*), Buttonwood (*Conocarpus erectus*), Wild Cinnamon (*Canella winterana*), Spanish Stopper (*Eugenia foetida*), Gumbo Limbo (*Bursera simaruba*), Strangler Fig (*Ficus aurea*), Pigeon Plum (*Coccoloba diversifolia*), and False Mastic (*Sideroxylon foetidissimum*), among others.

L5 – West Indian Mahogany Hammock (FHCg)

1a.5. Coastal hardwood hammock forest dominated by Florida thatch palm (*Thrinax radiata*) in a matrix of Jamaican Dogwood (*Piscidia piscipula*), Wild Cinnamon (*Canella winterana*), Spanish Stopper (*Eugenia foetida*), White Stopper (*E. axillaris*), Buttonwood (*Conocarpus erectus*), Pigeon Plum (*Coccoloba diversifolia*), Wild Lime (*Zanthoxylum fagara*), and Blackbead (*Pithecellobium keyense*), among others.

L5 – Fan Palm Hammock (FHCt)

1b. Cabbage Palm (*Sabal palmetto*) dominated forest with sparse, generally less than 25%, Laurel Oak (*Quercus laurifolia*), Live Oak (*Q. virginiana*), Strangler Fig (*Ficus aurea*), and Swamp Fern (*Blechnum* spp.) as a common understory component. This community is usually characterized by a minimum of 50% Cabbage Palm (*S. palmetto*) trees and shrubs found in a matrix of other species.

L4 – Cabbage Palm Hammock (FHo)

1c. Co-dominant mix (20% or less difference in percent cover) of Slash Pine (*Pinus elliottii*) with Laurel Oak (*Quercus laurifolia*), Live Oak (*Q. virginiana*), and/or Cabbage Palm (*Sabal palmetto*). Common understory vegetation can include mixed hardwood shrubs like Red Mulberry (*Morus rubra*), Sugarberry (*Celtis laevigata*), Common Persimmon (*Diospyros virginiana*), and/or Saw Palmetto (*Serenoa repens*).

L4 – Hardwood Hammock-Pine Forest (FHp)

1d. Mix species assemblage of False Tamarind (*Lysiloma latisiliquum*), Gumbo Limbo (*Bursera simaruba*), Poisonwood (*Metopium toxiferum*), Pigeon Plum (*Coccoloba diversifolia*), False Mastic (*Sideroxylon foetidissimum*), Live Oak (*Quercus virginiana*), Sugarberry (*Celtis laevigata*), White Stopper (*Eugenia axillaris*) and Lancewood (*Nectandra coriacea*). May also contain Strangler Fig (*Ficus aurea*), Swamp Bay (*Persea borbonia*), Dahoon Holly (*Ilex Cassine*), Wax Myrtle (*Morella cerifera*), Myrsine (*Myrsine floridana*), and Willow Bustic (*Sideroxylon salicifolium*). Water Oak (*Q. nigra*), Red Maple (*Acer rubrum*), and Laurel Oak (*Q. laurifolia*) may be present as single individuals.

L4 – Tropical Hardwood Hammock (FHS)

1e. Mix species assemblage of Laurel Oak (*Quercus laurifolia*), Live Oak (*Quercus virginiana*), Cabbage Palm (*Sabal palmetto*), and occasionally Strangler Fig (*Ficus aurea*), Red Mulberry (*Morus rubra*), Common Persimmon (*Diospyros virginiana*), and Saw Palmetto (*Serenoa repens*) in the understory.

L4 – Temperate Hardwood Hammock (FHT)

L1 – Woodland (W)

Stands of trees (5 meters or taller) that are of low density (10-49% cover). Trees are evenly spaced out and often in a matrix of sparse shrubs (<50%), graminoids, and/or herbaceous vegetation. If understory shrub cover ≥ 50%, then the community is treated as a L1 – Shrubland.

I. Regularly flooded low density stands of trees consisting of flood tolerant tree species.

L2 – <u>Wetland Woodland</u> (WW)

1. Regularly flooded low density stands of trees consisting of salt tolerant tree species.

L3 – <u>Mangrove Woodland</u> (WM)

2. Seasonally to semi-permanently flooded low density stands of freshwater tree species.

L3 – <u>Swamp Woodland</u> (WS)

II. Briefly flooded low density stands of trees consisting of semi-flood tolerant or flood intolerant woody species.

L2 – <u>Upland Woodland</u> (WU)

1. Stands of Slash Pine (*Pinus elliottii*) trees (10-100% cover) in a matrix composed of upland graminoids, herbs, and/or shrubs. Also known as a mesic pine flatwoods. This is an exception to the Woodland class because even in the case of Forest density (50-100% cover) this community is still considered **L1 – <u>Woodland</u> (W)**.

L3 – <u>Pine Woodland</u> (WUp)

2. Rarely inundated and well drained open canopy woodland containing a mixed species assemblage of tropical and temperate broad-leaved trees.

L3 – <u>Upland Hardwood Woodland</u> (WUH)

L2 – Wetland Woodland (WW)

<u>L3 – Mangrove Woodland (MW)</u>

1a. Black Mangrove (*Avicennia germinans*) in a matrix composed of salt marsh graminoids, herbs, and/or succulents.

L4 – Black Mangrove Woodland (WMa)

1a.1. Black Mangrove (*Avicennia germinans*) in a matrix composed predominately of graminoids.

L5 – Black Mangrove Woodland-Graminoid Marsh (WMaG)

1a.2. Black Mangrove (*Avicennia germinans*) in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L5 – Black Mangrove Woodland-Open Marsh (WMaO)

1a.3. Black Mangrove (*Avicennia germinans*) in a matrix composed predominately of succulents.

L5 – Black Mangrove Woodland-Succulent Marsh (WMaS)

1b. Buttonwood (*Conocarpus erectus*) in a matrix composed of salt marsh graminoids, herbs, and/or succulents.

L4 – Buttonwood Woodland (WMc)

1b.1. Buttonwood (*Conocarpus erectus*) in a matrix composed predominately of graminoids.

L5 – Buttonwood Woodland-Graminoid Marsh (WMcG)

1b.2. Buttonwood (*Conocarpus erectus*) in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation. Mangroves can occur in both salt and freshwater dominated marshes.

L5 – Buttonwood Woodland-Open Marsh (WMcO)

1b.3. Buttonwood (*Conocarpus erectus*) in a matrix composed predominately of succulents.

L5 – Buttonwood Woodland-Succulent Marsh (WMcS)

1c. White Mangrove (*Laguncularia racemosa*) in a matrix composed of salt marsh graminoids, herbs, and/or succulents.

L4 – White Mangrove Woodland (WMl)

1c.1. White Mangrove (*Laguncularia racemosa*) in a matrix composed predominately of graminoids.

L5 – White Mangrove Woodland-Graminoid Marsh (WMlG)

1c.2. White Mangrove (*Laguncularia racemosa*) in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation. Mangroves can occur in both salt and freshwater dominated marshes.

L5 – White Mangrove Woodland-Open Marsh (WMlO)

1d. Red Mangrove (*Rhizophora mangle*) in a matrix composed of salt marsh graminoids, herbs, and/or succulents.

L4 – Red Mangrove Woodland (WMr)

1d.1. Red Mangrove (*Rhizophora mangle*) in a matrix composed predominately of graminoids.

L5 – Red Mangrove Woodland-Graminoid Marsh (WMrG)

1d.2. Red Mangrove (*Rhizophora mangle*) in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L5 – Red Mangrove Woodland-Open Marsh (WMrO)

1d.3. Red Mangrove (*Rhizophora mangle*) in a matrix composed predominately of succulents.

L5 – Red Mangrove Woodland-Succulent Marsh (WMrS)

1e. Co-dominant mix (20% or less difference in percent cover) between two mangrove tree species in a matrix composed of salt marsh graminoids, herbs, and/or succulents.

L4 – Mixed Mangrove Woodland (WMX)

1e.1. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) trees.

L5 – Black Mangrove-Buttonwood Woodland (WMXac)

1e.1*i*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) trees in a matrix of graminoids.

L6 – Black Mangrove-Buttonwood Woodland-Graminoid Marsh (WMXacG)

1e.1*ii*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) trees in a matrix composed predominately of herbaceous vegetation.

L6 – Black Mangrove-Buttonwood Woodland-Herbaceous Marsh (WMXacH)

1e.1*iii*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) trees in a matrix of succulents.

L6 – Black Mangrove-Buttonwood Woodland-Succulent Marsh (WMXacS)

1e.2. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) trees.

L5 – Black Mangrove-White Mangrove Woodland (WMXal)

1e.2*i*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) trees in a matrix of graminoids.

L6 – Black Mangrove-White Mangrove Woodland-Graminoid Marsh (WMXalG)

1e.2*ii*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) trees with an open understory.

L6 – Black Mangrove-White Mangrove Woodland-Open Marsh (WMXalO)

1e.2*iii*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) trees in a matrix of succulents.

L6 – Black Mangrove-White Mangrove Woodland-Succulent Marsh (WMXalS)

1e.3. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) trees.

L5 – Black Mangrove-Red Mangrove Woodland (WMXar)

1e.3*i*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) trees in a matrix of graminoids.

L6 – Black Mangrove-Red Mangrove Woodland-Graminoid Marsh (WMXarG)

1e.3*ii*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) trees with an open understory.

L6 – Black Mangrove-Red Mangrove Woodland-Open Marsh (WMXarO)

1e.3*iii*. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) trees in a matrix of succulents.

L6 – Black Mangrove-Red Mangrove Woodland-Succulent Marsh (WMXarS)

1e.4. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) trees.

L5 – Buttonwood-Red Mangrove Woodland (WMXcr)

1e.4*i*. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) trees in a matrix of succulents.

L6 – Buttonwood-Red Mangrove Woodland-Succulent Marsh (WMXcrS)

1e.5. Co-dominant mix (20% or less difference in percent cover) of White Mangrove (*Laguncularia racemosa*) and Red Mangrove (*Rhizophora mangle*) trees.

L5 – White Mangrove-Red Mangrove Woodland (WMXlr)

1e.5*i*. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) trees in a matrix of graminoids.

L6 – White Mangrove-Red Mangrove Woodland-Graminoid Marsh (WMXlrG)

1e.5*ii*. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) trees with an open understory.

L6 – White Mangrove-Red Mangrove Woodland-Open Marsh (WMXlrO)

1e.5*iii*. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) trees in a matrix of succulents.

L6 – White Mangrove-Red Mangrove Woodland-Succulent Marsh (WMXlrS)

1e.6. Co-dominant mix of trees of three or more mangrove species including Black Mangrove (*Avicennia germinans*), Buttonwood (*Conocarpus erectus*), Red Mangrove (*Rhizophora mangle*), and White Mangrove (*Laguncularia racemosa*). This community is characterized by having no particular species in dominance, meaning there is 30% or less difference in percent cover between the most and least abundant mangrove tree species.

L5 – Mixed Mangrove Woodland-Mixed (WMXX)

1e.6*i*. Co-dominant mix (30% or less difference in percent cover) of trees of three or more mangrove species in a matrix of graminoids.

L6 – Mixed Mangrove-Graminoid Marsh (WMXXG)

1e.6*ii*. Co-dominant mix (30% or less difference in percent cover) of trees of three or more mangrove species, with an open understory.

L6 – Mixed Mangrove-Open Marsh (WMXXO)

1e.6*iii*. Co-dominant mix (30% or less difference in percent cover) of trees of three or more mangrove species in a matrix of succulents.

L6 – Mixed Mangrove-Succulent Marsh (WMXXS)

<u>L3 – Swamp Woodland (WS)</u>

1a. Cabbage Palm (Sabal palmetto) in a matrix composed of marsh graminoids, herbs, and/or shrubs.

L4 – Cabbage Palm Lowland (WSo)

1a.1. Cabbage Palm (*Sabal palmetto*) in a matrix composed predominately of marsh graminoids, such as Sawgrass (*Cladium jamaicense*), Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), among others.

L5 – Cabbage Palm Lowland-Graminoid Marsh (WSoG)

2a.2. Cabbage Palm (*Sabal palmetto*) in a matrix composed predominately of marsh shrubs, such as Buttonwood (*Conocarpus erectus*), Wax Myrtle (*Morella cerifera*), or other shrubs.

L5 – Cabbage Palm Lowland-Shrubs (WSoS)

1a.3. Cabbage Palm (*Sabal palmetto*) in a matrix composed of a co-dominant mix (20% or less difference in percent cover) of marsh graminoids and shrubs.

L5 – Cabbage Palm Lowland-Mixed (WSoX)

1b. Cypress (*Taxodium* spp.) in a matrix composed of Open Freshwater Marsh, graminoids, herbs, and/or shrubs.

L4 – Cypress Woodland (WSt)

1b.1. Cypress (*Taxodium* spp.) in a matrix composed predominately of graminoids, such as Sawgrass (*Cladium jamaicense*), Switchgrass (*Panicum virgatum*), Maidencane (*P. hemitomon*), among others.

L5 – Cypress Woodland-Graminoid Marsh (WStG)

1b.1*i*. Cypress (*Taxodium* spp.) in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Cypress Woodland-Sawgrass Marsh (WStGc)

1b.1*ii*. Bald Cypress (*Taxodium distichum*) and/or Pond Cypress (*T. ascendens*) in a mixed-graminoid matrix with not particular graminoid species in dominance.

L6 – Cypress Woodland-Mixed Graminoid Marsh (WStGX)

1b.2. Bald Cypress (*Taxodium distichum*) and/or Pond Cypress (*T. ascendens*) in a matrix composed predominately of Freshwater Graminoid Prairie species.

L5 – Cypress Woodland-Graminoid Prairie (WStGP)

1b.3. Co-dominant mix (20% or less difference in percent cover) of Cypress (*Taxodium* spp.) with Slash Pine (*Pinus elliottii*). Common understory vegetation can include mixed hardwood shrubs or various graminoids.

L5 – Cypress-Pine Woodland (WStp)

1b.3*i*. Bald Cypress (*Taxodium distichum*) and Slash Pine (*Pinus elliottii*) in a matrix composed predominately of freshwater graminoids species such as Sawgrass (*Cladium jamaicense*), Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Panicgrass (*Panicum* spp.), Little Bluestem (*Schizachyrium rhizomatum*), Flatsedge (*Cyperus* spp.), Fimbry (*Fimbristylis* spp.), Beaksedge (*Rhynchospora* spp.), Nutrush (*Scleria* spp.), Yelloweyed Grass (*Xyris* spp.), Bluestem (*Andropogon* spp.), Threeawn (*Aristida* spp.), Witchgrass (*Dichanthelium* spp.), Lovegrass (*Eragrostis* spp.), or Dropseed (*Sporobolus* spp.).

L6 – Cypress-Pine Woodland-Graminoid (WStpG)

1b.3*ii*. Bald Cypress (*Taxodium distichum*) and Slash Pine (*Pinus elliottii*) in a matrix composed of marsh or prairie graminoids and shrubs.

L6 – Cypress-Pine Woodland-Mixed (WStpX)

1b.4. Bald Cypress (*Taxodium distichum*) and/or Pond Cypress (*T. ascendens*) in a matrix composed predominately of shrubs, such as Wax Myrtle (*Morella cerifera*), Pond Apple (*Annona glabra*), and/or Cocoplum (*Chrysobalanus icaco*).

L5 – Cypress Woodland-Shrubs (WStS)

1b5. Bald Cypress (*Taxodium distichum*) and/or Pond Cypress (*T. ascendens*) in a matrix composed of marsh or prairie graminoids and shrubs.

L5 – Cypress Woodland-Mixed (WStX)

L2 – Upland Woodland (WU)

L3 – Pine Woodland (WUp)

1a. Slash Pine (*Pinus elliottii*) in a matrix composed of marsh graminoids, herbs, and/or shrubs. This community is commonly referred to as hydric pine flatwoods.

L4 – Pine Lowland (WSp)

1a.1. Slash Pine (*Pinus elliottii*) in a matrix composed predominately of graminoids, such as Sawgrass (*Cladium jamaicense*), Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Panicgrass (*Panicum* spp.), Little Bluestem (*Schizachyrium rhizomatum*), Flatsedge (*Cyperus* spp.), Fimbry (*Fimbristylis* spp.), Beaksedge (*Rhynchospora* spp.), Nutrush (*Scleria* spp.), Yelloweyed Grass (*Xyris* spp.), Bluestem (*Andropogon* spp.), Threeawn (*Aristida* spp.), Witchgrass (*Dichanthelium* spp.), Lovegrass (*Eragrostis* spp.), Dropseed (*Sporobolus* spp.), and Hairsedge (*Bulbostylis* spp.).

L5 – Pine Lowland-Graminoid (WSpG)

1a.2. Slash Pine (*Pinus elliottii*) in a matrix composed predominately of shrubs and trees, such as Wax Myrtle (*Morella cerifera*), Cabbage Palm (*Sabal palmetto*), Dahoon Holly (*Ilex cassine*), Red Bay (*Persea borbonia*), Buttonbush (*Cephalanthus occidentalis*), and other hardwood swamp species.

L5 – Pine Lowland-Shrubs (WSpS)

1a.3. Slash Pine (*Pinus elliotti*) in a matrix composed of a co-dominant mix (20% or less difference in percent cover) of lowland graminoids and shrubs.

L5 – Pine Lowland-Mixed (WSpX)

1b. Pine Upland found on moderately to well-drained sandy soils.

L4 – Pine Flatwoods (WUpF)

1b.1. Pine Flatwoods in a matrix composed predominately of shrubs and trees, such as Wax Myrtle (*Morella cerifera*), Saw Palmetto (*Serenoa repens*), Cabbage Palm (*Sabal palmetto*),

Fetterbush (*Lyonia lucida*), Tarflower (*Bejaria racemosa*), Rusty Staggerbush (*Lyonia ferruginea*), St. John's Wort (*Hypericum* spp.), and other upland hardwood species.

L5 – Pine Flatwoods-Shrubs (WUpFS)

1c. Pine Upland found on low ridges of oolitic limestone.

L4 – Pine Rockland (WUpR)

1c.1. Pine Rockland in a matrix composed predominately of graminoids, such as Bluestem (*Andropogon* spp.), Gamagrass (*Tripsacum* spp.), Threeawn (*Aristida* spp.), Lovegrass (*Eragrostis* spp.), Witchgrass (*Dichanthelium* spp.), Panicgrass (*Panicum* spp.), among others.

