FLORIDA DEPARTMENT OF
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

August 23, 2019

Mr. Steven Cutshaw
Division of Recreation and Parks
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 525
Tallahassee, Florida 32399-3000

RE: Waccasassa Bay Preserve State Park– Lease No. 2599

Dear Mr. Cutshaw:

On **August 16, 2019**, the Acquisition and Restoration Council (ARC) recommended approval of the **Waccasassa Bay Preserve State Park** management plan. Therefore, Division of State Lands, Office of Environmental Services (OES), acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the **Waccasassa Bay Preserve State Park** management plan. The next management plan update is due August 16, 2029.

Pursuant to s. 253.034(5)(a), F.S., each management plan is required to "describe both short-term and long-term management goals, and include measurable objectives to achieve those goals. Short-term goals shall be achievable within a 2-year planning period, and long-term goals shall be achievable within a 10-year planning period." Upon completion of short-term goals, please submit a signed letter identifying categories, goals, and results with attached methodology to the Division of State Lands, Office of Environmental Services.

Pursuant to s. 259.032(8)(g), F.S., by July 1 of each year, each governmental agency and each private entity designated to manage lands shall report to the Secretary of Environmental Protection, via the Division of State Lands, on the progress of funding, staffing, and resource management of every project for which the agency or entity is responsible.

Pursuant to s. 259.036(2), F.S., management areas that exceed 1,000 acres in size, shall be scheduled for a land management review at least every 5 years.

Pursuant to s. 259.032, F.S., and Chapter 18-2.021, F.A.C., management plans for areas less than 160 acres may be handled in accordance with the negative response process. This process requires small management plans and management plan amendments be

submitted to the Division of State Lands for review, and the Acquisition and Restoration Council (ARC) for public notification. The Division of State Lands will approve these plans or plan amendments submitted for review through delegated authority unless three or more ARC members request the division place the item on a future council meeting agenda for review. To create better efficiency, improve customer service, and assist members of the ARC, the Division of State Lands will notice negative response items on Thursdays except for weeks that have State or Federal holidays that fall on Thursday or Friday. The Division of State Lands will contact you on the appropriate Friday to inform you if the item is approved via delegated authority or if it will be placed on a future ARC agenda by request of the ARC members.

Conditional approval of this land management plan does not waive the authority or jurisdiction of any governmental entity that may have an interest in this project. Implementation of any upland activities proposed by this management plan may require a permit or other authorization from federal and state agencies having regulatory jurisdiction over those particular activities. Pursuant to the conditions of your lease, please forward copies of all permits to this office upon issuance.

Sincerely,

Callie DeHaven
Director, Division of State Lands
Department of Environmental Protection

Waccasassa Bay Preserve State Park

Lead Agency: Department of Environmental Protection
Division of Recreation and Parks

Common Name of Property: Waccasassa Bay Preserve State Park

Location: Levy County

Direct Economic Impact: FY 17-18 $8,954,358 and 125 jobs added to local economy

Acreage: 34,397.02 Acres

Acreage Breakdown

Natural Communities	Acres
Mesic Flatwoods	168.43
Scrubby Flatwoods	0.53
Basin Swamp	383.33
Depression Marsh	11.06
Hydric Hammock	7,608.71
Mangrove Swamp	311.73
Salt Marsh	19,460.20
Blackwater Stream	13.00
Estuarine Composite Substrate	6,374.70
Estuarine Mollusk Reef	55.91

Lease/Management Agreement Number(s): 2599

Use: Single Use

Management Responsibilities

Agency: Dept. of Environmental Protection, Division of Recreation and Parks

Responsibility: Public Outdoor Recreation and Conservation

Designated Land Use: Public outdoor recreation and conservation is the designated single use of the property

Sublease: None

Encumbrances: See Addendum 1 for details

Type of Acquisition(s): I (see Addendum 1 for details).

Unique Features

Overview: Waccasassa Bay Preserve State Park is located in Levy County. There is currently limited access to the park via land. Access to the park is primarily from water. Waccasassa Bay Preserve State Park was initially acquired on December 10, 1971 with funds from the Land Acquisition Trust Fund (LATF) and the Land and Water Conservation Fund (LWCF). Currently, the park comprises 34,397.02 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park and on April 6, 1972, the Trustees leased (Lease Number 2599) the property to DRP under a ninety-nine year lease. The purpose of Waccasassa Bay Preserve State Park is to conserve and protect the distinct and significant biological and geological resources within the park for the benefit of the people of Florida. Waccasassa Bay Preserve also plays a significant role in improving the water quality for adjacent estuaries.

Natural: Waccasassa Bay Preserve State Park contains some of the last undisturbed remnants of the once great Gulf Hammock. The Gulf Hammock was an old-growth hydric hammock some 100,000 acres in size that stretched from Yankeetown to Cedar Key. It is estimated that 80% of the Gulf Hammock was clear-cut for conversion to loblolly pine plantations between 1970 and the mid-1980s (Simons et al 1989). Much of what remained was sold to the State of Florida to form the core of Waccasassa Bay Preserve State Park. The extensive outcrops of limestone in the preserve are a notable geologic feature. The limestone underlying the Florida peninsula is exposed at the land surface along the Levy County coastline where the Floridan aquifer leaks out into the Gulf of Mexico. A unique botanical feature of the preserve is the number of plant species occurring at either the northern or southern limits of their ranges. A floristic survey of Waccasassa Bay Preserve State Park has documented 29 species that occur at or near their contiguous southern limit in Florida (Abbott 1998). Likewise, 45 species were documented that occur at or near their contiguous northern limit in Florida.

Archaeological/Historical: There are 75 archaeological sites and 1 linear resource group in the park that have been recorded with the FMSF; all known sites have been recorded. The majority of the sites in the park are prehistoric and are from the Weeden Island and Woodland cultures dating to about 1000 AD. The Deptford and Safety Harbor cultures are represented on a much smaller scale. These sites include shell middens, prehistoric habitations and campsites, burial sites, and procurement sites. Some sites lack pottery and thus are designated prehistoric. There is a wealth of archaeological information within the park that could greatly increase our knowledge about the evolution of aboriginal cultures along the Gulf coast. A few sites in the park are historic, ranging from the Territorial Development period of 1821-45 to the early 20th Century.

Management Goals, Objectives and Actions

Measurable objectives and actions have been identified for each of the

Division's management goals for Waccasassa Bay Preserve State Park. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While, the Division of Recreation and Parks utilizes the ten-year management plan to serve as the basic statement of policy and future direction for each park, a number of annual work plans provide more specific guidance for Division staff to accomplish many of the resource management goals and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire management, exotic plant management and imperiled species management. Annual or longer-term work plans are developed for natural community restoration and hydrological restoration.

The work plans provide the Division with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system. The work plans are reviewed and updated annually. Through this process, the Division's resource management strategies are systematically evaluated to determine their effectiveness. The process and the information collected is used to refine techniques, methodologies and strategies, and ensures that each park's prescribed management actions are monitored and reported as required by Chapters 253.034 and 259.037, Florida Statutes. The goals, objectives and actions identified in this management plan will serve as the basis for developing annual work plans for the park. Since the plan is based on conditions that exist at the time the plan is developed, the annual work plans will provide the flexibility needed to adapt to future conditions as they change during the ten-year management planning cycle. As the park's annual work plans are implemented through the ten-year cycle, it may become necessary to adjust the management plan's priority schedules and cost estimates to reflect these changing conditions.

Natural Resource Management

Hydrological Management

Goal: Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.

- *Objective A: Conduct/obtain an assessment of the park's hydrological restoration needs.*
- *Objective B: Restore natural hydrological conditions and function to approximately 10 acres of hydric hammock natural community.*

Natural Communities Management

Goal: Restore and maintain the natural communities/habitats of the park.

- *Objective A: Within 10 years, have 180 acres of the park maintained within optimum fire return interval.*
- *Objective B: Conduct natural community/habitat improvement activities on 40 acres of mesic flatwoods natural community.*

Imperiled Species Management
Goal: Maintain, improve or restore imperiled species populations and habitats in the park.

- *Objective A: Update baseline imperiled species occurrence inventory lists for plants and animals.*
- *Objective B: Monitor and document 5 selected imperiled animal species in the park.*
- *Objective C: Monitor and document 2 imperiled plant species in the park.*

Exotic Species Management
Goal: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.

- *Objective A: Annually treat 3 acres of exotic plant species in the park.*
- *Objective B: Prevent the introduction and spread of invasive exotic plants into the park.*
- *Objective C: Survey the entire park for invasive exotics at least 1 time over 10 years.*
- *Objective D: Implement control measures on 1 exotic animal species in the park.*

Cultural Resource Management

Cultural Resource Management
Goal: Protect, preserve and maintain the cultural resources of the park.

- *Objective A: Assess and evaluate 6 of 75 recorded cultural resources in the park.*
- *Objective B: Compile reliable documentation for all recorded historic and archaeological resources.*
- *Objective C: Bring 0 of 75 recorded cultural resources into good condition.*

Ten-Year Implementation Schedule and Cost Estimates: See Table 8, pages 93—102.