L5 – Pine Rockland-Graminoid Marsh (WUpRG)

1c.2. Pine Rockland in a matrix composed predominately of shrubs and trees, such as Wax Myrtle (*Morella cerifera*), Saw Palmetto (*Serenoa repens*), Cabbage Palm (*Sabal palmetto*), Rough velvetseed (*Guettarda scabra*), Varnishleaf (*Dodonaea viscosa*), St. John's-Wort (*Hypericum* spp.), and other upland hardwood species.

L5 – Pine Rockland-Shrubs (WUpRS)

1c.2*i*. Pine Rockland in a matrix composed predominately of Saw Palmetto (*Serenoa repens*).

L6 – Pine Rockland-Saw Palmetto (WUpRSn)

1c.3. Pine Rockland in a matrix composed of a co-dominant mix (20% or less difference in percent cover) of upland graminoids and shrubs.

L5 – Pine Rockland-Mixed (WUpRX)

<u>L3 – Upland Hardwood/Palm Woodland (WUH)</u>

2a. Cabbage Palm (*Sabal palmetto*) in a matrix composed of upland graminoids, herbs, and/or shrubs.

L4 – Cabbage Palm Upland (WUo)

2a.1. Cabbage Palm (*Sabal palmetto*) in a matrix composed predominately of upland graminoids like Bluestem (*Andropogon* spp.).

L5 – Cabbage Palm Upland-Graminoid Prairie (WUoGP)

2b. Mix of Gumbo Limbo (*Bursera simaruba*), Cabbage Palm (*Sabal palmetto*), Jamaican Dogwood (*Piscidia piscipula*), Pigeon Plum (*Coccoloba diversifolia*), Sea Grape (*C. uvifera*),West Indian Mahogany (*Swietenia mahagoni*), and White Stopper (*Eugenia axillaris*). May also contain Strangler Fig (*Ficus aurea*), False Mastic (*Sideroxylon foetidissimum*), Wax Myrtle (*Morella cerifera*), Myrsine (*Myrsine floridana*), and Willow Bustic (*Sideroxylon salicifolium*) among others.

L4 – Tropical Hardwood Woodland (WUHC)

2c. Mix of Live Oak (*Quercus virginiana*), False Tamarind (*Lysiloma latisiliquum*), Gumbo Limbo (*Bursera simaruba*), Poisonwood (*Metopium toxiferum*), Jamaican Dogwood (*Piscidia piscipula*), Pigeon Plum (*Coccoloba diversifolia*), Sea Grape (*C. uvifera*), and White Stopper (*Eugenia axillaris*). May also contain Strangler Fig (*Ficus aurea*), Swamp Bay (*Persea borbonia*), Dahoon Holly (*Ilex Cassine*), Sugarberry (*Celtis laevigata*), Spicewood (*Calyptranthes pallens*), False Mastic (*Sideroxylon foetidissimum*), Mahogany (*Swietenia mahagoni*), Wax Myrtle (*Morella cerifera*), and Myrsine (*Myrsine floridana*), Willow Bustic (*Sideroxylon salicifolium*), Red Maple (*Acer rubrum*), Lancewood (*Nectandra coriacea*), and Cabbage Palm (*Sabal palmetto*).

L4 – Tropical Hardwood Woodland (WUHS)

L1 – Shrubland (S)

Stands of shrubs (shorter than 5 meters) that are of high density (50-100% cover). Mangrove communities with mean canopy heights of 2 meters or less with canopy cover greater than 10% are an exception to the Shrubland Class and fall under L1 – Scrub class.

I. Shrubs adapted to regularly flooded conditions.

L2 – Wetland Shrubland (SW)

1. Regularly flooded salt tolerant shrubs. These communities are typically found along saltwater shorelines, interior tidal rivers and creeks, or estuarine zones. Mangrove shrubs (taller than 2 meters but shorter than 5 meters) that are of high density (50-100% cover) are considered **L1 – Shrubland (S)**, and if they are of low density (10-49% cover) they are considered **L1 – Scrub (C)**. Dwarf mangrove shrubs (2 meters or shorter) are an exception to the Shrubland class because regardless of density (10-100% cover) they are **L1 – Scrub (C)**.

L3 – Mangrove Shrubland (SM)

2. Seasonally to semi-permanently flooded freshwater shrubs primarily found in interior wetlands but may extend well into coastal zone.

L3 – Swamp Shrubland (SS)

II. Rarely flooded shrub communities consisting of semi-flood tolerant or flood intolerant woody species.

L2 – Upland Shrubland (SU)

1. Mix of Gumbo Limbo (*Bursera simaruba*), Poisonwood (*Metopium toxiferum*), Pigeon Plum (*Coccoloba diversifolia*), White Stopper (*Eugenia axillaris*), Strangler Fig (*Ficus aurea*), Red Bay (*Persea borbonia*), Dahoon Holly (*Ilex Cassine*), Saffron Plum (*Sideroxylon celastrinum*), Sugarberry (*Celtis laevigata*), False Mastic (*Sideroxylon foetidissimum*), Wax Myrtle (*Morella cerifera*), and Myrsine (*Myrsine floridana*). Similar to **L4 – Tropical Hardwood Hammock (FHS)** except average vegetation height is less than 5 meters.

L3 – Tropical Hardwood Shrubland (SUH)

2. Coastal Shrubland characterized by a mixed species assemblage of Sea Grape (*Coccoloba uvifera*), Gumbo Limbo (*Bursera simaruba*), West Indian Mahogany (*Swietenia mahagoni*), Spanish Stopper (*Eugenia foetida*), Poisonwood (*Metopium toxiferum*), Willow Bustic (*Sideroxylon salicifolium*), Jamaican Dogwood (*Piscidia piscipula*), Florida Thatch Palm (*Thrinax radiata*). Common understory components include Pricklypear (*Opuntia stricta*), Triangle Cactus (*Acanthocereus tetragonus*), among others.

L3 – Coastal Hardwood Shrubland (SUC)

L2 – Wetland Shrubland (SW)

L3 – Mangrove Shrubland (SM)

1a. Black Mangrove (*Avicennia germinans*) dominant Shrubland.

L4 – Black Mangrove Shrubland (SMa)

1b. Buttonwood (*Conocarpus erectus*) dominant Shrubland.

L4 – Buttonwood Shrubland (SMc)

1c. White Mangrove (*Laguncularia racemosa*) dominant Shrubland.

L4 – White Mangrove Shrubland (SMl)

1d. Red Mangrove (*Rhizophora mangle*) dominant Shrubland.

L4 – Red Mangrove Shrubland (SMr)

1e. Mix of mangrove tree species with no particular species having dominance.

L4 – Mixed Mangrove Shrubland (SMX)

1e.1. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) shrubs.

L5 – Black Mangrove-Buttonwood Shrubland (SMXac)

1e.2. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) shrubs.

L5 – Black Mangrove-White Mangrove Shrubland (SMXal)

1e.3. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) shrubs.

L5 – Black Mangrove-Red Mangrove Shrubland (SMXar)

1e.4. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and White Mangrove (*Laguncularia racemosa*) shrubs.

L5 – Buttonwood-White Mangrove Shrubland (SMXcl)

1e.5. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) shrubs.

L5 – Buttonwood-Red Mangrove Shrubland (SMXcr)

1e.6. Co-dominant mix (20% or less difference in percent cover) of White Mangrove (*Laguncularia racemosa*) and Red Mangrove (*Rhizophora mangle*) shrubs.

L5 – White Mangrove-Red Mangrove Shrubland (SMXlr)

1e.7. Co-dominant mix (20% or less difference in percent cover) of Red Mangrove (*Rhizophora mangle*) and Cocoplum (*Chrysobalanus icaco*) shrubs.

L5 – Red Mangrove-Cocoplum Shrubland (SMXry)

1e.8. Co-dominant mix consisting of three or more mangrove tree species. This community is characterized by having no particular species in dominance, meaning there is 20% or less difference in percent cover between the most and least abundant mangrove tree species.

L5 – Mixed Mangrove Shrubland-Mixed (SMXX)

L3 – Swamp Shrubland (SS)

2a. Cypress (*Taxodium* spp.) shrubs, < 5 meter tall, with 10-100% cover are considered **L1 – Scrub (C)**.

L4 – Cypress Scrub (CSt)

2b. Pond Apple (*Annona glabra*) dominant Shrubland.

L4 – Pond Apple Shrubland (SSa)

2c. Buttonbush (*Cephalanthus occidentalis*) dominant Shrubland.

L4 – Buttonbush Scrub (SSh)

2d. Dahoon Holly (*Ilex casine*) dominant Shrubland.

L4 – Dahoon Holly Shrubland (SSi)

2e. Wax Myrtle (*Morella cerifera*) dominant Shrubland.

L4 – Wax Myrtle Shrubland (SSm)

2f. Saltwater Falsewillow (*Baccharis angustifolia*), Silverling (*B. glomeruliflora*), and/or Groundsel Bush (*B. halimifolia*) dominant Shrubland.

L4 – Falsewillow Shrubland (SSr)

2g. Seasonally to semi-permanently flooded dominant to monotypic stands of Willow (*Salix caroliniana*) trees and shrubs in association with Leather Fern (*Acrostichum danaeifolium*), Cattail (*Typha* spp.), Sawgrass (*Cladium jamaicense*), Arrowhead (*Sagittaria* spp.), as well as other freshwater marsh species. This community is usually characterized by a minimum of 50% Willow (*Salix caroliniana*) trees and shrubs. This is an exception to the Forest class because even in the case of Forest height (5 meters or taller) this community is still considered **L1 – Shrubland (S)**.

L4 – Willow Shrubland (SSs)

2h. Seasonally flooded dominant to monotypic stands of Cocoplum (*Chrysobalanus icaco*) trees and shrubs in association with other wetland species, e.g., Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Dahoon Holly (*Ilex cassine*), Willow (*Salix caroliniana*), Wax Myrtle (*Morella cerifera*), Sweetbay (*Magnolia virginiana*), Cypress (*Taxodium* spp.), and/or Pond Apple (*Annona glabra*), or upland tree species at higher elevation sites, e.g., Poisonwood (*Metopium toxiferum*) and/or Pigeon Plum (*Coccoloba diversifolia*). This community is usually characterized by a minimum of 50% Cocoplum (*C. icaco*) trees and shrubs. This is an exception to the Forest class because even if average vegetation height is 5 meters or taller is still considered **L1 – Shrubland (S)**.

L4 – Cocoplum Shrubland (SSy)

2i. Mix of flood tolerant fresh water tree and shrub species like Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Cocoplum (*Chrysobalanus icaco*), Dahoon Holly (*Ilex cassine*), Willow (*Salix caroliniana*), Wax Myrtle (*Morella cerifera*), Sweetbay (*Magnolia virginiana*), Cypress (*Taxodium spp.*), Pond Apple (*Annona glabra*), and occasionally Buttonwood (*Conocarpus erectus*).

L4 – Bayhead Shrubland (SSB)

2j. Mixed assemblage of shrubs characterized by Buttonwood (*Conocarpus erectus*), Red Mangrove (*Rhizophora mangle*), Cocoplum (*Chrysobalanus icaco*), Wax Myrtle (*Morella cerifera*), Poisonwood (*Metopium toxiferum*), Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Sweetbay (*Magnolia virginiana*), Dahoon Holly (*Ilex cassine*), and occasionally West Indian Mahogany (*Swietenia mahagoni*). The signatures for Buttonwood and Dahoon Holly (*I. cassine*) are often confused in regions where the two species co-exist, leaving Red Mangrove (*R. mangle*) as the distinguishing component between the Transitional Bayhead and Bayhead classes in regions where both classes are likely to be found. The significant presence (at least 30% cover) of Buttonwood (*C. erectus*) or Red Mangrove (*R. mangle*) evenly distributed throughout the vegetation matrix sets this class apart from the Bayhead Shrubland class. Note that when these species are confined to the fringe or outer edge, they are not considered indicative of a Transitional Bayhead.

L4 – Transitional Bayhead Shrubland (SSBT)

2k. Mix of lowland hardwood trees such as Red Maple (*Acer rubrum*), Pop Ash (*Fraxinus caroliniana*), Red Bay (*Persea borbonia*), Swamp Bay (*P. palustris*), Sweetbay (*Magnolia virginiana*), Pond Apple (*Anona glabra*), Willow (*Salix caroliniana*), Cocoplum (*Chrysolabanus icaco*), Cabbage Palm (*Sabal palmetto*), Wax Myrtle (*Morella cerifera*), Dahoon Holly (*Ilex cassine*), and Cypress (*Taxodium* spp.).

L4 – Hardwood Swamp Shrubland (SSH)

L2 – Upland Shrubland (SU)

1. Coastal Shrubland characterized by a mixed species assemblage of Sea Grape (*Coccoloba uvifera*), Gumbo Limbo (*Bursera simaruba*), West Indian Mahogany (*Swietenia mahagoni*), Spanish Stopper (*Eugenia foetida*), Poisonwood (*Metopium toxiferum*), Willow Bustic (*Sideroxylon salicifolium*), Jamaican Dogwood (*Piscidia piscipula*), Florida Thatch Palm (*Thrinax radiata*). Common understory components include Pricklypear (*Opuntia stricta*), Triangle Cactus (*Acanthocereus tetragonus*), among others.

L3 – Coastal Hardwood Shrubland (SUC)

2. Mix of Gumbo Limbo (*Bursera simaruba*), Poisonwood (*Metopium toxiferum*), Pigeon Plum (*Coccoloba diversifolia*), White Stopper (*Eugenia axillaris*), Strangler Fig (*Ficus aurea*), Swamp Bay (*Persea borbonia*), Dahoon Holly (*Ilex Cassine*), Saffron Plum (*Sideroxylon celastrinum*), Sugarberry (*Celtis laevigata*), False Mastic (*S. foetidissimum*), Wax Myrtle (*Morella cerifera*), and Myrsine (*Myrsine floridana*); similar to **L4 – <u>Tropical Hardwood Hammock</u> (FHS)** except canopy heights are less than 5 meters.

L3 – Tropical Hardwood Shrubland (SUH)

3. Saw Palmetto (*Serenoa repens*) dominant Shrubland.

L3 – Saw Palmetto Shrubland (SUn)

L1 – Scrub (C)

Stands of shrubs (shorter than 5 meters) that are of low density (10-49% cover) and evenly spaced out in a matrix of graminoids and/or herbaceous vegetation. Mangrove communities with mean canopy heights of 2 meters or less with canopy cover greater than 10% are an exception to the Shrubland Class and fall under L1 – Scrub class.

I. Shrubs adapted to regularly flooded conditions.

L2 – Wetland Scrub (CW)

1. Regularly flooded salt tolerant shrubs. These communities are typically found along saltwater shorelines, interior tidal rivers and creeks, or estuarine zones. Mangrove shrubs (taller than 2 meters but shorter than 5 meters) that are of high density (50-100% cover) are considered **L1 – Shrubland (S)**, and if they are of low density (10-49% cover) they are considered **L1 – Scrub (C)**. Dwarf mangrove shrubs (2 meters or shorter) are an exception to the Shrubland class because regardless of density (10-100% cover) they are **L1 – Scrub (C)**.

L3 – Mangrove Scrub (CM)

2. Seasonally to semi-permanently flooded freshwater shrubs primarily found in interior wetlands but may extend well into coastal zone.

L3 – Swamp Scrub (CS)

II. Rarely flooded shrub communities consisting of semi-flood tolerant or flood intolerant woody species found on marl or rocky substrate.

L2 – Upland Scrub (CU)

1. Saw Palmetto (*Serenoa repens*) Scrub in a matrix of short-hydroperiod graminoids species such as Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Sawgrass (*Cladium jamaicense*), Little Bluestem (*Schizachyrium* spp.), among others.

L3 – Saw Palmetto Scrub (CUn)

2. Cabbage Palm (*Sabal palmetto*) dominant scrub.

L3 – Cabbage Palm Upland Scrub (CUo)

3. Coastal Scrub characterized by a mixed species assemblage of Sea Grape (*Coccoloba uvifera*), Gumbo Limbo (*Bursera simaruba*), West Indian Mahogany (*Swietenia mahagoni*), Spanish Stopper (*Eugenia foetida*), Poisonwood (*Metopium toxiferum*), Willow Bustic (*Sideroxylon salicifolia*), Jamaican Dogwood (*Piscidia piscipula*), Florida Thatch Palm (*Thrinax radiata*), Florida Swampprivet (*Forestiera segregata*), and Yellow Necklacepod (*Sophora tomentosa*).

L3 – Coastal Hardwood Scrub (CUC)

4. Mix of dwarf trees and/or shrubs such as Poisonwood (*Metopium toxiferum*), Red Bay (*Persea borbonia*), Myrsine (*Myrsine floridana*), Wax Myrtle (*Morella cerifera*), Dahoon Holly (*Ilex cassine*), Buttonwood (*Conocarpus erectus*), Cocoplum (*Chrysobalanus icaco*), Varnish Leaf (*Dodonaea viscosa*), Cabbage Palm (*Sabal palm*etto), West Indian Mahogany

(*Swietenia mahagoni*), an/or Saffron Plum (*Sideroxylon celastrinum*) in a matrix of prairie grasses, herbs, and, at times, including various species of vines. Canopy density will range from 10-49%. This community is typically found in marl prairie environments or along the edge of pine rocklands on marl or rocky soils.

L3 – Upland Hardwood Scrub (CUW)

L2 – Wetland Scrub (CW)

L3 – Mangrove Scrub (CM)

1a. Black Mangrove (*Avicennia germinans*) dominant scrub.

L4 – Black Mangrove Scrub (CMa)

1a.1. Black Mangrove (*Avicennia germinans*) scrub with an average height up to 2m, and mangrove cover of 85% or more.

L5 – Black Mangrove Scrub-Dominant (CMaD)

1a.2. Black Mangrove (*Avicennia germinans*) scrub in a matrix composed predominately of graminoids.

L5 – Black Mangrove Scrub-Graminoid Marsh (CMaG)

1a.2*i*. Black Mangrove (*Avicennia germinans*) scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L6 – Black Mangrove Scrub-Black Rush Marsh (CMaGj)

1a.3. Black Mangrove (*Avicennia germinans*) scrub in a matrix composed predominately of herbaceous vegetation.

L5 – Black Mangrove Scrub-Herbaceous Marsh (CMaH)

1a.4. Black Mangrove (*Avicennia germinans*) scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L5 – Black Mangrove Scrub-Open Marsh (CMaO)

1a.5. Black Mangrove (Avicennia germinans) scrub in a matrix composed predominately of succulents.

L5 – Black Mangrove Scrub-Succulent Marsh (CMaS)

1b. Seaside Oxeye (*Borrichia* spp.) shrubs with 10–100% cover. This is an exception to the Shrubland class because even in the case of Shrubland density (50–100% cover) this community is still considered **L1 – Scrub (C)**.