Acquisition Needs/Acreage: Approximately 6,360 acres of lands are identified within the optimum boundary for Waccasassa Bay Preserve State Park (see Optimum Boundary Map, page 79). Properties proposed around the park are proposed for acquisition to create a constant connection of

conservation lands from the Lower Suwannee National Wildlife Refuge through Cedar Key Scrub and continuing through Waccasassa Bay Preserve State Park. This connection would provide vital habitat connection for species throughout Dixie and Levy Counties. Additionally acquisition of these properties would ensure a buffer for the park with the growing population of Levy County.

Surplus Lands/Acreage: No lands are considered surplus to the needs of the park.

Public Involvement: DRP solicited public input by conducting a public workshop on Wednesday, February 27, 2019. The purpose was to present the Management plan to the public. On Thursday, February 28, 2019, an Advisory Group meeting was held. The purpose of this meeting was to provide the Advisory Group members the opportunity to review and discuss the management plan (see Addendum 2).

Summary of Significant Changes in the Management Plan Update

New recreational opportunities and support facilities have been proposed that are appropriate for this park and consistent with the DRP mission. These include:

Recreation Facilities

Parkwide

Maintain existing primitive campsites

Designate park as a Wilderness Preserve

Waccasassa Bay Preserve State Park

Approved Unit Management Plan

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Recreation and Parks
August 2019

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INTRODUCTION

Waccasassa Bay Preserve State Park is located in Levy County (see Vicinity Map). There is currently limited access to the park via land. Access to the park is primarily from water (see Reference Map). The Vicinity Map also reflects significant land and water resources existing near the park.

Waccasassa Bay Preserve State Park was initially acquired on December 10, 1971 with funds from the Land Acquisition Trust Fund (LATF) and the Land and Water Conservation Fund (LWCF). Currently, the park comprises 34,397.02 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park and on April 6, 1972, the Trustees leased (Lease Number 2599) the property to DRP under a ninety-nine year lease. The current lease will expire on April 5, 2071.

Waccasassa Bay Preserve State Park is designated single-use to provide public outdoor recreation and other park-related uses. There are no legislative or executive directives that constrain the use of this property (see Addendum 1).

Purpose and Significance of the Park

The purpose of Waccasassa Bay Preserve State Park is to protect the diverse natural communities and the imperiled species dependent on those communities. The park was acquired to provide outdoor recreation opportunities to the public and conserve sensitive environmental lands.

Park Significance

- The park protects numerous imperiled species such as the Florida panther, manatee, and several wading birds and shorebirds, and offers unique wildlife viewing opportunities.

- The park is the sixth largest park in the Florida Park Service system with 34,000 acres containing 19,000 acres of tidal marshes along 20 miles of coastline. These marshes support an important estuarine habitat for many saltwater sport fish.

- The park protects natural communities such as salt marsh, hydric hammock, basin swamp, and mesic flatwoods as well as numerous archaeological sites, several of which are likely eligible for listing on the National Register of Historic Places.

- Along the upland edge of the tidal marshes are the remnants of Gulf Hammock which was once Florida's largest hydric hammock natural communities covering some 100,000 acres.

- The park offers resource-based recreation in the form of fishing, and paddling and contains four primitive campsites. This beautiful park is only accessible by private boat or canoe/kayak.

Waccasassa Bay Preserve State Park is classified as a Preserve in the DRP's unit classification system. In the management of a Preserve, preservation and enhancement of natural conditions is all important. Resource considerations are given priority over user considerations and development is restricted to the minimum necessary for ensuring its protection and maintenance, limited access, user safety and convenience, and appropriate interpretation. Permitted uses are primarily of a passive nature, related to the aesthetic, educational and recreational enjoyment of the preserve, although other compatible uses are permitted in limited amounts. Program emphasis is placed on interpretation of the natural and cultural attributes of the preserve.