L4 – Sea-Oxeye Shrubland (CMb)

1c. Buttonwood (*Conocarpus erectus*) dominant scrub.

L4 – Buttonwood Scrub (CMc)

1c.1. Buttonwood (*Conocarpus erectus*) scrub with an average height up to 2m, and mangrove cover of 85% or more.

L5 – Buttonwood Scrub-Dominant (CMcD)

1c.2. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of graminoids.

L5 – Buttonwood Scrub-Graminoid Marsh (CMcG)

1c.2*i*. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Buttonwood Scrub-Sawgrass Marsh (CMcGc)

1c.2*ii*. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L6 – Buttonwood Scrub-Saltgrass Marsh (CMcGd)

1c.2*iii*. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L6 – Buttonwood Scrub-Spikerush Marsh (CMcGe)

1c.2*iv*. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Firmbry (*Fimbristylis* spp.).

L6 – Buttonwood Scrub-Fimbry Marsh (CMcGf)

1c.2*iv*. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L6 – Buttonwood Scrub-Black Rush Marsh (CMcGj)

1c.2*v*. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L6 – Buttonwood Scrub-Sand Cordgrass Marsh (CMcGn)

1c.3. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L5 – Buttonwood Scrub-Open Marsh (CMcO)

1c.4. Buttonwood (*Conocarpus erectus*) scrub in a matrix composed predominately of succulents.

L5 – Buttonwood Scrub-Succulent Marsh (CMcS)

1d. White Mangrove (*Laguncularia racemosa*) dominant scrub.

L4 – White Mangrove Scrub (CMl)

1d.1. White Mangrove (*Laguncularia racemosa*) scrub with an average height up to 2m, and mangrove cover of 85% or more.

L5 – White Mangrove Scrub-Dominant (CMlD)

1d.2. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of succulents.

L5 – White Mangrove Scrub- Graminoid Marsh (CMlG)

1d.2*i*. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – White Mangrove Scrub-Sawgrass Marsh (CMlGc)

1d.2*ii*. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L6 – White Mangrove Scrub-Saltgrass Marsh (CMlGd)

1d.2*iii*. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L6 – White Mangrove Scrub-Black Rush Marsh (CMlGj)

1d.2*iv*. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of Sand Cordgrass (*Spartina* bakeri).

L6 – White Mangrove Scrub-Sand Cordgrass Marsh (CMlGn)

1d.3. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L5 – White Mangrove Scrub- Open Marsh (CMlO)

1d.4. White Mangrove (*Laguncularia racemosa*) scrub in a matrix composed predominately of succulents.

L5 – White Mangrove Scrub-Succulent Marsh (CMlS)

1e. Red Mangrove (*Rhizophora mangle*) dominant scrub.

L4 – Red Mangrove Scrub (CMr)

1e.1. Red Mangrove (*Rhizophora mangle*) scrub with an average height up to 2m, and mangrove cover of 85% or more.

L5 – Red Mangrove Scrub-Dominant (CMrD)

1e.2. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of graminoids.

L5 – Red Mangrove Scrub-Graminoid Marsh (CMrG)

1e.2*i*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Red Mangrove Scrub-Sawgrass Marsh (CMrGc)

1d.2*ii*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L6 – Red Mangrove Scrub-Saltgrass Marsh (CMrGd)

1e.2*iii*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L6 – Red Mangrove Scrub-Spikerush Marsh (CMrGe)

1e.2*iv*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L6 – Red Mangrove Scrub-Black Rush Marsh (CMrGj)

1e.2*v*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Cordgrass (*Spartina* spp.).

L6 – Red Mangrove Scrub-Cordgrass Marsh (CMrGn)

1e.2*vi*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Cattail (*Typha* spp.).

L6 – Red Mangrove Scrub-Cattail Marsh (CMrGt)

1e.2*vii*. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed of two or more graminoid marsh species like Spikerush (*Eleocharis* spp.), Panicgrass (*Panicum* spp.), Sawgrass (*Cladium jamaicense*), Beakrush (*Rhynchospora* spp.), and Cattail (*Typha* spp.).

L6 – Red Mangrove Scrub-Mixed Graminoid Marsh (CMrGX)

1e.2. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation. Mangroves can occur in both salt and freshwater dominated marshes.

L5 – Red Mangrove Scrub-Open Marsh (CMrO)

1e.3. Red Mangrove (*Rhizophora mangle*) scrub in a matrix composed predominately of succulents.

L5 – Red Mangrove Scrub-Succulent Marsh (CMrS)

1f. Co-dominant mix (20% or less difference in percent cover) between two mangrove tree species with no particular species having dominance.

L4 – Mixed Mangrove Scrub (CMX)

1f.1. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Buttonwood (*Conocarpus erectus*) scrub.

L5 – Black Mangrove-Buttonwood Scrub (CMXac)

1f.1*i*. Black Mangrove-Buttonwood scrub with an average height up to 2m, and mangrove cover of 85% or more.

L6 – Black Mangrove-Buttonwood Scrub-Dominant (CMXacD)

1f.1*ii*. Black Mangrove-Buttonwood Scrub in a matrix composed predominately of graminoids.

L6 – Black Mangrove-Buttonwood Scrub-Graminoid Marsh (CMXacG)

1f.1*ii.a.* Black Mangrove-Buttonwood scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L7 – Black Mangrove-Buttonwood Scrub-Saltgrass Marsh (CMXacGd)

1f.1*iii*. Black Mangrove-Buttonwood scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L6 – Black Mangrove-Buttonwood Scrub-Open Marsh (CMXacO)

1f.1*iv*. Black Mangrove-Buttonwood scrub in a matrix composed predominately of succulents.

L6 – Black Mangrove-Buttonwood Scrub-Succulent Marsh (CMXacS)

1f.2. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and White Mangrove (*Laguncularia racemosa*) trees.

L5 – Black Mangrove-White Mangrove Scrub (CMXal)

1f.2*i*. Black Mangrove-White Mangrove Scrub with an average height up to 2 meters (6.5 ft), and mangrove cover of 85% or more.

L6 – Black Mangrove-White Mangrove Scrub-Dominant (CMXalD)

1f.2*ii*. Black Mangrove-White Mangrove Scrub in a matrix composed predominately of graminoids.

L6 – Black Mangrove-White Mangrove Scrub-Graminoid Marsh (CMXalG)

1f.2*ii.a.* Black Mangrove-White Mangrove Scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L7 – Black Mangrove-White Mangrove Scrub-Saltgrass Marsh (CMXalGd)

1f.2I*i.b.* Black Mangrove-White Mangrove Scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L7 – Black Mangrove-White Mangrove Scrub-Sand Cordgrass Marsh (CMXalGn)

1f.2*iii*. Black Mangrove-White Mangrove Scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L6 – Black Mangrove-White Mangrove Scrub-Open Marsh (CMXalO)

1f.2*iv*. Black Mangrove-White Mangrove Scrub in a matrix composed predominately of succulents.

L6 – Black Mangrove-White Mangrove Scrub-Succulent Marsh (CMXalS)

1f.3. Co-dominant mix (20% or less difference in percent cover) of Black Mangrove (*Avicennia germinans*) and Red Mangrove (*Rhizophora mangle*) scrub.

L5 – Black Mangrove-Red Mangrove Scrub (CMXar)

1f.3i. Black Mangrove-Red Mangrove Scrub with an average height up to 2 meters (6.5 ft), and mangrove cover of 85% or more.

L6 – Black Mangrove-Red Mangrove Scrub-Dominant (CMXarD)

1f.3*ii*. Black Mangrove-Red Mangrove Scrub in a matrix composed predominately of graminoids.

L6 – Black Mangrove-Red Mangrove Scrub-Graminoid Marsh (CMXarG)

1f.3*ii.a.* Black Mangrove-Red Mangrove Scrub in a matrix composed predominately of Sawgrass (*Cladium Jamaicense*).

L7 – Black Mangrove-Red Mangrove Scrub-Sawgrass Marsh (CMXarGc)

1f.3*ii.b.* Black Mangrove-Red Mangrove Scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L7 – Black Mangrove-Red Mangrove Scrub-Saltgrass Marsh (CMXarGd)

1f.3*iii*. Black Mangrove-Red Mangrove Scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L6 – Black Mangrove-Red Mangrove Scrub-Open Marsh (CMXarO)

1f.3*iv*. Black Mangrove-Red Mangrove Scrub in a matrix composed predominately of succulents.

L6 – Black Mangrove-Red Mangrove Scrub-Succulent Marsh (CMXarS)

1f.4. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and White Mangrove (*Laguncularia racemosa*) scrub.

L5 – Buttonwood-White Mangrove Scrub (CMXcl)

1f.4*i*. Buttonwood-White Mangrove Scrub with an average height up to 2m, and mangrove cover of 85% or more.

L6 – Buttonwood-White Mangrove Scrub-Dominant (CMXclD)

1f.4*ii*. Buttonwood-White Mangrove Scrub in a matrix composed predominately of graminoids.

L6 – Buttonwood-White Mangrove Scrub-Graminoid Marsh (CMXclG)

1f.4*ii.a.* Buttonwood-White Mangrove Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L7 – Buttonwood-White Mangrove Scrub-Sawgrass Marsh (CMXclGc)

1f.4*ii.b.* Buttonwood-White Mangrove Scrub in a matrix composed predominately Saltgrass (*Distichlis spicata*).

L7 – Buttonwood-White Mangrove Scrub-Saltgrass Marsh (CMXclGd)

1f.4*ii.c.* Buttonwood-White Mangrove Scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L7 – Buttonwood-White Mangrove Scrub-Black Rush Marsh (CMXclGj)

1f.4*i*.d. Buttonwood-White Mangrove Scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L7 – Buttonwood-White Mangrove Scrub-Sand Cordgrass Marsh (CMXclGn)

1f.4*ii.e*. Buttonwood-White Mangrove Scrub in a matrix composed predominately of Kissimmeegrass (*Paspalidium geninatum*).

L7 – Buttonwood-White Mangrove Scrub-Kissimmeegrass Marsh (CMXclGu)

1f.4*iii*. Buttonwood-White Mangrove Scrub in a matrix composed predominately of succulents.

L6 – Buttonwood-White Mangrove Scrub-Succulent Marsh (CMXclS)

1f.5. Co-dominant mix (20% or less difference in percent cover) of Buttonwood (*Conocarpus erectus*) and Red Mangrove (*Rhizophora mangle*) scrub.

L5 – Buttonwood-Red Mangrove Scrub (CMXcr)

1f.5*i*. Buttonwood-Red Mangrove Scrub with an average height up to 2 meters, and mangrove cover of 85% or more.

L6 – Buttonwood-Red Mangrove Scrub-Dominant (CMXcrD)

1f.5*ii.* Buttonwood-Red Mangrove Scrub in a matrix composed predominately of graminoids.

L6 – Buttonwood-Red Mangrove Scrub-Graminoid Marsh (CMXcrG)

1f.5*ii.a.* Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L7 – Buttonwood-Red Mangrove Scrub-Sawgrass Marsh (CMXcrGc)

1f.5*ii.b.* Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L7 – Buttonwood-Red Mangrove Scrub-Saltgrass Marsh (CMXcrGd)

1f.5*ii.c*. Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L7 – Buttonwood-Red Mangrove Scrub-Spikerush Marsh (CMXcrGe)

1f.5*ii.d*. Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L7 – Buttonwood-Red Mangrove Scrub-Black Rush Marsh (CMXcrGj)

1f.5*ii.e*. Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L7 – Buttonwood-Red Mangrove Scrub-Sand Cordgrass Marsh (CMXcrGn)

1f.5*ii.f*. Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Kissimmeegrass (*Paspalidium geminatum*).

L7 – Buttonwood-Red Mangrove Scrub-Kissimmeegrass Marsh (CMXcrGu)

1f.5*iii*. Buttonwood-Red Mangrove Scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L6 – Buttonwood-Red Mangrove Scrub-Open Marsh (CMXcrO)

1f.5*iv*. Buttonwood-Red Mangrove Scrub in a matrix composed predominately of succulents.

L6 – Buttonwood-Red Mangrove Scrub-Succulent Marsh (CMXcrS)

1f.6. Co-dominant mix (20% or less difference in percent cover) of White Mangrove (*Laguncularia racemosa*) and Red Mangrove (*Rhizophora mangle*) scrub.

L5 – White Mangrove-Red Mangrove Scrub (CMXlr)

1f.6*i*. White Mangrove-Red Mangrove Scrub with an average height up to 2 meters, and mangrove cover of 85% or more.

L6 – White Mangrove-Red Mangrove Scrub-Dominant (CMXlrD)

1f.6*ii.* White Mangrove-Red Mangrove Scrub in a matrix composed predominately of graminoids.

L6 – White Mangrove-Red Mangrove Scrub-Graminoid Marsh (CMXlrG)

1f.6*ii.a.* White Mangrove-Red Mangrove Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L7 – White Mangrove-Red Mangrove Scrub-Sawgrass Marsh (CMXlrGc)

1f.6*ii.c*. White Mangrove-Red Mangrove Scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L7 – White Mangrove-Red Mangrove Scrub-Saltgrass Marsh (CMXlrGd)

1f.6*ii.c*. White Mangrove-Red Mangrove Scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L7 – White Mangrove-Red Mangrove Scrub-Black Rush Marsh (CMXlrGj)

1f.6*ii.d*. White Mangrove-Red Mangrove Scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L7 – White Mangrove-Red Mangrove Scrub-Sand Cordgrass Marsh (CMXlrGn)

1f.6*ii.e*. White Mangrove-Red Mangrove Scrub in a matrix composed predominately of Cattail (*Typha* spp.).

L7 – White Mangrove-Red Mangrove Scrub-Cattail Marsh (CMXlrGt)

1f.6*iii*. White Mangrove-Red Mangrove Scrub in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L6 – White Mangrove-Red Mangrove Scrub-Open Marsh (CMXlrO)

1f.6*iv*. White Mangrove-Red Mangrove Scrub in a matrix composed predominately of succulents.

L6 – White Mangrove-Red Mangrove Scrub-Succulent Marsh (CMXlrS)

1f.7. Co-dominant mix consisting of three or more mangrove tree species. This community is characterized by having no particular species in dominance, meaning there is 20% or less difference in percent cover between the most and least abundant mangrove tree species.

L5 – Mixed Mangrove Scrub-Mixed (CMXX)

1e.7*i*. Mixed Mangrove Scrub-Mixed with an average height up to 2m, and mangrove cover of 85% or more.

L6 – Mixed Mangrove Scrub-Mixed-Dominant (CMXXD)

1f.7*ii*. Mixed Mangrove Scrub-Mixed in a matrix composed predominately of graminoids.

L6 – Mixed Mangrove Scrub-Mixed-Graminoid Marsh (CMXXG)

1f.7*ii.a.* Mixed Mangrove Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L7 – Mixed Mangrove Scrub-Sawgrass Marsh (CMXXGc)

1f.7*ii.b.* Mixed Mangrove Scrub in a matrix composed predominately of Saltgrass (*Distichlis spicata*).

L7 – Mixed Mangrove Scrub-Saltgrass Marsh (CMXXGd)

1f.7*iii.c*. Mixed Mangrove Scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L7 – Mixed Mangrove Scrub-Black Rush Marsh (CMXXGj)

1f.7*iv.d*. Mixed Mangrove Scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L7 – Mixed Mangrove Scrub-Cordgrass Marsh (CMXXGn)

1f.7*iii*. Mixed Mangrove Scrub-Mixed in a matrix composed predominately of Open Freshwater Marsh or Open Saltwater Marsh, both of which have less than 15% marsh vegetation.

L6 – Mixed Mangrove Scrub-Mixed-Open Marsh (CMXXO)

1f.7*iv*. Mixed Mangrove Scrub-Mixed in a matrix composed predominately of succulents.

L6 – Mixed Mangrove Scrub-Mixed-Succulent Marsh (CMXXS)

L3 – Swamp Scrub (CS)

2a. Pond Apple (*Annona glabra*) characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Pond Apple Scrub (CSa)

2a.1. Pond Apple Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Pond Apple Scrub-Graminoid Marsh (CSaG)

2a.1*i*. Pond Apple Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Pond Apple Scrub-Sawgrass Marsh (CSaGc)

2a.1*ii*. Pond Apple Scrub in a matrix composed predominately of Beakrush (*Rhynchospora* spp.)

L6 – Pond Apple Scrub-Beakrush Marsh (CSaGr)

2a.1*iii*. Pond Apple Scrub in a mixed-graminoid matrix with no particular graminoid species in dominance.

L6 – Pond Apple Scrub-Panicgrass Marsh (CSaGX)

2b. Buttonbush (*Cephalanthus occidentalis*) characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Buttonbush Scrub (CSh)

2b.1. Buttonbush Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Buttonbush Scrub-Graminoid Marsh (CShG)

2b.1*i*. Buttonbush Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Buttonbush Scrub-Sawgrass Marsh (CShGc)

2b.1*ii*. Buttonbush Scrub scrub in a matrix composed of two or more graminoid marsh species like Spikerush (*Eleocharis* spp.), Panicgrass (*Panicum* spp.), Sawgrass (*Cladium jamaicense*), and/or Beakrush (*Rhynchospora* spp.).

L6 – Buttonbush Scrub-Mixed Graminoid Marsh (CShGX)

2c. Dahoon Holly (*Ilex cassine*) characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Dahoon Holly Scrub (CSi)

2c.1. Dahoon Holly Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Dahoon Holy Scrub-Graminoid Marsh (CSiG)

2c.1*i*. Dahoon Holly Scrub in a mixed-graminoid matrix with not particular graminoid species in dominance.

L6 – Dahoon Holly Scrub-Mixed Graminoid Marsh (CSiGX)

2d. Wax Myrtle (*Morella cerifera*) characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Wax Myrtle Scrub (CSm)

2d.1. Wax Myrtle Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Wax Myrtle Scrub-Graminoid Marsh (CSmG)

2d.1*i*. Wax Myrtle Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Wax Myrtle Scrub-Sawgrass Marsh (CSmGc)

2d.1*ii*. Wax Myrtle Scrub in a matrix composed predominately of Cattail (*Typha* spp.).

L6 – Wax Myrtle Scrub-Cattail Marsh (CSmGt)

2d.2. Wax Myrtle Scrub in a matrix composed predominately of herbaceous vegetation.

L5 – Wax Myrtle Scrub-Mixed Graminoid Marsh (CSmH)

2d.3. Wax Myrtle Scrub in a matrix composed predominately of Freshwater Graminoid Prairie species.

L5 – Wax Myrtle Scrub-Graminoid Prairie (CSmGP)

2e. Cabbage Palm (Sabal palmetto) Scrub characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Cabbage Palm Swamp Scrub (CSo)

2e.1. Cabbage Palm Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Cabbage Palm Swamp Scrub-Graminoid Marsh (CSoG)

2e.1*i*. Cabbage Palm Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Cabbage Palm Swamp Scrub-Sawgrass Marsh (CSoGc)

2f. Saltwater Falsewillow (*Baccharis angustifolia*), Silverling (*B. glomeruliflora*), and/or Groundsel Bush (*B. halimifolia*) characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Falsewillow Scrub (CSr)

2f.1. Falsewillow Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Falsewillow Scrub-Graminoid Marsh (CSrG)

2f.1*i*. Saltwater Falsewillow (*Baccharis angustifolia*), Silverling (*B. glomeruliflora*), and/or Groundsel Bush (*B. halimifolia*) Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Falsewillow Scrub-Sawgrass Marsh (CSrGc)

2f.1*ii*. Falsewillow Scrub in a mixed-graminoid matrix with not particular graminoid species in dominance.

L6 – Falsewillow Scrub-Mixed Graminoid Marsh (CSrGX)

2f.2. Falsewillow Scrub in a matrix composed predominately of herbaceous vegetation.

L5 – Falsewillow Scrub-Herbaceous Marsh (CSrH)

2g. Willow (*Salix caroliniana*) characterized by canopy densities from 10-49% in a matrix of graminoids and/or herbaceous vegetation.

L4 – Willow Scrub (CSs)

2g.1. Willow Scrub in a matric composed predominately of broadleaf emergent vegetation.

L5 – Willow Scrub-Emergent Marsh (CSsE)

2g.2. Willow Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Willow Scrub-Graminoid Marsh (CSsG)

2g.2*i*. Willow Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Willow Scrub-Sawgrass Marsh (CSsGc)

2f.2*ii*. Willow Scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L6 – Willow Scrub-Spikerush Marsh (CSsGe)

2g.2*iii*. Willow Scrub in a matrix composed predominately of Common Reed (*Phragmites* spp.).

L6 – Willow Scrub-Common Reed Marsh (CSsGg)

2g.2*iv*. Willow Scrub in a matrix composed predominately of Sand Cordgrass (*Spartina bakeri*).

L6 – Willow Scrub-Sand Cordgrass Marsh (CSsGn)

2g.2*v*. Willow Scrub in a matrix composed predominately of Cattail (*Typha* spp.).

L6 – Willow Scrub-Cattail Marsh (CSsGt)

2g.2*vi*. Willow Scrub in a mixed-graminoid matrix with not particular graminoid species in dominance.

L6 – Willow Scrub-Mixed Graminoid Marsh (CSsGX)

2g.3. Willow (*Salix caroliniana*) in a matrix composed predominately of herbaceous vegetation.

L5 – Willow Scrub-Herbaceous Marsh (CSsH)

2h. Cypress (*Taxodium* spp.) shrubs with 10-100% cover. This is an exception to the Shrubland class because even in the case of Shrubland density (50-100% cover) this community is still considered **L1 – Scrub (C)**.

L4 – Cypress Scrub (CSt)

2h.1. Cypress Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Cypress Scrub-Graminoid Marsh (CStG)

2h.1*i*. Cypress Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Cypress Scrub-Sawgrass Marsh (CStGc)

2h.1*ii*. Cypress Scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L6 – Cypress Scrub-Spikerush Marsh (CStGe)

2h.1*iii*. Cypress Scrub in a matrix composed predominately of Beakrush (*Rhynchospora* spp.).

L6 – Cypress Scrub-Beakrush Marsh (CStGr)

2h.1*iv*. Cypress Scrub in a matrix composed predominately of Cattails (*Typha* spp.).

L6 – Cypress Scrub-Cattail Marsh (CStGt)

2h.1*v*. Cypress Scrub in a mixed-graminoid matrix with no particular graminoid species in dominance.

L6 – Cypress Scrub-Mixed Graminoid Marsh (CStGX)

2h.2. Cypress (*Taxodium* spp.) Scrub in a matrix composed predominately of Freshwater Graminoid Prairie species.

L5 – Cypress Scrub-Graminoid Prairie (CStGP)

2h.3. Cypress (*Taxodium* spp.) Scrub with at least 10% cover of other hardwood trees and/or shrubs such as Wax Myrtle (*Morella cerifera*), Cabbage palm (*Sabal palmetto*), Red Maple (*Acer rubrum*), Myrsine (*Myrsine floridiana*) and/or Dahoon Holly (*Ilex Cassine*), Cocoplum (*Chrysobalanus icaco*), Swamp Bay (*Persea palustris*) and/or Pond Apple (*Anona glabra*).

L5 – Cypress-Hardwood Scrub (CStW)

2h.3*i*. Cypress (*Taxodium* spp.)-Hardwood Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L6 – Cypress-Hardwood Scrub-Graminoid Marsh (CStWG)

2g.3*i.a*. Cypress-Hardwood Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L7 – Cypress-Hardwood Scrub-Sawgrass Marsh (CStWGc)

2h.3*ii*. Cypress (*Taxodium* spp.)-hardwood scrub mix in a matrix composed predominately of Freshwater Graminoid Prairie species.

L6 – Cypress-Hardwood Scrub-Graminoid Prairie (CStWGP)

2i. Mixed assemblage of dwarf trees and/or shrubs such as Red Bay (*Persea borbonia*), Sweet Bay (*Magnolia virginiana*), Pond Apple (*Annona glabra*), Willow (*Salix caroliniana*), Wax Myrtle (*Morella cerifera*), Dahoon Holly (*Ilex cassine*), and/or Cocoplum (*Chrysobalanus icaco*) in a matrix of long-hydroperiod grasses, herbs, and, at times, including various species of vines. Canopy density will range from 10-49%. This community is typical of tree island tails or drainage areas with peat soils.

L4 – Bayhead Swamp Scrub (CSB)

2i.1. Bayhead Swamp Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Bayhead Swamp Scrub-Graminoid Marsh (CSBG)

2i.1*i*. Bayhead Swamp Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Bayhead Swamp Scrub-Sawgrass Marsh (CSBGc)

2i.1*ii*. Bayhead Swamp Scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L6 – Bayhead Swamp Scrub-Spikerush Marsh (CSBGe)

2i.1*iii*. Bayhead Swamp Scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L6 – Bayhead Swamp Scrub-Black Rush Marsh (CSBGj)

2i.1*iv*. Bayhead Swamp Scrub in a matrix composed predominately of Cordgrass (*Spartina bakeri*).

L6 – Bayhead Swamp Scrub-Cordgrass Marsh (CSBGn)

2i.1*v*. Bayhead Swamp Scrub in a matrix composed predominately of Cattail (*Typha* spp.).

L6 – Bayhead Swamp Scrub-Cattail Marsh (CSBGt)

2i.1*vi*. Bayhead Swamp Scrub in a mixed-graminoid matrix with not particular graminoid species in dominance.

L6 – Bayhead Swamp Scrub-Graminoid Marsh (CSBGX)

2i.2. Bayhead Swamp Scrub in a matrix composed predominately of herbaceous vegetation.

L5 – Bayhead Swamp Scrub-Herbaceous Marsh (CSBH)

2j. Mixed assemblage of shrubs characterized by Buttonwood (*Conocarpus erectus*), Red Mangrove (*Rhizophora mangle*), Cocoplum (*Chrysobalanus icaco*), Wax Myrtle (*Morella cerifera*), Poisonwood (*Metopium toxiferum*), and occasionally West Indian Mahogany (*Swietenia mahagoni*), Swamp Bay (*Persea palustris*), Red Bay (*P. borbonia*), Sweetbay (*Magnolia virginiana*), and Dahoon Holly (*Ilex cassine*). The signatures for Buttonwood and Dahoon Holly (*I. cassine*) are often confused in regions where the two species co-exist, leaving Red Mangrove (*R. mangle*) as the distinguishing component between the Transitional Bayhead and Bayhead classes in regions where both classes are likely to be found. The significant presence (at least 30% cover) of Buttonwood (*C. erectus*) or Red Mangrove (*R. mangle*) evenly distributed throughout the vegetation matrix sets this class apart from the Bayhead Scrub class. Note that when these species are confined to the outside fringe, they are not considered indicative of a Transitional Bayhead. Shrub cover will range from 10-49%.

L4 – Transitional Bayhead Swamp Scrub (CSBT)

2j.1. Transitional Bayhead Swamp Scrub in a matrix composed predominately of Freshwater Graminoid Marsh.

L5 – Transitional Bayhead Swamp Scrub-Graminoid Marsh (CSBTG)

2j.1*i*. Transitional Bayhead Swamp Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L6 – Transitional Bayhead Swamp Scrub-Sawgrass Marsh (CSBTGc)

2j.1*ii*. Transitional Bayhead Swamp Scrub in a matrix composed predominately of Spikerush (*Eleocharis* spp.).

L6 – Transitional Bayhead Swamp Scrub-Spikerush Marsh (CSBTGe)

2j.1*iii*. Transitional Bayhead Swamp Scrub in a matrix composed predominately of Black Rush (*Juncus roemerianus*).

L6 – Transitional Bayhead Swamp Scrub-Black Rush Marsh (CSBTGj)

2j.1*iv*. Transitional Bayhead Swamp Scrub in a matrix composed predominately of Cordgrass (*Spartina bakeri*).

L6 – Transitional Bayhead Swamp Scrub-Cordgrass Marsh (CSBTGn)

2j.2. Transitional Bayhead Swamp Scrub in a matrix composed predominately of Open Freshwater Marsh with less than 15% marsh vegetation.

L5 – Transitional Bayhead Swamp Scrub-Open Marsh (CSBTO)

L2 – Upland Scrub (CU)

L3 – Saw Palmetto Scrub (CUn)

1a. Saw Palmetto (*Serenoa repens*) Scrub in a matrix of short-hydroperiod graminoids species such as Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Sawgrass (*Cladium jamaicense*), Little Bluestem (*Schizachyrium* spp.), among others.

L4 – Saw Palmetto Scrub-Graminoid Prairie (CUnGP)

L3 – Cabbage Palm Upland Scrub (CUo)

2a. Cabbage Palm (*Sabal palmetto*) Scrub in a matrix of short-hydroperiod graminoids species such as Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Sawgrass (*Cladium jamaicense*), Little Bluestem (*Schizachyrium* spp.), among others.

L4 – Cabbage Palm Upland Scrub-Graminoid Prairie (CUoGP)

L3 – Coastal Hardwood Scrub (CUC)

3. Coastal Scrub characterized by a mixed species assemblage of Sea Grape (*Coccoloba uvifera*), Gumbo Limbo (*Bursera simaruba*), West Indian Mahogany (*Swietenia mahagoni*), Spanish Stopper (*Eugenia foetida*), Poisonwood (*Metopium toxiferum*), Willow Bustic (*Dipholis salicifolia*), Jamaican Dogwood (*Piscidia piscipula*), Florida Thatch Palm (*Thrinax radiata*), Florida Swampprivet (*Forestiera segregata*), and Yellow Necklacepod (*Sophora tomentosa*). Common understory components include Pricklypear (*Opuntia stricta*), Triangle Cactus (*Acanthocereus tetragonus*), among others.

L3 – Upland Hardwood Scrub (CUW)

4a. Upland Hardwood Scrub in a matrix of Freshwater Graminoid Marsh.

L4 – Upland Hardwood Scrub-Graminoid Marsh (CUWG)

4a.1. Upland Hardwood Scrub in a matrix composed predominately of Sawgrass (*Cladium jamaicense*).

L5 – Upland Hardwood Scrub-Sawgrass Marsh (CUWGc)

4b. Upland Hardwood Scrub in a matrix of short-hydroperiod graminoids species such as Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Sawgrass (*Cladium jamaicense*), and/or Little Bluestem (*Schizachyrium* spp.), among others. Pond Apple and Willow may be present in solutions holes or depressions.

L4 – Upland Hardwood Scrub-Graminoid Prairie (CUWGP)

L1 – Marsh (M)

Graminoid and/or herbaceous emergent or floating vegetation in shallow water that stands at or above the ground surface for much of the year. Prairie habitat is included in this class. A marsh can have low density (0-9%) tree and shrub cover.

I. A saline wetland consisting of salt tolerant graminoid and/or herbaceous vegetation.

L2 – Salt Marsh (MS)

1. Saltgrass (*Distichlis spicata*), Black Rush (*Juncus roemerianus*), Keysgrass (*Monanthochloe littoralis*), Gulf Cordgrass (*Spartina spartinae*), Marshhay Cordgrass (*S. patens*), and/or Dropseed (*Sporobolus* spp.) dominated salt marsh.

L3 – Graminoid Salt Marsh (MSG)

2. Open (less than 15% vegetation) dominated salt marsh often with a mix of sparse graminoids and/or herbaceous salt marsh vegetation, such as Black Rush (*Juncus roemerianus*) and/or Cordgrass (*Spartina* spp.).

L3 – Open Salt Marsh (MSO)

3. Saltwort (*Batis maritima*), Glasswort (*Salicornia* spp.), and/or Sea Purslane (*Sesuvium* spp.) dominated salt marsh.

L3 – Succulent Salt Marsh (MSS)

II. Freshwater graminoid and/or herbaceous marsh.

L2 – Freshwater Marsh (MF)

1. Golden Leather Fern (*Acrostichum aureum*), Leather Fern (*A. danaeifolium*), Pickerelweed (*Pontederia cordata*), Lanceleaf Arrowhead (*Sagittaria lancifolia*), and/or Alligator Flag (*Thalia geniculata*) broadleaf emergent dominated freshwater marsh.

L3 – Broadleaf Emergent Marsh (MFB)

2. Floating emergent long hydroperiod marsh consisting of American White Waterlily (*Nymphaea odorata*), Floatingheart (*Nymphoides aquatica*), and/or Spatterdock (*Nuphar lutea*) dominated freshwater marsh.

L3 – Floating Emergent Marsh (MFF)

3. Long hydroperiod marsh consisting of Sawgrass (*Cladium jamaicense*), Spikerush (*Eleocharis* spp.), Soft Rush (*Juncus effusus*), Maidencane (*Panicum hemitomon*), Common Reed (*Phragmites australis*), Cattail (*Typha* spp.) and/or Sand Cordgrass (*Spartina bakeri*), among others.

L3 – Graminoid Freshwater Marsh (MFG)

4. Short hydroperiod marsh characterized by a mix of graminoids that includes low-stature Sawgrass (*Cladium jamaicense*), Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Little Bluestem (*Schizachyrium rhizomatum*), and Black Sedge (*Schoenus nigricans*), among others.

L3 – Graminoid Freshwater Prairie (MFGP)

5. Herbaceous dominated marsh consisting of Morning Glory (*Ipomoea* spp.), Hempvine (*Mikania* spp.), and/or Smartweed (*Polygonum* spp.) among others.

L3 – Herbaceous Freshwater Marsh (MFH)

6. Open water with less than 15% vegetation cover consisting of a mix of sparse graminoids, herbaceous, and/or emergent freshwater vegetation, such as Spikerush (*Eleocharis* spp.), Panicgrass (*Panicum* spp.), Sawgrass (*Cladium jamaicense*), Cattail (*Typha* spp.), Arrowhead (*Sagittaria* spp.), Pickerelweed (*Pontederia cordata*), Waterlily (*Nymphaea* spp.), Green Arum (*Peltandra virginica*), Swamp-Lily (*Crinum americanum*), Spider-lilies (*Hymenocallis* spp.), among others.

L3 – Open Freshwater Marsh (MFO)

7. Co-dominant mix (20% or less difference in percent cover) of two or more long hydroperiod freshwater graminoid such as sawgrass (*Cladium jamaicense*), cattail (*Typha* spp.), and/or spikerush (*Eleocharis* spp.) in association with broadleaf species such as Alligator Flag (*Thalia geniculata*), Arrowhead (*Sagittaria* spp.), and/or Pickerelweed (*Pontederia cordata*), for example.

L3 – Mixed Graminoid-Broadleaf Freshwater Marsh (MFXGB)

L2 – Salt Marsh (MS)

L3 – Graminoid Salt Marsh (MSG)

1. Saltgrass (*Distichlis spicata*), Black Rush (*Juncus roemerianus*), Keysgrass (*Monanthochloe littoralis*), Gulf Cordgrass (*Spartina spartinae*), Marshhay Cordgrass (*S. patens*), and/or Dropseed (*Sporobolus* spp.) dominated salt marsh.

1a. Saltgrass (*Distichlis spicata*) dominated salt marsh.

L4 – Saltgrass Marsh (MSGd)

1b. Black Rush (*Juncus roemerianus*) dominated salt marsh.

L4 – Black Rush Marsh (MSGj)

1c. Co-dominant mix of two or more graminoid marsh species like Saltgrass (*Distichlis spicata*), Black Rush (*Juncus roemerianus*), and/or Sand Cordgrass (*Spartina bakeri*). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L4 – Mixed Graminoid Salt Marsh (MSGX)

1c.1. Co-dominant mix of Saltgrass (*Distichlis spicata*) and Sand Cordgrass (*Spartina bakeri*). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L5 – Saltgrass-Sand Cordgrass Marsh (MSGXdn)

1c.2. Co-dominant mix of Black Rush (*Juncus roemerianus*) and Sand Cordgrass (*Spartina bakeri*). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L5 – Black Rush-Sand Cordgrass Marsh (MSGXjn)

L3 – Open Salt Marsh (MSO)

2. Open (less than 15% vegetation) dominated salt marsh often with a mix of sparse graminoids and/or herbaceous salt marsh vegetation, such as Black Rush (*Juncus roemerianus*) and/or Cordgrass (*Spartina* spp.), among others.

L3 – Succulent Salt Marsh (MSS)

3. Saltwort (*Batis maritima*), Glasswort (Salicornia spp.), and/or Sea Purslane (*Sesuvium* spp.) dominated salt marsh.

L2 – Freshwater Marsh (MF)

L3 – Broadleaf Emergent Marsh (MFB)

Golden Leather Fern (*Acrostichum aureum*), Leather Fern (*A. danaeifolium*), Pickerelweed (*Pontederia cordata*), Lanceleaf Arrowhead (*Sagittaria lancifolia*), and/or Alligator Flag (*Thalia geniculata*) broadleaf emergent dominated freshwater marsh.

1a. Lanceleaf Arrowhead (*Sagittaria lancifolia*) and/or Broadleaf Arrowhead (*S. latifolia*) dominated marsh.

L4 – Arrowhead Marsh (MFBs)

L3 – Floating Emergent Marsh (MFF)

Floating emergent long hydroperiod marsh consisting of American White Waterlily (*Nymphaea odorata*), Floatingheart (*Nymphoides aquatica*), and/or Spatterdock (*Nuphar lutea*) dominated freshwater marsh.

2a. Spatterdock (*Nuphar lutea* subsp. *advena*) dominated marsh.

L4 – Spatterdock Marsh (MFFn)

2b. Waterlily (*Nymphaea odorata*) dominated marsh.

L4 – Waterlily Marsh (MFFy)

L3 – Graminoid Freshwater Marsh (MFG)

Long hydroperiod marsh consisting of Sawgrass (*Cladium jamaicense*), Spikerush (*Eleocharis* spp.), Soft Rush (*Juncus effusus*), Maidencane (*Panicum hemitomon*), Common Reed (*Phragmites australis*), Cattail (*Typha* spp.) and/or Sand Cordgrass (*Spartina bakeri*), among others.

3a. Maidencane (*Panicum hemitomon*) and/or Redtop Panicum (*P. rigidulum*) dominated marsh.

L4 – Panicgrass Marsh (MFGa)

3b. Sawgrass (*Cladium jamaicense*) dominated marsh.

L4 – Sawgrass Marsh (MFGc)

3b.1. Sawgrass Marsh with average height shorter than 2 meters.

L5 – Short Sawgrass Marsh (MFGcS)

3a.1*i*. Sawgrass Marsh with 50-100% Sawgrass (*Cladium jamaicense*) cover. Spikerush (*Eleocharis cellulosa*) and Beakrush (*Rhynchospora* sp.) maybe present as well (10-25% cover).

L6 – Short Sawgrass Marsh-Dense (MFGcSD)

3a.1*ii*. Short statured (< 1 m tall) Sawgrass Marsh with 15-49% Sawgrass (*Cladium* jamaicense) cover. Spikerush (*Eleocharis* spp.), Beakrush (*Rhynchospora* spp.), and/or Panicgrass (*Panicum* spp.), among others, maybe be present. However, their combined cover does not exceed that of Sawgrass. This class differs from **Mixed Graminoid Freshwater Marsh** (MFGX) in that Sawgrass is the dominant graminoid species present, otherwise MFGX.

L6 – Short Sawgrass Marsh-Sparse (MFGcSS)

3b.2. Sawgrass Marsh with average height of 2 meters or taller.

L5 – Tall Sawgrass Marsh (MFGcT)

3b.2*i*. Tall Sawgrass Marsh with 50-100% Sawgrass (*Cladium jamaicense*) cover.

L6 – Tall Sawgrass Marsh-Dense (MFGcTD)

3b.2*ii*. Tall Sawgrass Marsh with 15-49% Sawgrass (*Cladium jamaicense*) cover.

L6 – Tall Sawgrass Marsh-Sparse (MFGcTS)

3c. Coastal Spikerush (*Eleocharis cellulosa*), Slim Spikerush (*E. elongata*), and/or Knotted Spikerush (*E. interstincta*) dominated marsh.

L4 – Spikerush Marsh (MFGe)

3d. Common Reed (*Phragmites australis*) dominated marsh.

L4 – Common Reed Marsh (MFGg)

3e Sand Cordgrass (*Spartina bakeri*) dominated freshwater marsh.

L4 – Sand Cordgrass Marsh (MFGn)

3f. Beakrush (*Rhynchospora* spp.) dominated marsh. Found commonly growing with Sawgrass (*Cladium jamaicense*). Beakrush found in the substantial presence of Little Bluestem (*Schizachyrium rhizomatum*) and/or Muhly Grass (*Muhlenbergia capillaris* var. *filipes*) is characteristic of a **L3 – Graminoid Freshwater Prairie (MFGP)**.

L4 – Beakrush Marsh (MFGr)

3g. Cattail (*Typha* spp.) dominated marsh.

L4 – Cattail Marsh (MFGt)

3h. Kissimmee Grass (*Paspalidium geninatum*) dominated marsh.

L4 – Kissimmee Grass Marsh (MFGu)

3i. Co-dominant mix of two or more graminoid marsh species like Spikerush (*Eleocharis* spp.), Panicgrass (*Panicum* spp.), Sawgrass (*Cladium jamaicense*), and/or Beakrush (*Rhynchospora* spp.), among others. This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L4 – Mixed Graminoid Freshwater Marsh (MFGX)

3i.1. Co-dominant mix of Sawgrass (*Cladium jamaicense*) and Black Rush (*Juncus roemerianus*). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L5 – Sawgrass-Black Rush Marsh (MSGXcj)

3i.2. Co-dominant mix of Sawgrass (*Cladium jamaicense*) and Sand Cordgrass (*Spartina bakeri*). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L5 – Sawgrass-Sand Cordgrass Marsh (MFGXcn)

3i.3. Co-dominant mix of Sawgrass (*Cladium jamaicense*) and Beakrush (*Rhynchospora tracyi*). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L5 – Sawgrass-Beakrush Marsh (MFGXcr)

3i.4. Co-dominant mix of Sawgrass (*Cladium jamaicense*) and Cattail (*Typha* spp.). This community is characterized by having no particular graminoid species in dominance, meaning there is 15% or less difference in percent cover between two or more graminoid species.

L5 – Sawgrass-Cattail Marsh (MFGXct)

<u>L3 – Graminoid Freshwater Prairie (MFGP)</u>

4. Short hydroperiod marsh characterized by a mix of graminoids that includes low-stature Sawgrass (*Cladium jamaicense*), Muhly Grass (*Muhlenbergia capillaris* var. *filipes*), Little Bluestem (*Schizachyrium rhizomatum*), and Black Sedge (*Schoenus nigricans*), among others.

4a. Black Sedge (*Schoenus nigricans*) dominated wet prairie.

L4 – Black Sedge Prairie (MFGPh)

<u>L3 – Herbaceous Freshwater Marsh (MFH)</u>

5. Herbaceous dominated marsh consisting of Morning Glory (*Ipomoea* spp.), Hempvine (*Mikania* spp.), and/or Smartweed (*Polygonum* spp.) among others.

L3 – Open Freshwater Marsh (MFO)

6. Open water with less than 15% vegetation cover consisting of a mix of sparse graminoids, herbaceous, and/or emergent freshwater vegetation, such as Spikerush (*Eleocharis* spp.), Panicgrass (*Panicum* spp.), Sawgrass (*Cladium jamaicense*), Cattail (*Typha* spp.), Arrowhead (*Sagittaria* spp.), Pickerelweed (*Pontederia cordata*), Waterlily (*Nymphaea* spp.), Green Arum (*Peltandra virginica*), Swamp-Lily (*Crinum americanum*), Spider-lilies (*Hymenocallis* spp.), among others.

L3 – Mixed Graminoid-Broadleaf Freshwater Marsh (MFXGB)

7. Co-dominant mix (20% or less difference in percent cover) of two or more long hydroperiod freshwater graminoid such as sawgrass (*Cladium jamaicense*), cattail (*Typha* spp.), and/or spikerush (*Eleocharis* spp.) in association with broadleaf species such as Alligator Flag (*Thalia geniculata*), Arrowhead (*Sagittaria* spp.), and/or Pickerelweed (*Pontederia cordata*), for example.

L1 – Dune (D)

Shrub, graminoid and/or herbaceous vegetation associated with a mound or ridge of sediment formed by wind and/or storm deposits.

I. Graminoid dominated coastal dune.

L2 – Graminoid Dune (DG)

II. Herbaceous dominated coastal dune.

L2 – Herbaceous Dune (DH)

L1 – Exotic (E)

Non-native species assemblages. A cell label should reflect its native vegetation whenever possible with exotic codes being secondary. Level 2 codes for the exotic species present in this map are listed below. Level 3 codes designate the density or coverage of the exotic within the grid cell: Sparse (10-49% cover), Dominant (50-89% cover), and Monotypic (90-100% cover). Users are asked to reference exotic plant species codes in the *Vegetation Classification System for South Florida*.

I. Shoebutton (Ardisia elliptica).

L2 – Shoebutton (Ea)

II. River Sheoak (*Casuarina cunninghamiana*), Australian Pine (*Casuarina equisetifolia*), and Suckering Australian Pine (*Casuarina glauca*).

L2 – Australian Pine (Ec)

III. Napier Grass (*Pennisetum* spp.) and Silkreed (*Neyraudia* spp.).

L2 – Giant Grasses (EG)

IV. Old-World Climbing Fern (*Lygodium* spp.).

L2 – Old-World Climbing Fern (El)

V. Melaleuca (*Melaleuca quinquenervia*).

L2 – Melaleuca (Em)

VI. Brazilian Pepper (*Schinus terebinthifolius*).

L2 – Brazilian Pepper (Es)

L1 – Other (O)

Anthropogenic or non-vegetative features.

I. Non-Vegetative cover.

L2 – Non-Vegetative (ON)

1. Ground covered in sand that is adjacent to lakes, bays, oceans, or other large bodies of water.

L3 – Beach (ONB)

2. Exposed open ground or peat, particularly in hurricane damaged mangrove forests with < 10% vegetation cover.

L3 – Soil (ONO)

3. Barren, generally hypersaline, flats found above the high tide mark created by storm-driven tidal events.

L3 – Barren Salt Flat (ONS)

4. Shallow intertidal sand or mud areas, which are regularly exposed to the atmosphere at low tide.

L3 – Tidal Flat (ONT)

5.Open water areas such as ponds, lakes, rivers, bays, and estuaries.

L3 – Water (ONW)

II. Non-natural coverage associated with human infrastructure and/or activities.

L2 – Anthropogenic (OA)

1. Area of cleared land manipulated for the purpose of growing crops.

L3 – Agriculture (OAA)

2. Artificial waterway constructed to allow the passage of boats or ships inland, or to convey water.

L3 – Canal (OAC)

3. Designated camping or recreational area

L3 –Campground (OAG)

4. An embankment built to prevent the overflow of water from a river, canal, or lake.

L3 – Levee (OAL)

5. A defined path that has been established through a landscape for the purpose of travel from one point to another.

L3 – Road (OAR)

6. Waste material brought up during the course of an excavation or a dredging.

L3 – Spoil (OAS)

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Appendix A-1: Exceptions to Level 1 Classes

L1 – Forest (F) – Stands of trees (5 meters or taller) that are of high density (50-100% cover).

Exceptions:

Stands of Slash Pine (*Pinus elliottii* var. *densa*) trees of Forest density are considered Woodland.

Stands of Willow (*Salix caroliniana*) trees of Forest density are considered Shrubland.

Stands of Cocoplum (*Chrysobalanus icaco*) trees of Forest density are considered Shrubland.

L1 – Woodland (W) – Stands of trees (5 meters or taller) that are of low density (10-49% cover). Trees are evenly spaced out and often in a matrix of sparse shrubs, graminoids, and/or herbaceous vegetation.

Exceptions:

If a Woodland contains dense shrub cover (50% or more), it is considered Shrubland. This does not apply to pineland and Cypress (*Taxodium* spp.) communities – these can have a dense shrub understory and still be considered Woodland.

Stands of Slash Pine (*Pinus elliottii* var. *densa*) trees of Forest density are considered Woodland.

L1 – Shrubland (S) – Stands of shrubs (shorter than 5 meters) that are of high density (50-100% cover).

Exceptions:

Stands of Cypress (*Taxodium* spp.) shrubs of Shrubland density are considered Scrub.

Stands of Sea-Oxeye (*Borrichia arborescens*) shrubs of Shrubland density are considered Scrub.

Stands of Buttonbush (*Cephalanthus occidentalis*) shrubs of Shrubland density are considered Scrub.

Mangrove communities averaging heights of 2 meters or shorter, regardless of density (10-100% cover) are considered Scrub.

Stands of Willow (*Salix caroliniana*) trees of Forest density are considered Shrubland.

Stands of Cocoplum (*Chrysobalanus icaco*) trees of Forest density are considered Shrubland.

If a Woodland contains dense shrub cover (50% or more), it is considered Shrubland. This does not apply to pineland and Cypress (*Taxodium* spp.) communities – these can have a dense shrub understory and still be considered Woodland.

L1 – Scrub (C) – Stands of shrubs (shorter than 5 meters) that are of low density (10-49% cover). Shrubs are evenly spaced out and often in a matrix of graminoids and/or herbaceous vegetation.

Exceptions:

Stands of Cypress (*Taxodium* spp.) shrubs of Shrubland density are considered Scrub.

Stands of Sea-Oxeye (*Borrichia arborescens*) shrubs of Shrubland density are considered Scrub.

Mangrove communities averaging heights of 2 meters or shorter, regardless of density (10-100% cover) are considered Scrub.

Appendix B. Area, Percentage, and Frequency of all Thematic Classes Mapped in Everglades National Park

Table B-1. Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Short Sawgrass Marsh-Dense	MFGcSD	75,956	187,690	19.7%	303,822
Water[8]	ONW	62,076	153,394	NA	248,305
Graminoid Freshwater Prairie	MFGP	47,599	117,618	12.3%	190,394
Mixed Mangrove Forest-Mixed	FMXX	20,285	50,126	5.3%	81,141
Transitional Bayhead Shrubland	SSBT	20,175	49,853	5.2%	80,699
Mixed Graminoid Freshwater Marsh	MFGX	19,562	48,338	5.1%	78,246
Red Mangrove Scrub-Open Marsh	CMrO	16,354	40,412	4.2%	65,417
Spikerush Marsh	MFGe	13,045	32,234	3.4%	52,178
Black Mangrove-Red Mangrove Forest	FMXar	9,684	23,928	2.5%	38,734
Black Mangrove Forest	FMa	9,471	23,402	2.5%	37,882
Tall Sawgrass Marsh-Dense	MFGcTD	8,759	21,644	2.3%	35,036
Red Mangrove Scrub-Sawgrass Marsh	CMrGc	8,481	20,958	2.2%	33,925
White Mangrove-Red Mangrove Forest	FMXlr	8,432	20,836	2.2%	33,728
Transitional Bayhead Swamp Scrub-Sawgrass Marsh	CSBTGc	7,575	18,719	2.0%	30,301
Red Mangrove Forest	FMr	7,298	18,033	1.9%	29,190
Buttonwood-Red Mangrove Shrubland	SMXcr	6,124	15,133	1.6%	24,497
Sawgrass-Beakrush Marsh	MFGXcr	5,895	14,566	1.5%	23,578
Red Mangrove Shrubland	SMr	5,403	13,350	1.4%	21,611
Bayhead Swamp Scrub-Sawgrass Marsh	CSBGc	4,878	12,054	1.3%	19,512
Red Mangrove Scrub-Dominant	CMrD	4,596	11,358	1.2%	18,385
Red Mangrove Scrub-Spikerush Marsh	CMrGe	4,292	10,606	1.1%	17,169
Bayhead Shrubland	SSB	4,174	10,315	1.1%	16,697
Sand Cordgrass Marsh	MFGn	4,022	9,938	1.0%	16,087
Pine Rockland-Shrubs	WUpRS	3,428	8,471	0.9%	13,712
Black Rush Marsh	MSGj	3,219	7,955	0.8%	12,877
Upland Hardwood Scrub-Graminoid Prairie	CUWGP	2,930	7,240	0.8%	11,719
Buttonwood-Red Mangrove Forest	FMXcr	2,883	7,123	0.7%	11,530

[8] The percent area of open water (bays, lakes, and other water features, 13.9%) within the mapping area is not included in the Percent Map Area calculations for each upland community class.

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
White Mangrove-Red Mangrove Shrubland	SMXlr	2,872	7,096	0.7%	11,487
Mixed Mangrove Shrubland-Mixed	SMXX	2,699	6,669	0.7%	10,796
Buttonwood-Red Mangrove Scrub-Sawgrass Marsh	CMXcrGc	2,625	6,487	0.7%	10,500
Transitional Bayhead Forest	FSBT	2,517	6,220	0.7%	10,068
Cypress Scrub-Graminoid Prairie	CStGP	2,350	5,806	0.6%	9,399
Cypress Scrub-Sawgrass Marsh	CStGc	1,964	4,853	0.5%	7,855
Short Sawgrass Marsh-Sparse	MFGcSS	1,782	4,403	0.5%	7,128
Black Mangrove Shrubland	SMa	1,726	4,265	0.4%	6,904
Pine Rockland-Mixed	WUpRX	1,690	4,177	0.4%	6,761
Tropical Hardwood Hammock	FHS	1,618	3,998	0.4%	6,471
Buttonwood-Red Mangrove Scrub-Open Marsh	CMXcrO	1,499	3,703	0.4%	5,995
Willow Shrubland	SSs	1,443	3,565	0.4%	5,771
Black Mangrove-White Mangrove Forest	FMXal	1,411	3,486	0.4%	5,643
Brazilian Pepper	Es	1,373	3,393	0.4%	5,492
Bayhead Forest	FSB	1,339	3,309	0.3%	5,357
Black Mangrove Scrub-Succulent Marsh	CMaS	1,251	3,090	0.3%	5,002
Buttonwood Forest	FMc	1,213	2,997	0.3%	4,851
Willow Scrub-Sawgrass Marsh	CSsGc	1,176	2,905	0.3%	4,703
Sawgrass-Cattail Marsh	MFGXct	1,148	2,837	0.3%	4,592
Succulent Salt Marsh	MSS	992	2,451	0.3%	3,968
Black Mangrove-Buttonwood Forest	FMXac	965	2,383	0.2%	3,858
Buttonwood Shrubland	SMc	850	2,100	0.2%	3,400
White Mangrove Shrubland	SMl	834	2,061	0.2%	3,336
White Mangrove Forest	FMl	807	1,994	0.2%	3,228
Black Mangrove-White Mangrove Shrubland	SMXal	786	1,941	0.2%	3,142
Buttonwood Scrub-Sawgrass Marsh	CMcGc	747	1,845	0.2%	2,986
Cypress Forest-Monotypic	FStM	675	1,667	0.2%	2,699
Sawgrass-Black Rush Marsh	MFGXcj	674	1,665	0.2%	2,695
Sawgrass-Sand Cordgrass Marsh	MFGXcn	633	1,564	0.2%	2,531
Cattail Marsh	MFGt	624	1,543	0.2%	2,497
Cypress Scrub-Mixed Graminoid Marsh	CStGX	617	1,523	0.2%	2,466
Buttonwood-White Mangrove Shrubland	SMXcl	613	1,515	0.2%	2,453
Pine Rockland-Graminoids	WUpRG	591	1,460	0.2%	2,364
Anthropogenic	OA	537	1,326	0.1%	2,147

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Red Mangrove Scrub-Black Rush Marsh	CMrGj	536	1,325	0.1%	2,145
Tropical Hardwood Shrubland	SUH	536	1,323	0.1%	2,142
Saltgrass Marsh	MSGd	503	1,242	0.1%	2,011
Black Mangrove Scrub-Open Marsh	CMaO	501	1,239	0.1%	2,005
Black Mangrove Woodland-Succulent Marsh	WMaS	479	1,183	0.1%	1,915
Beakrush Marsh	MFGr	427	1,056	0.1%	1,709
Black Mangrove-Red Mangrove Shrubland	SMXar	385	951	0.1%	1,540
Black Sedge Prairie	MFGPh	380	939	0.1%	1,520
Open Freshwater Marsh	MFO	380	938	0.1%	1,518
White Mangrove Scrub-Cordgrass Marsh	CMlGn	374	924	0.1%	1,495
Black Mangrove-Buttonwood Shrubland	SMXac	338	835	0.1%	1,352
Mixed Graminoid Salt Marsh	MSGX	289	713	0.1%	1,154
Buttonwood Hammock	FHCc	283	699	0.1%	1,131
Buttonwood-White Mangrove Forest	FMXcl	274	676	0.1%	1,094
Buttonwood-Red Mangrove Scrub-Cordgrass Marsh	CMXcrGn	270	667	0.1%	1,079
Cypress Woodland-Graminoid Prairie	WStGP	269	664	0.1%	1,075
Black Mangrove-Red Mangrove Woodland-Open Marsh	WMXarO	255	630	0.1%	1,020
Black Mangrove Woodland-Graminoid Marsh	WMaG	253	626	0.1%	1,013
Black Mangrove-Red Mangrove Scrub-Open Marsh	CMXarO	247	610	0.1%	988
Buttonwood-Red Mangrove Scrub-Dominant	CMXcrD	244	602	0.1%	974
Cypress Woodland-Graminoid Marsh	WStG	240	592	0.1%	959
Black Mangrove Woodland-Open Marsh	WMaO	232	573	0.1%	928
White Mangrove Scrub-Black Rush Marsh	CMlGj	220	544	0.1%	881
Cabbage Palm Lowland-Shrubs	WSoS	216	533	0.1%	862
Buttonwood-Red Mangrove Scrub-Black Rush Marsh	CMXcrGj	214	528	0.1%	854
Cabbage Palm Lowland-Mixed	WSoX	204	505	0.1%	817
Buttonwood Scrub-Black Rush Marsh	CMcGj	201	497	0.1%	805
Tidal Flat	ONT	201	495	0.1%	802
Soil	ONO	190	470	0.05%	761
White Mangrove-Red Mangrove Scrub-Black Rush Marsh	CMXlrGj	189	468	0.05%	757
Waterlily Marsh	MFFy	188	465	0.05%	753
Cocoplum Shrubland	SSy	187	463	0.05%	749

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Buttonwood Scrub-Succulent	CMcS	182	450	0.05%	729
Willow Scrub-Cattail Marsh	CSsGt	180	444	0.05%	718
Transitional Bayhead Swamp Scrub-Black Rush Marsh	CSBTGj	179	443	0.05%	717
Coastal Hardwood Hammock	FHCC	176	435	0.05%	704
Saltgrass-Sand Cordgrass Marsh	MSGXdn	156	384	0.04%	622
White Mangrove Scrub-Sawgrass Marsh	CMlGc	155	383	0.04%	620
Red Mangrove Scrub-Cattail Marsh	CMrGt	149	369	0.04%	597
Buttonwood-White Mangrove Scrub-Cordgrass Marsh	CMXclGn	142	350	0.04%	566
Red Mangrove Woodland-Open Marsh	WMrO	139	342	0.04%	554
White Mangrove Scrub-Saltgrass Marsh	CMlGd	132	325	0.03%	526
Buttonwood Scrub-Cordgrass Marsh	CMcGn	130	320	0.03%	518
Black Mangrove-White Mangrove Scrub-Open Marsh	CMXalO	122	301	0.03%	488
Buttonwood-Red Mangrove Scrub-Saltgrass Marsh	CMXcrGd	117	289	0.03%	468
White Mangrove-Red Mangrove Scrub-Sawgrass Marsh	CMXlrGc	117	288	0.03%	466
Cabbage Palm Swamp Scrub-Sawgrass Marsh	CSoGc	116	287	0.03%	465
White Mangrove Scrub-Succulent Marsh	CMlS	114	282	0.03%	457
Black Mangrove-Buttonwood Scrub-Succulent Marsh	CMXacS	111	274	0.03%	444
Buttonwood-Red Mangrove Scrub-Spikerush Marsh	CMXcrGe	105	259	0.03%	420
Barren Salt Flat	ONS	105	258	0.03%	418
White Mangrove Scrub-Open Marsh	CMlO	101	248	0.03%	402
Coastal Hardwood Shrubland	SUC	99	245	0.03%	397
Levee	OAL	94	231	0.02%	374
Cypress Forest-Dome	FStD	93	229	0.02%	371
Transitional Bayhead Swamp Scrub-Cordgrass Marsh	CSBTGn	91	225	0.02%	365
White Mangrove-Red Mangrove Scrub-Cordgrass Marsh	CMXlrGn	90	223	0.02%	361
Black Mangrove-White Mangrove Scrub-Saltgrass Marsh	CMXalGd	90	222	0.02%	360
Graminoid Dune	DG	90	222	0.02%	359
Coastal Hardwood Scrub	CUC	86	212	0.02%	343

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Buttonwood Woodland-Succulent Marsh	WMcS	85	209	0.02%	339
Cypress Scrub-Graminoid Marsh	CStG	83	205	0.02%	332
Black Mangrove-White Mangrove Scrub-Succulent Marsh	CMXalS	80	198	0.02%	321
Black Mangrove-Red Mangrove Woodland-Succulent Marsh	WMXarS	80	197	0.02%	319
Buttonbush Scrub-Sawgrass Marsh	CShGc	74	182	0.02%	295
Herbaceous Freshwater Marsh	MFH	71	175	0.02%	284
Buttonwood Scrub-Saltgrass Marsh	CMcGd	70	173	0.02%	280
Red Mangrove Scrub-Cordgrass Marsh	CMrGn	70	172	0.02%	279
Coastal Dune Hammock	FHCD	69	171	0.02%	276
Giant Grasses	EG	68	169	0.02%	273
Black Mangrove-White Mangrove Woodland-Graminoid Marsh	WMXalG	67	165	0.02%	267
Transitional Bayhead Swamp Scrub-Open Marsh	CSBTO	67	164	0.02%	266
Buttonwood-White Mangrove Scrub-Sawgrass Marsh	CMXclGc	66	162	0.02%	262
Melaleuca	Em	65	160	0.02%	259
Cypress Woodland-Sawgrass Marsh	WStGc	65	160	0.02%	259
Road	OAR	64	157	0.02%	254
Spoil	OAS	62	153	0.02%	247
Black Mangrove-Red Mangrove Woodland-Graminoid Marsh	WMXarG	61	151	0.02%	244
Agriculture	OAA	59	146	0.02%	236
Pond Apple Scrub-Sawgrass Marsh	CSaGc	59	145	0.02%	235
Willow Scrub-Mixed Graminoid Marsh	CSsGX	56	139	0.01%	225
Campground	OAG	55	136	0.01%	220
Mixed Mangrove Scrub-Mixed-Saltgrass Marsh	CMXXGd	55	135	0.01%	218
Cabbage Palm Upland-Graminoid Prairie	WUoGP	53	130	0.01%	210
Mixed Mangrove Scrub-Mixed-Cordgrass Marsh	CMXXGn	50	124	0.01%	200
Cypress Woodland-Shrubs	WStS	50	124	0.01%	200
Mixed Graminoid-Broadleaf Freshwater Marsh	MFXGB	48	119	0.01%	193
Open Salt Marsh	MSO	48	119	0.01%	193
Beach	ONB	48	119	0.01%	193
Cypress-Hardwood Forest	FStH	46	114	0.01%	184
Dahoon Holly Scrub-Mixed Graminoid Marsh	CSiGX	44	109	0.01%	177
Canal	OAC	44	109	0.01%	176

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Mixed Mangrove Scrub-Mixed-Sawgrass Marsh	CMXXGc	44	108	0.01%	175
Cypress Woodland-Mixed	WStX	44	108	0.01%	175
Mixed Mangrove Scrub-Mixed-Open Marsh	CMXXO	44	107	0.01%	174
Tall Sawgrass Marsh-Sparse	MFGcTS	43	107	0.01%	173
Cabbage Palm Upland Scrub-Graminoid Prairie	CUoGP	43	106	0.01%	171
Buttonwood-White Mangrove Scrub-Saltgrass Marsh	CMXclGd	42	104	0.01%	169
White Mangrove Scrub-Dominant	CMlD	42	104	0.01%	168
Pine Rockland-Saw Palmetto	WUpRSn	42	104	0.01%	168
Cypress Woodland-Mixed Graminoid Marsh	WStGX	42	103	0.01%	167
Buttonwood-White Mangrove Scrub-Black Rush Marsh	CMXclGj	41	102	0.01%	165
Black Rush-Sand Cordgrass Marsh	MSGXjn	41	102	0.01%	165
West Indian Mahogany Hammock	FHCg	39	96	0.01%	156
Red Mangrove Scrub-Saltgrass Marsh	CMrGd	39	96	0.01%	155
Saw Palmetto Scrub-Graminoid Prairie	CUnGP	38	94	0.01%	152
Black Mangrove-Buttonwood Woodland-Succulent Marsh	WMXacS	38	94	0.01%	152
Cypress Scrub-Spikerush Marsh	CStGe	38	93	0.01%	151
Transitional Bayhead Swamp Scrub-Spikerush Marsh	CSBTGe	38	93	0.01%	150
Black Mangrove-Buttonwood Woodland-Graminoid Marsh	WMXacG	38	93	0.01%	150
Bayhead Swamp Scrub-Cordgrass Marsh	CSBGn	33	82	0.01%	132
Wax Myrtle Scrub-Sawgrass Marsh	CSmGc	33	81	0.01%	131
Buttonwood Scrub-Spikerush Marsh	CMcGe	33	80	0.01%	130
Black Mangrove Scrub-Graminoid Marsh	CMaG	31	77	0.01%	124
Bayhead Swamp Scrub-Mixed Graminoid Marsh	CSBGX	30	74	0.01%	120
Bayhead Swamp Scrub-Cattail Marsh	CSBGt	30	73	0.01%	118
Black Mangrove-Red Mangrove Scrub-Succulent Marsh	CMXarS	29	72	0.01%	117
Tropical Hardwood Woodland	WUHS	29	72	0.01%	116
Black Mangrove-Red Mangrove Scrub-Dominant	CMXarD	28	69	0.01%	111
Mixed Mangrove Woodland-Mixed-Graminoid Marsh	WMXXG	27	67	0.01%	109
Mixed Mangrove Scrub-Mixed-Black Rush Marsh	CMXXGj	26	64	0.01%	103
Bayhead Swamp Scrub-Herbaceous Marsh	CSBH	25	62	0.01%	100

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Australian Pine	Ec	23	57	0.01%	93
Cypress Forest-Strand	FStS	21	53	0.01%	85
Black Mangrove-White Mangrove Scrub-Cordgrass Marsh	CMXalGn	21	52	0.01%	84
Hardwood Swamp Forest	FSH	21	52	0.01%	84
Bayhead Swamp Scrub-Black Rush Marsh	CSBGj	21	51	0.01%	83
Kissimmee Grass Marsh	MFGu	21	51	0.01%	83
Mixed Mangrove Woodland-Mixed-Open Marsh	WMXXO	21	51	0.01%	83
Red Mangrove Woodland-Succulent Marsh	WMrS	20	49	0.01%	80
White Mangrove-Red Mangrove Scrub-Dominant	CMXlrD	19	47	< 0.01%	76
Upland Hardwood Scrub-Sawgrass Marsh	CUWGc	19	46	< 0.01%	75
Mixed Mangrove Woodland-Mixed-Succulent Marsh	WMXXS	19	46	< 0.01%	75
Red Mangrove Woodland-Graminoid Marsh	WMrG	18	45	< 0.01%	73
Black Mangrove-Red Mangrove Scrub-Graminoid Marsh	CMXarG	18	44	< 0.01%	72
Buttonwood-White Mangrove Scrub-Dominant	CMXclD	18	44	< 0.01%	72
Pond Apple Shrubland	SSa	18	44	< 0.01%	72
Coastal Hardwood Woodland	WUHC	18	44	< 0.01%	71
Buttonwood-Red Mangrove Scrub-Graminoid Marsh	CMXcrG	17	42	< 0.01%	68
Common Reed Marsh	MFGg	17	41	< 0.01%	66
Dahoon Holly Shrubland	SSi	16	38	< 0.01%	62
Buttonwood Woodland-Graminoid Marsh	WMcG	16	38	< 0.01%	62
Mixed Mangrove Scrub-Mixed-Dominant	CMXXD	15	37	< 0.01%	60
White Mangrove-Red Mangrove Scrub-Open Marsh	CMXlrO	15	36	< 0.01%	58
Buttonwood-Red Mangrove Scrub-Kissimmee Grass Marsh	CMXcrGu	14	33	< 0.01%	54
Bayhead Swamp Scrub-Spikerush Marsh	CSBGe	13	33	< 0.01%	53
White Mangrove-Red Mangrove Woodland-Open Marsh	WMXlrO	13	32	< 0.01%	52
Pond Apple Forest	FSa	13	31	< 0.01%	50
Cypress-Hardwood Scrub-Graminoid Prairie	CStWGP	12	30	< 0.01%	49
Hardwood Swamp Shrubland	SSH	12	28	< 0.01%	46
Fan Palm Hammock	FHCt	11	26	< 0.01%	42
Pond Apple Scrub-Beakrush Marsh	CSaGr	10	25	< 0.01%	41

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Spatterdock	MFFn	10	25	< 0.01%	41
Buttonwood-White Mangrove Scrub-Succulent Marsh	CMXclS	10	24	< 0.01%	39
Red Mangrove Scrub-Succulent Marsh	CMrS	10	23	< 0.01%	38
Broadleaf Emergent Marsh	MFB	9	23	< 0.01%	37
Mixed Mangrove Scrub-Mixed-Succulent Marsh	CMXXS	9	22	< 0.01%	36
Wax Myrtle Shrubland	SSm	9	22	< 0.01%	36
Buttonwood Scrub-Open Marsh	CMcO	8	20	< 0.01%	33
Cabbage Palm Lowland-Graminoid Marsh	WSoG	8	20	< 0.01%	33
White Mangrove Woodland-Graminoid Marsh	WMlG	8	19	< 0.01%	31
Graminoid Salt Marsh	MSG	7	18	< 0.01%	29
Buttonwood Woodland-Open Marsh	WMcO	7	18	< 0.01%	29
Black Mangrove-White Mangrove Woodland-Open Marsh	WMXalO	7	18	< 0.01%	29
White Mangrove-Red Mangrove Woodland-Gramiod Marsh	WMXlrG	7	16	< 0.01%	26
Black Mangrove Scrub-Dominant	CMaD	6	15	< 0.01%	25
White Mangrove-Red Mangrove Scrub-Saltgrass Marsh	CMXlrGd	6	15	< 0.01%	25
White Mangrove Woodland-Open Marsh	WMlO	6	15	< 0.01%	24
Black Mangrove-Buttonwood Scrub-Graminoid Marsh	CMXacG	6	14	< 0.01%	23
Pond Apple Scrub-Mixed Graminoid Marsh	CSaGX	6	14	< 0.01%	23
Falsewillow Scrub-Herbaceous Marsh	CSrH	6	14	< 0.01%	22
White Mangrove-Red Mangrove Scrub-Succulent Marsh	CMXlrS	5	13	< 0.01%	21
Buttonwood-Red Mangrove Scrub-Succulent Marsh	CMXcrS	5	12	< 0.01%	19
Arrowhead Marsh	MFBs	5	12	< 0.01%	19
Black Mangrove-White Mangrove Woodland-Succulent Marsh	WMXalS	5	11	< 0.01%	18
Black Mangrove-White Mangrove Scrub-Dominant	CMXalD	4	11	< 0.01%	17
Cypress-Hardwood Scrub-Sawgrass Marsh	CStWGc	4	11	< 0.01%	17
Buttonwood-Reg Mangrove Woodland-Succulent Marsh	WMXcrS	4	11	< 0.01%	17
Black Mangrove-Red Mangrove Scrub-Saltgrass Marsh	CMXarGd	4	10	< 0.01%	16
Black Mangrove-Buttonwood Scrub-Open Marsh	CMXacO	4	9	< 0.01%	15

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Buttonbush Shrubland	SSh	4	9	< 0.01%	15
Buttonwood-White Mangrove Scrub-Kissimmee Grass Marsh	CMXclGu	4	9	< 0.01%	14
Willow Scrub-Sand Cordgrass Marsh	CSsGn	4	9	< 0.01%	14
Saw Palmetto Shrubland	SUn	4	9	< 0.01%	14
Black Mangrove Scrub-Herbaceous Marsh	CMaH	3	8	< 0.01%	13
Wax Myrtle Scrub-Graminoid Prairie	CSmGP	3	8	< 0.01%	13
Cabbage Palm Hammock	FHo	3	8	< 0.01%	13
Willow Scrub-Herbaceous Marsh	CSsH	3	7	< 0.01%	12
Mixed Mangrove Scrub-Mixed-Graminoid Marsh	CMXXG	3	7	< 0.01%	11
Pine Lowland-Shrubs	WSpS	3	7	< 0.01%	11
Black Mangrove-Buttonwood Scrub-Saltgrass Marsh	CMXacGd	3	6	< 0.01%	10
Cypress-Pine Forest	FStp	3	6	< 0.01%	10
Cypress-Pine Woodland-Graminoid	WStpG	3	6	< 0.01%	10
Buttonwood Scrub-Dominant	CMcD	2	6	< 0.01%	9
Black Mangrove-Red Mangrove Scrub-Sawgrass Marsh	CMXarGc	2	6	< 0.01%	9
Black Mangrove-Buttonwood Scrub-Dominant	CMXacD	2	5	< 0.01%	8
Falsewillow Scrub-Sawgrass Marsh	CSrGc	2	5	< 0.01%	8
Pine Flatwoods-Shrubs	WUpFS	2	5	< 0.01%	8
Red Mangrove Scrub-Mixed Graminoid Marsh	CMrGX	2	4	< 0.01%	7
Herbaceous Dune	DH	2	4	< 0.01%	7
Temperate Hardwood Hammock	FHT	2	4	< 0.01%	6
Black Mangrove-Buttonwood Woodland-Herbaceous Marsh	WMXacH	2	4	< 0.01%	6
White Mangrove-Red Mangrove Woodland-Succulent Marsh	WMXlrS	2	4	< 0.01%	6
Black Mangrove Scrub-Black Rush Marsh	CMaGj	1.3	3	< 0.01%	5
Buttonbush Scrub-Mixed Graminoid Marsh	CShGX	1.3	3	< 0.01%	5
Wax Myrtle Scrub-Cattail Marsh	CSmGt	1.3	3	< 0.01%	5
Willow Scrub-Emergent Marsh	CSsE	1.3	3	< 0.01%	5
Cypress Scrub-Beakrush Marsh	CStGr	1.3	3	< 0.01%	5
Panicgrass Marsh	MFGa	1.3	3	< 0.01%	5
Red Mangrove-Cocoplum Shrubland	SMXry	1.3	3	< 0.01%	5
Pine Lowland-Mixed	WSpX	1.3	3	< 0.01%	5
Willow Scrub-Common Reed Marsh	CSsGg	1.0	2.5	< 0.01%	4

Table B-1 (continued). Thematic class area (ha – hectares; ac – acres), percentage, and frequency.

Thematic Class	Thematic Class Code	Area (ha)	Area (ac)	Percent Map Area	Number of Mapped Cells
Hardwood Hammock-Pine Forest	FHp	1.0	2.5	< 0.01%	4
Paurotis Palm Forest	FSw	1.0	2.5	< 0.01%	4
Falsewillow Scrub-Mixed Graminoid Marsh	CSrGX	0.8	1.9	< 0.01%	3
Falsewillow Shrubland	SSr	0.8	1.9	< 0.01%	3
Sea-Oxeye Scrub	CMb	0.5	1.2	< 0.01%	2
Buttonwood Scrub-Fimbry Marsh	CMcGf	0.5	1.2	< 0.01%	2
White Mangrove-Red Mangrove Scrub-Cattail Marsh	CMXlrGt	0.5	1.2	< 0.01%	2
Cypress Scrub-Cattail Marsh	CStGt	0.5	1.2	< 0.01%	2
Pine Lowland-Graminoid	WSpG	0.5	1.2	< 0.01%	2
Cypress-Pine Woodland-Mixed	WStpX	0.5	1.2	< 0.01%	2
Wax Myrtle Scrub-Herbaceous Marsh	CSmH	0.3	0.6	< 0.01%	1
Willow Scrub-Spikerush Marsh	CSsGe	0.3	0.6	< 0.01%	1
Transitional Hardwood Swamp Forest	FSHT	0.3	0.6	< 0.01%	1

Appendix C. Accuracy Assessment Table for the Vegetation Map of Everglades National Park (2009)

Table C-1. Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: [1]vegetation map class correct at level mapped; [2]vegetation map class more detailed than assessment points; [3]assessment point at boundary between two similar classes, height or cover, difference; [4]sawgrass class modifier; [5]split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Barren Salt Flat	Barren Salt Flat	1	1	1	–	–
	Barren Salt Flat Total	**1**	**1**	**1**	**100**	**100**
Bayhead Forest	Bayhead Forest	8	8	8	–	–
	Bayhead Shrubland[3]	0	3	3	–	–
	Cocoplum Shrubland[3]	0	1	1	–	–
	Tropical Hardwood Hammock	0	0	1	–	–
	Bayhead Forest Total	**8**	**12**	**13**	**62**	**92**
Bayhead Shrubland	Bayhead Forest[3]	0	1	1	–	–
	Bayhead Shrubland	5	5	5	–	–
	Bayhead Swamp Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Buttonwood Shrubland	0	0	1	–	–
	Transitional Bayhead Shrubland[3]	0	2	2	–	–
	Bayhead Shrubland Total	**5**	**9**	**10**	**50**	**90**
Bayhead Swamp Scrub-Sawgrass Marsh	Bayhead Swamp Scrub-Sawgrass Marsh	4	4	4	–	–
	Buttonbush Scrub-Sawgrass Marsh[3]	0	1	3	–	–
	Falsewillow Scrub-Sawgrass Marsh[3]	1	3	3	–	–

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Bayhead Swamp Scrub-Sawgrass Marsh (continued)	Pond Apple Scrub-Graminoid Marsh[3]	0	1	1	–	–
	Short Sawgrass Marsh-Dense	0	0	2	–	–
	Tall Sawgrass Marsh-Dense	0	0	1	–	–
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh	0	2	2	–	–
	Wax Myrtle Scrub-Sawgrass Marsh[3]	1	4	4	–	–
	Bayhead Swamp Scrub-Sawgrass Marsh Total	**6**	**15**	**20**	**30**	**75**
Beakrush Marsh	Beakrush Marsh	1	1	1	–	–
	Mixed Graminoid Freshwater Marsh[3]	0	1	1	–	–
	Beakrush Marsh Total	**1**	**2**	**2**	**50**	**100**
Black Mangrove Forest	Black Mangrove Forest	17	17	17	–	–
	Black Mangrove-Red Mangrove Forest[3]	0	2	2	–	–
	Black Mangrove Forest Total	**17**	**19**	**19**	**89**	**100**
Black Mangrove Scrub-Graminoid Marsh	Black Mangrove Woodland-Graminoid Marsh[3]	0	1	1	–	–
	Black Mangrove Scrub-Graminoid Marsh Total	**0**	**1**	**1**	**0**	**100**
Black Mangrove Scrub-Open Marsh	Black Mangrove Shrubland[3]	0	1	1	–	–
	Black Mangrove Scrub-Open Marsh Total	**0**	**1**	**1**	**0**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Black Mangrove Scrub-Succulent Marsh	Black Mangrove Scrub-Saltwort Marsh[3]	0	2	2	–	–
	Black Mangrove Scrub-Succulent Marsh	1	1	1	–	–
	Black Mangrove Woodland-Open Marsh[3]	0	1	1	–	–
	Black Mangrove Scrub-Succulent Marsh Total	**1**	**4**	**4**	**25**	**100**
Black Mangrove Shrubland	Black Mangrove Forest[2]	0	7	7	–	–
	Black Mangrove Scrub-Open Marsh[2]	0	1	1	–	–
	Black Mangrove Scrub-Saltwort Marsh[1]	0	2	2	–	–
	Black Mangrove Shrubland[3]	2	2	2	–	–
	Black Mangrove Shrubland Total	**2**	**12**	**12**	**17**	**100**
Black Mangrove Woodland-Graminoid Marsh	Black Mangrove Woodland[1]	0	1	1	–	–
	Black Mangrove Woodland-Graminoid Marsh	1	1	1	–	–
	Black Mangrove Woodland-Open Marsh[2]	0	2	2	–	–
	Black Mangrove Woodland-Graminoid Marsh Total	**1**	**4**	**4**	**25**	**100**
Black Mangrove Woodland-Open Marsh	Black Mangrove Forest[3]	0	1	1	–	–
	Black Mangrove Woodland-Open Marsh	1	1	1	–	–
	Black Mangrove Woodland-Open Marsh Total	**1**	**2**	**2**	**50**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Black Mangrove Woodland-Succulent Marsh	Black Mangrove Woodland-Succulent Marsh	2	2	2	–	–
	Black Mangrove Woodland-Succulent Marsh Total	**2**	**2**	**2**	**100**	**100**
Black Mangrove-Buttonwood Forest	Buttonwood Forest[3]	0	1	1	–	–
	Mixed Mangrove Forest-Mixed[3]	0	1	1	–	–
	Black Mangrove-Buttonwood Forest Total	**0**	**2**	**2**	**0**	**100**
Black Mangrove-Buttonwood Shrubland	Black Mangrove Shrubland[3]	0	1	1	–	–
	Black Mangrove-Buttonwood Shrubland	1	1	1	–	–
	Black Mangrove-Buttonwood Woodland[3]	0	1	1	–	–
	Black Mangrove-Red Mangrove Forest	0	0	1	–	–
	Black Mangrove-Buttonwood Shrubland Total	**1**	**3**	**4**	**25**	**75**
Black Mangrove-Buttonwood Woodland-Graminoid Marsh	Buttonwood Shrubland[3]	1	1	1	–	–
	Black Mangrove-Buttonwood Woodland-Graminoid Marsh Total	1	1	1	**100**	**100**
Black Mangrove-Red Mangrove Forest	Black Mangrove Forest[2]	0	2	2	–	–
	Black Mangrove-Red Mangrove Forest	19	19	19	–	–
	Red Mangrove Shrubland[3]	0	1	1	–	–
	Black Mangrove-Red Mangrove Forest Total	**19**	**22**	**22**	**86**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Black Mangrove-Red Mangrove Scrub-Graminoid Marsh	Black Mangrove Shrubland	0	0	1	–	–
	Black Mangrove-Red Mangrove Scrub-Graminoid Marsh Total	**0**	**0**	**1**	**0**	**0**
Black Mangrove-Red Mangrove Shrubland	Black Mangrove-Red Mangrove Shrubland	1	1	1	–	–
	Red Mangrove Shrubland[3]	0	1	1	–	–
	Black Mangrove-Red Mangrove Shrubland Total	**1**	**2**	**2**	**50**	**100**
Black Mangrove-Red Mangrove Woodland-Graminoid Marsh	Black Mangrove Woodland-Open Marsh[3]	0	1	1	–	–
	Black Mangrove-Red Mangrove Woodland-Graminoid Marsh Total	**0**	**1**	**1**	**0**	**100**
Black Mangrove-Red Mangrove Woodland-Open Marsh	Mixed Mangrove Forest-Mixed[2]	0	1	1	–	–
	Black Mangrove-Red Mangrove Woodland-Open Marsh Total	**0**	**1**	**1**	**0**	**100**
Black Mangrove-White Mangrove Forest	Black Mangrove-White Mangrove Forest	1	1	1	–	–
	Mixed Mangrove Forest-Mixed[3]	0	1	1	–	–
	Black Mangrove-White Mangrove Forest Total	**1**	**2**	**2**	**50**	**100**
Black Mangrove-White Mangrove Shrubland	Black Mangrove Woodland-Open Marsh[3]	0	1	1	–	–
	Black Mangrove-White Mangrove Shrubland	1	1	1	–	–
	Black Mangrove-White Mangrove Shrubland Total	**1**	**2**	**2**	**50**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Black Rush Marsh	Black Rush Marsh	7	7	7	–	–
	Red Mangrove Scrub-Sawgrass Marsh	0	0	1	–	–
	Black Rush Marsh Total	**7**	**7**	**8**	**88**	**88**
Brazilian Pepper-Dominant	Brazilian Pepper-Dominant	1	1	1	–	–
	Brazilian Pepper-Dominant Total	**1**	**1**	**1**	**100**	**100**
Buttonwood Forest	Buttonwood Forest	14	14	14	–	–
	Buttonwood Woodland-Succulent Marsh[3]	0	1	1	–	–
	Buttonwood Forest Total	**14**	**15**	**15**	**93**	**100**
Buttonwood Hammock	Buttonwood Forest[3]	0	1	1	–	–
	Buttonwood Hammock Total	**0**	**1**	**1**	**0**	**100**
Buttonwood Scrub-Black Rush Marsh	Buttonwood Scrub-Black Rush Marsh	3	3	3	–	–
	Buttonwood Scrub-Black Rush Marsh Total	**3**	**3**	**3**	**100**	**100**
Buttonwood Scrub-Cordgrass Marsh	Buttonwood Scrub-Black Rush Marsh[5]	0	1	1	–	–
	Buttonwood Scrub-Cordgrass Marsh Total	**0**	**1**	**1**	**0**	**100**
Buttonwood Shrubland	Buttonwood Forest[1]	0	3	3	–	–
	Buttonwood Shrubland	2	2	2	–	–
	Buttonwood Woodland-Graminoid Marsh[2]	0	1	1	–	–
	Buttonwood Woodland-Succulent Marsh[2]	0	1	1	–	–
	Buttonwood Shrubland Total	**3**	**7**	**7**	**43**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Buttonwood-Red Mangrove Forest	Buttonwood Shrubland	0	0	1	–	–
	Buttonwood-Red Mangrove Forest	3	3	3	–	–
	Mixed Mangrove Forest-Mixed[2]	0	1	1	–	–
	Red Mangrove Forest[2]	0	1	1	–	–
	Buttonwood-Red Mangrove Forest Total	**3**	**5**	**6**	**50**	**83**
Buttonwood-Red Mangrove Scrub-Dominant	Buttonwood-Red Mangrove Scrub-Dominant	1	1	1	–	–
	Buttonwood-Red Mangrove Scrub-Open Marsh[3]	0	1	1	–	–
	Red Mangrove Scrub-Open Marsh	0	0	1	–	–
	Buttonwood-Red Mangrove Scrub-Dominant Total	**1**	**2**	**3**	**33**	**67**
Buttonwood-Red Mangrove Scrub-Open Marsh	Red Mangrove Scrub-Open Marsh[3]	0	2	2	–	–
	Buttonwood-Red Mangrove Scrub-Open Marsh Total	**0**	**2**	**2**	**0**	**100**
Buttonwood-Red Mangrove Scrub-Sawgrass Marsh	Buttonwood Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Buttonwood-Red Mangrove Scrub-Sawgrass Marsh	2	2	2	–	–
	Buttonwood-Red Mangrove Shrubland[3]	0	1	1	–	–
	Red Mangrove Scrub-Open Marsh	0	0	1	–	–
	Buttonwood-Red Mangrove Scrub-Sawgrass Marsh Total	**2**	**4**	**5**	**40**	**80**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Buttonwood-Red Mangrove Shrubland	Black Mangrove-Red Mangrove Shrubland[3]	0	1	1	–	–
	Buttonwood Forest	0	0	1	–	–
	Buttonwood Scrub-Sawgrass Marsh	0	0	1	–	–
	Buttonwood Shrubland[3]	0	1	1	–	–
	Buttonwood-Red Mangrove Scrub[3]	0	1	1	–	–
	Buttonwood-Red Mangrove Shrubland	11	11	11	–	–
	Mixed Mangrove Shrubland-Mixed[3]	0	1	1	–	–
	Transitional Bayhead Shrubland[3]	0	1	2	–	–
	Buttonwood-Red Mangrove Shrubland Total	**11**	**16**	**19**	**58**	**84**
Buttonwood-White Mangrove Forest	Buttonwood-White Mangrove Forest	1	1	1	–	–
	Buttonwood-White Mangrove Forest Total	**1**	**1**	**1**	**100**	**100**
Buttonwood-White Mangrove Shrubland	Buttonwood-White Mangrove Forest[3]	0	1	1	–	–
	Buttonwood-White Mangrove Shrubland Total	**0**	**1**	**1**	**0**	**100**
Cabbage Palm Lowland-Shrubs	Cabbage Palm Lowland-Shrubs	1	1	1	–	–
	Cabbage Palm Lowland-Shrubs Total	**1**	**1**	**1**	**100**	**100**
Coastal Hardwood Scrub	Coastal Hardwood Scrub	1	1	1	–	–
	Coastal Hardwood Scrub Total	**1**	**1**	**1**	**100**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Cocoplum Shrubland	Cocoplum Shrubland	2	2	2	–	–
	Cocoplum Shrubland Total	**2**	**2**	**2**	**100**	**100**
Cypress Forest-Monotypic	Cypress Forest	2	2	2	–	–
	Cypress Forest-Monotypic Total	**2**	**2**	**2**	**100**	**100**
Cypress Scrub-Graminoid Marsh	Cypress Scrub-Graminoid Marsh	1	1	1	–	–
	Cypress Scrub-Graminoid Marsh Total	**1**	**1**	**1**	**100**	**100**
Cypress Scrub-Graminoid Prairie	Cypress Scrub-Muhly Prairie[2]	0	2	2	–	–
	Cypress Scrub-Sawgrass Prairie[2]	0	1	1	–	–
	Cypress Scrub-Short Sawgrass Marsh	0	0	1	–	–
	Cypress Scrub-Graminoid Prairie Total	**0**	**3**	**4**	**0**	**75**
Cypress Scrub-Mixed Graminoid Marsh	Cypress Scrub-Sawgrass Prairie[3]	0	1	1	–	–
	Cypress Scrub-Mixed Graminoid Marsh Total	**0**	**1**	**1**	**0**	**100**
Cypress Scrub-Sawgrass Marsh	Cypress Scrub-Sawgrass Marsh	0	1	1	–	–
	Cypress Scrub-Sawgrass Prairie	0	0	1	–	–
	Cypress Scrub-Short Sawgrass Marsh[2]	3	4	4	–	–
	Short Sawgrass Marsh-Sparse[3]	0	1	1	–	–
	Cypress Scrub-Short Sawgrass Marsh Total	**3**	**6**	**7**	**43**	**86**
Cypress Scrub-Spikerush Marsh	Cypress Scrub-Spikerush Marsh	1	1	1	–	–
	Cypress Scrub-Spikerush Marsh Total	**1**	**1**	**1**	**100**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Cypress Woodland-Graminoid Prairie	Cypress Woodland-Graminoid Prairie	1	1	1	–	–
	Cypress Woodland-Graminoid Prairie Total	**1**	**1**	**1**	**100**	**100**
Graminoid Freshwater Prairie	Bayhead Swamp Scrub	0	0	1	–	–
	Cypress Scrub-Mixed Prairie	0	0	1	–	–
	Cypress Scrub-Sawgrass Prairie	0	0	1	–	–
	Cypress Scrub-Short Sawgrass Marsh	0	0	1	–	–
	Graminoid Freshwater Prairie	6	6	6	–	–
	Mixed Graminoid Freshwater Marsh[3]	0	1	2	–	–
	Mixed Graminoid Freshwater Prairie[2]	0	38	38	–	–
	Muhly Grass Prairie[2]	1	7	7	–	–
	Sawgrass Prairie[2]	1	15	15	–	–
	Short Sawgrass Marsh-Sparse	0	0	4	–	–
	Upland Hardwood Scrub-Mixed Prairie[3]	0	1	2	–	–
	Upland Hardwood Scrub-Sawgrass Prairie	0	0	2	–	–
	Graminoid Freshwater Prairie Total	**8**	**68**	**80**	**10**	**85**
Mixed Graminoid Freshwater Marsh	Beakrush Marsh[2]	0	9	9	–	–
	Graminoid Freshwater Prairie	0	0	1	–	–
	Mixed Graminoid Freshwater Marsh	15	15	15	–	–
	Sawgrass-Beakrush Marsh[3]	0	3	3	–	–

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Mixed Graminoid Freshwater Marsh (continued)	Short Sawgrass Marsh-Sparse[3]	0	23	23	–	–
	Spikerush Marsh[2]	0	4	4	–	–
	Tall Sawgrass Marsh-Sparse[3]	0	1	1	–	–
	Wax Myrtle Scrub-Sawgrass Marsh	0	0	1	–	–
	Willow Scrub-Graminoid Marsh	0	0	1	–	–
	Mixed Graminoid Freshwater Marsh Total	**15**	**55**	**58**	**26**	**95**
Mixed Mangrove Forest-Mixed	Black Mangrove Forest[2]	0	1	1	–	–
	Black Mangrove-Buttonwood Forest[2,3]	0	1	1	–	–
	Black Mangrove-Red Mangrove Forest[2,3]	0	8	8	–	–
	Black Mangrove-White Mangrove Forest[3]	0	1	1	–	–
	Buttonwood-Red Mangrove Forest	0	1	1	–	–
	Mixed Mangrove Forest-Mixed	28	28	28	–	–
	White Mangrove-Red Mangrove Forest[2]	0	2	2	–	–
	White Mangrove-Red Mangrove Shrubland	0	0	1	–	–
	Mixed Mangrove Forest-Mixed Total	**28**	**42**	**43**	**65**	**98**
Mixed Mangrove Shrubland-Mixed	Black Mangrove-Buttonwood Shrubland[3]	0	1	1	–	–
	Red Mangrove Shrubland	0	0	2	–	–
	White Mangrove-Red Mangrove Scrub[3]	0	1	1	–	–
	Mixed Mangrove Shrubland-Mixed Total	**0**	**2**	**4**	**0**	**50**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Open Salt Marsh	Saltwort Marsh[3]	0	1	1	–	–
	Open Salt Marsh Total	**0**	**1**	**1**	**0**	**100**
Pine Rockland-Graminoids	Pine Rockland-Graminoids	2	2	2	–	–
	Pine Rockland-Graminoids Total	**2**	**2**	**2**	**100**	**100**
Pine Rockland-Mixed	Pine Rockland-Graminoids[3]	0	1	1	–	–
	Pine Rockland-Mixed	1	1	1	–	–
	Upland Hardwood Scrub-Sawgrass Prairie	0	0	1	–	–
	Pine Rockland-Mixed Total	**1**	**2**	**3**	**33**	**67**
Pine Rockland-Shrubs	Pine Rockland-Graminoids[3]	0	2	2	–	–
	Pine Rockland-Mixed[3]	0	5	5	–	–
	Pine Rockland-Saw Palmetto[3]	0	2	2	–	–
	Pine Rockland-Shrubs	1	1	1	–	–
	Tropical Hardwood Hammock	0	0	1	–	–
	Pine Rockland-Shrubs Total	**1**	**10**	**11**	**9**	**91**
Pond Apple Scrub-Sawgrass Marsh	Pond Apple Scrub-Sawgrass Marsh	1	1	1	–	–
	Pond Apple Scrub-Sawgrass Marsh Total	**1**	**1**	**1**	**100**	**100**
Red Mangrove Forest	Black Mangrove-Red Mangrove Forest[3]	0	1	1	–	–
	Buttonwood-Red Mangrove Forest[3]	0	1	1	–	–
	Red Mangrove Forest	16	16	16	–	–

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Red Mangrove Forest (continued)	Red Mangrove Shrubland[3]	0	2	2	–	–
	Red Mangrove Forest Total	**16**	**20**	**20**	**80**	**100**
Red Mangrove Scrub-Dominant	Red Mangrove Scrub-Dominant	10	10	10	–	–
	Red Mangrove Scrub-Open Marsh[3]	0	3	3	–	–
	Red Mangrove Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Red Mangrove Scrub-Spikerush Marsh[3]	0	2	2	–	–
	Red Mangrove Shrubland[3]	0	2	2	–	–
	Water	0	0	1	–	–
	White Mangrove Scrub-Black Rush Marsh	0	0	1	–	–
	Red Mangrove Scrub-Dominant Total	**10**	**18**	**20**	**50**	**90**
Red Mangrove Scrub-Open Marsh	Buttonwood Scrub-Open Marsh	0	0	1	–	–
	Red Mangrove Scrub-Dominant[3]	0	1	1	–	–
	Red Mangrove Scrub-Open Marsh	48	48	48	–	–
	Red Mangrove Scrub-Sawgrass Marsh[3]	0	3	3	–	–
	Red Mangrove Scrub-Spikerush Marsh[3]	0	2	2	–	–
	Red Mangrove Shrubland[3]	0	1	1	–	–
	Red Mangrove Scrub-Open Marsh Total	**48**	**55**	**56**	**86**	**98**
Red Mangrove Scrub-Sawgrass Marsh	Buttonwood-Red Mangrove Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Red Mangrove Scrub-Graminoid[1]	0	1	1	–	–

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Red Mangrove Scrub-Sawgrass Marsh (continued)	Red Mangrove Scrub-Open Marsh[3]	0	3	3	–	–
	Red Mangrove Scrub-Sawgrass Marsh	19	19	19	–	–
	White Mangrove-Red Mangrove Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Red Mangrove Scrub-Sawgrass Marsh Total	**19**	**25**	**25**	**76**	**100**
Red Mangrove Scrub-Spikerush Marsh	Red Mangrove Scrub-Graminoid[1]	0	1	1	–	–
	Red Mangrove Scrub-Open Marsh[3]	0	9	9	–	–
	Red Mangrove Scrub-Sawgrass Marsh	0	0	1	–	–
	Red Mangrove Scrub-Spikerush Marsh	10	10	10	–	–
	Red Mangrove Scrub-Spikerush Marsh Total	**10**	**20**	**21**	**48**	**95**
Red Mangrove Shrubland	Red Mangrove Forest[3]	0	1	1	–	–
	Red Mangrove Scrub-Cordgrass Marsh[3]	0	1	1	–	–
	Red Mangrove Scrub-Dominant[3]	0	2	2	–	–
	Red Mangrove Scrub-Sawgrass Marsh	0	0	1	–	–
	Red Mangrove Shrubland	14	14	14	–	–
	Red Mangrove Shrubland Total	**14**	**18**	**19**	**74**	**95**
Saltgrass-Sand Cordgrass Marsh	Sand Cordgrass Marsh[3]	0	1	1	–	–
	Saltgrass-Sand Cordgrass Marsh Total	**0**	**1**	**1**	**0**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Sand Cordgrass Marsh	Buttonwood-White Mangrove Scrub-Cordgrass Marsh	0	0	1	–	–
	Sand Cordgrass Marsh	8	8	8	–	–
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh	0	0	1	–	–
	Sand Cordgrass Marsh Total	**8**	**8**	**10**	**80**	**80**
Sawgrass-Beakrush Marsh	Beakrush Marsh[3]	0	1	1	–	–
	Sawgrass-Beakrush Marsh	2	2	2	–	–
	Short Sawgrass Marsh-Sparse[3]	0	4	4	–	–
	Sawgrass-Beakrush Marsh Total	**2**	**7**	**7**	**29**	**100**
Sawgrass-Black Rush Marsh	Graminoid Salt Marsh	0	0	1	–	–
	Red Mangrove Scrub-Black Rush Marsh[3]	0	1	1	–	–
	Short Sawgrass Marsh-Sparse[3]	0	1	1	–	–
	Sawgrass-Black Rush Marsh Total	**0**	**2**	**3**	**0**	**67**
Sawgrass-Cattail Marsh	Bayhead Swamp Scrub-Sawgrass Marsh	0	0	1	–	–
	Tall Sawgrass Marsh-Sparse[3]	0	3	3	–	–
	Sawgrass-Cattail Marsh Total	**0**	**3**	**4**	**0**	**75**
Sawgrass-Sand Cordgrass Marsh	Black Rush Marsh[5]	0	1	1	–	–
	Sawgrass-Sand Cordgrass Marsh Total	**0**	**1**	**1**	**0**	**100**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Short Sawgrass Marsh-Dense	Bayhead Swamp Scrub-Sawgrass Marsh	0	0	1	–	–
	Beakrush Marsh	0	0	1	–	–
	Cypress Scrub-Graminoid Marsh	0	0	1	–	–
	Mixed Graminoid Freshwater Marsh[3]	0	4	4	–	–
	Mixed Graminoid Freshwater Prairie	0	0	1	–	–
	Red Mangrove Scrub-Sawgrass Marsh[3]	0	1	4	–	–
	Sawgrass Marsh[1]	0	1	1	–	–
	Sawgrass Prairie	0	0	1	–	–
	Sawgrass-Beakrush Marsh[3]	0	5	5	–	–
	Sawgrass-Sand Cordgrass Marsh[3]	0	1	1	–	–
	Short Sawgrass Marsh-Dense	36	36	36	–	–
	Short Sawgrass Marsh-Sparse[4]	0	54	55	–	–
	Tall Sawgrass Marsh-Dense[4]	0	36	36	–	–
	Tall Sawgrass Marsh-Sparse[4]	0	7	7	–	–
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh[3]	0	2	4	–	–
	Short Sawgrass Marsh-Dense Total	**36**	**147**	**158**	**23**	**93**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Short Sawgrass Marsh-Sparse	Graminoid Freshwater Prairie	0	0	1	–	–
	Mixed Graminoid Freshwater Marsh[3]	0	2	2	–	–
	Short Sawgrass Marsh-Sparse	3	3	3	–	–
	Short Sawgrass Marsh-Sparse Total	**3**	**6**	**6**	**50**	**100**
Spikerush Marsh	Beakrush Marsh	0	0	1	–	–
	Mixed Graminoid Freshwater Marsh[3]	0	6	6	–	–
	Red Mangrove Scrub-Spikerush Marsh[3]	0	1	1	–	–
	Short Sawgrass Marsh[3]	0	1	1	–	–
	Short Sawgrass Marsh-Sparse	0	0	2	–	–
	Spikerush Marsh	25	25	25	–	–
	Spikerush Marsh Total	**25**	**33**	**36**	**69**	**92**
Succulent Salt Marsh	Saltwort Marsh[2]	0	2	2	–	–
	Succulent Salt Marsh Total	**0**	**2**	**2**	**0**	**100**
Tall Sawgrass Marsh-Dense	Buttonbush Scrub-Sawgrass Marsh	0	0	1	–	–
	Pond Apple Scrub-Sawgrass Marsh	0	0	1	–	–
	Short Sawgrass Marsh-Dense[4]	0	1	1	–	–
	Tall Sawgrass Marsh-Dense	8	8	8	–	–
	Tall Sawgrass Marsh-Sparse[4]	0	4	4	–	–
	Tall Sawgrass Marsh-Dense Total	**8**	**13**	**15**	**53**	**87**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Tidal Flat	Black Mangrove-Red Mangrove Forest	0	0	1	–	–
	Tidal Flat Total	**0**	**0**	**1**	**0**	**0**
Transitional Bayhead Forest	Transitional Bayhead Forest	1	1	1	–	–
	Transitional Bayhead Shrubland[3]	0	1	1	–	–
	Transitional Bayhead Forest Total	**1**	**2**	**2**	**50**	**100**
Transitional Bayhead Shrubland	Bayhead Shrubland[3]	0	1	1	–	–
	Bayhead Swamp Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Black Mangrove-Red Mangrove Woodland	0	0	1	–	–
	Buttonwood Scrub-Sawgrass Marsh	0	0	4	–	–
	Buttonwood Shrubland	0	0	5	–	–
	Buttonwood-Red Mangrove Forest	0	0	1	–	–
	Buttonwood-Red Mangrove Scrub-Open Marsh	0	0	1	–	–
	Buttonwood-Red Mangrove Scrub-Sawgrass Marsh	0	0	1	–	–
	Buttonwood-Red Mangrove Shrubland	0	0	3	–	–
	Cocoplum Shrubland	0	0	2	–	–
	Red Mangrove Scrub-Dominant	0	0	1	–	–
	Red Mangrove Scrub-Open Marsh	0	0	1	–	–
	Red Mangrove Scrub-Sawgrass Marsh	0	0	2	–	–
	Red Mangrove Scrub-Spikerush Marsh	0	0	1	–	–

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Transitional Bayhead Shrubland (continued)	Red Mangrove Shrubland	0	0	3	–	–
	Short Sawgrass Marsh-Sparse[3]	0	1	1	–	–
	Transitional Bayhead Shrubland	26	26	26	–	–
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh[3]	0	6	6	–	–
	Transitional Bayhead Shrubland Total	**25**	**35**	**61**	**41**	**57**
Transitional Bayhead Swamp Scrub-Sawgrass Marsh	Buttonwood Scrub-Sawgrass Marsh	0	0	3	–	–
	Buttonwood-Red Mangrove Scrub-Sawgrass Marsh	0	0	1	–	–
	Buttonwood-Red Mangrove Shrubland	0	0	2	–	–
	Buttonwood-White Mangrove Scrub-Sawgrass Marsh	0	0	1	–	–
	Red Mangrove Scrub-Open Marsh	0	0	1	–	–
	Red Mangrove Scrub-Sawgrass Marsh	0	0	3	–	–
	Transitional Bayhead Shrubland[3]	0	7	7	–	–
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh	8	8	8	–	–
	Wax Myrtle Scrub-Sawgrass Marsh[3]	0	1	1	–	–
	Transitional Bayhead Swamp Scrub-Sawgrass Marsh Total	**8**	**16**	**27**	**30**	**59**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Transitional Bayhead Swamp Scrub-Spikerush Marsh	Transitional Bayhead Swamp Scrub-Sawgrass Marsh	0	0	1	–	–
	Transitional Bayhead Swamp Scrub-Spikerush Marsh Total	**0**	**0**	**1**	**0**	**0**
Tropical Hardwood Hammock	Bayhead Shrubland	0	0	1	–	–
	Tropical Hardwood Hammock	12	12	12	–	–
	Tropical Hardwood Shrubland[3]	0	2	2	–	–
	Tropical Hardwood Hammock Total	**12**	**14**	**15**	**80**	**93**
Tropical Hardwood Shrubland	Saw Palmetto Shrubland[3]	0	1	1	–	–
	Transitional Bayhead Forest	0	0	1	–	–
	Tropical Hardwood Shrubland Total	**0**	**1**	**2**	**0**	**50**
Upland Hardwood Scrub-Graminoid Prairie	Beakrush Marsh	0	0	1	–	–
	Upland Hardwood Scrub-Mixed Prairie[2]	0	2	2	–	–
	Upland Hardwood Scrub-Sawgrass Prairie[2]	0	2	2	–	–
	Wax Myrtle Scrub-Graminoid Prairie	0	0	1	–	–
	Upland Hardwood Scrub-Graminoid Prairie Total	**0**	**4**	**6**	**0**	**67**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
Water	Red Mangrove Forest[5]	0	1	1	–	–
	Tidal Flat[3]	0	2	2	–	–
	Water	41	41	41	–	–
	Water Total	**41**	**44**	**44**	**93**	**100**
White Mangrove Forest	White Mangrove Shrubland[3]	0	2	2	–	–
	White Mangrove-Red Mangrove Forest[3]	0	1	1	–	–
	White Mangrove Forest Total	**0**	**3**	**3**	**0**	**100**
White Mangrove Scrub-Black Rush Marsh	White Mangrove Scrub-Black Rush Marsh	1	1	1	–	–
	White Mangrove Scrub-Black Rush Marsh Total	**1**	**1**	**1**	**100**	**100**
White Mangrove Scrub-Cordgrass Marsh	Black Mangrove Woodland-Open Marsh	0	0	1	–	–
	White Mangrove Scrub-Cordgrass Marsh Total	**0**	**0**	**1**	**0**	**0**
White Mangrove Scrub-Open Marsh	White Mangrove Scrub-Open Marsh	1	1	1	–	–
	White Mangrove Scrub-Open Marsh Total	**1**	**1**	**1**	**100**	**100**
White Mangrove Scrub-Sawgrass Marsh	White Mangrove Scrub-Sawgrass Marsh	1	1	1	–	–
	White Mangrove Scrub-Sawgrass Marsh Total	**1**	**1**	**1**	**100**	**100**
White Mangrove Shrubland	Mixed Mangrove Shrubland-Mixed	0	0	1	–	–
	White Mangrove Shrubland Total	**0**	**0**	**1**	**0**	**0**

Table C-1 (continued). Accuracy assessment table for the eastern Big Cypress vegetation map. Superscripts identify the acceptance criteria as outlined in the methods section of the report and are as follows: 1vegetation map class correct at level mapped; 2vegetation map class more detailed than assessment points; 3assessment point at boundary between two similar classes, height or cover, difference; 4sawgrass class modifier; 5split cell/majority rule decision.

Map Annotation	Accuracy Assessment Annotation	One-to-One Match	Number of Accepted Points	Number of Accuracy Assessment Points	One-to-One Match Correct (%)	Final Map Annotation Assessment (%)
White Mangrove-Red Mangrove Forest	Mixed Mangrove Forest-Mixed[1]	0	2	2	–	–
	Red Mangrove Forest[3]	0	3	3	–	–
	Red Mangrove Shrubland	0	0	1	–	–
	White Mangrove Forest[3]	0	1	1	–	–
	White Mangrove-Red Mangrove Forest	1	1	1	–	–
	White Mangrove-Red Mangrove Shrubland[3]	0	1	1	–	–
	White Mangrove-Red Mangrove Forest Total	**1**	**8**	**9**	**11**	**89**
White Mangrove-Red Mangrove Shrubland	Buttonwood-Red Mangrove Shrubland[3]	0	1	1	–	–
	Red Mangrove Shrubland[3]	0	3	3	–	–
	White Mangrove Shrubland[3]	0	1	1	–	–
	White Mangrove-Red Mangrove Shrubland Total	**0**	**5**	**5**	**0**	**100**
Willow Scrub-Sawgrass Marsh	Willow Scrub-Sawgrass Marsh	1	1	1	–	–
	Willow Scrub-Sawgrass Marsh Total	**1**	**1**	**1**	**100**	**100**
Willow Shrubland	Willow Shrubland	2	2	2	–	–
	Willow Shrubland Total	**2**	**2**	**2**	**100**	**100**
Grand Total	–	**476**	**904**	**1014**	**47**	**89.2**

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

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Natural Resource Stewardship and Science
1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525