Purpose and Scope of the Plan

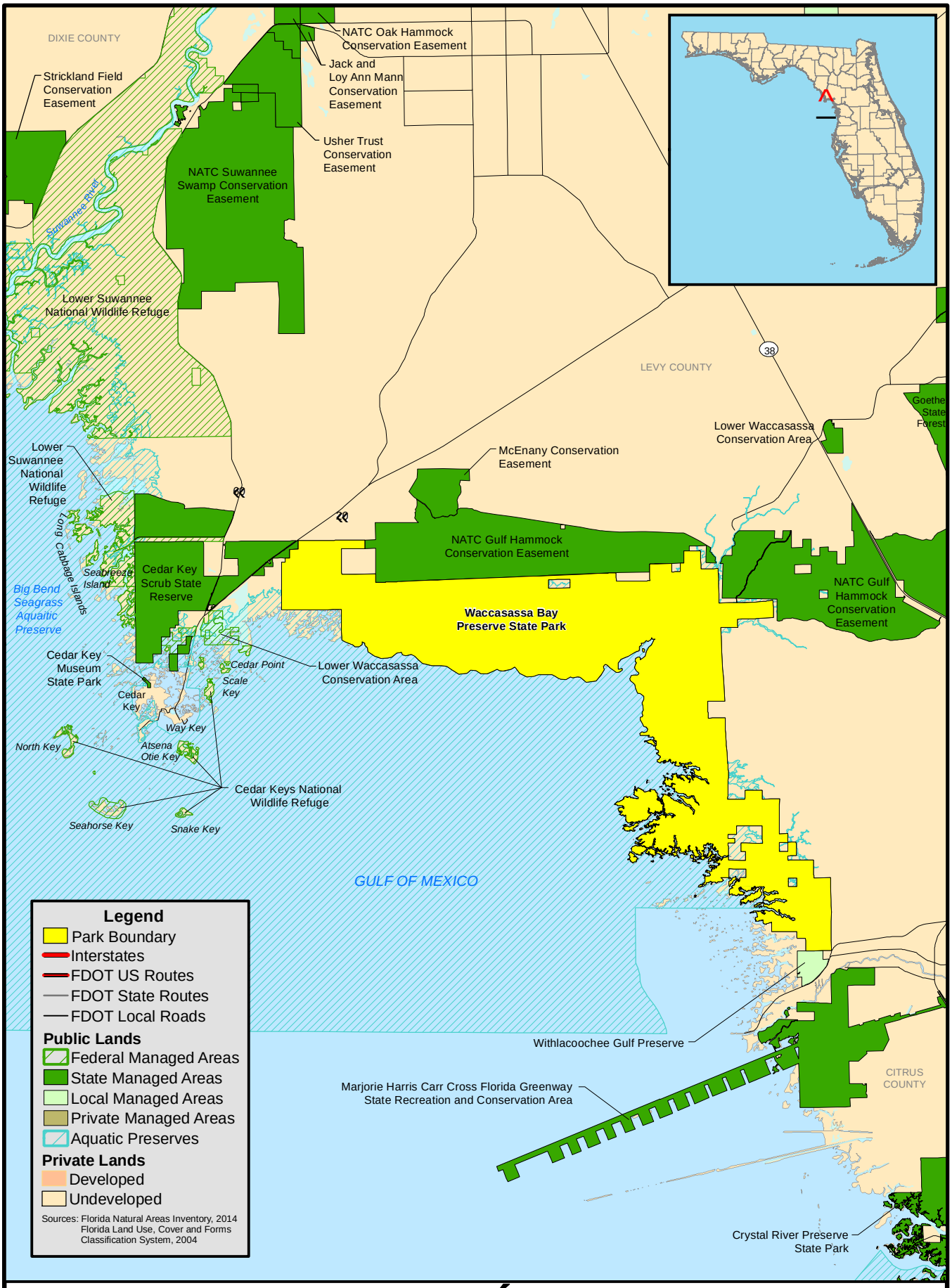
This plan serves as the basic statement of policy and direction for the management of Waccasassa Bay Preserve State Park as a unit of Florida's state park system. It identifies the goals, objectives, actions and criteria or standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives and provide balanced public utilization. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and is intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the 2005 approved plan.

The plan consists of three interrelated components: the Resource Management Component, the Land Use Component and the Implementation Component. The Resource Management Component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management needs and issues are identified, and measurable management objectives are established for each of the park's management goals and resource types. This component provides guidance on the application of such measures as prescribed burning, exotic species removal, imperiled species management, cultural resource management and restoration of natural conditions.

The Land Use Component is the recreational resource allocation plan for the park. Based on considerations such as access, population, adjacent land uses, the natural and cultural resources of the park, and current public uses and existing development, measurable objectives are set to achieve the desired allocation of the physical space of the park. These objectives identify use areas and propose the types of facilities and programs as well as the volume of public use to be provided.

The Implementation Component consolidates the measurable objectives and actions for each of the park's management goals. An implementation schedule and cost estimates are included for each objective and action. Included in this table are (1) measures that will be used to evaluate the DRP's implementation progress, (2) timeframes for completing actions and objectives and (3) estimated costs to complete each action and objective.

All development and resource alteration proposed in this plan is subject to the

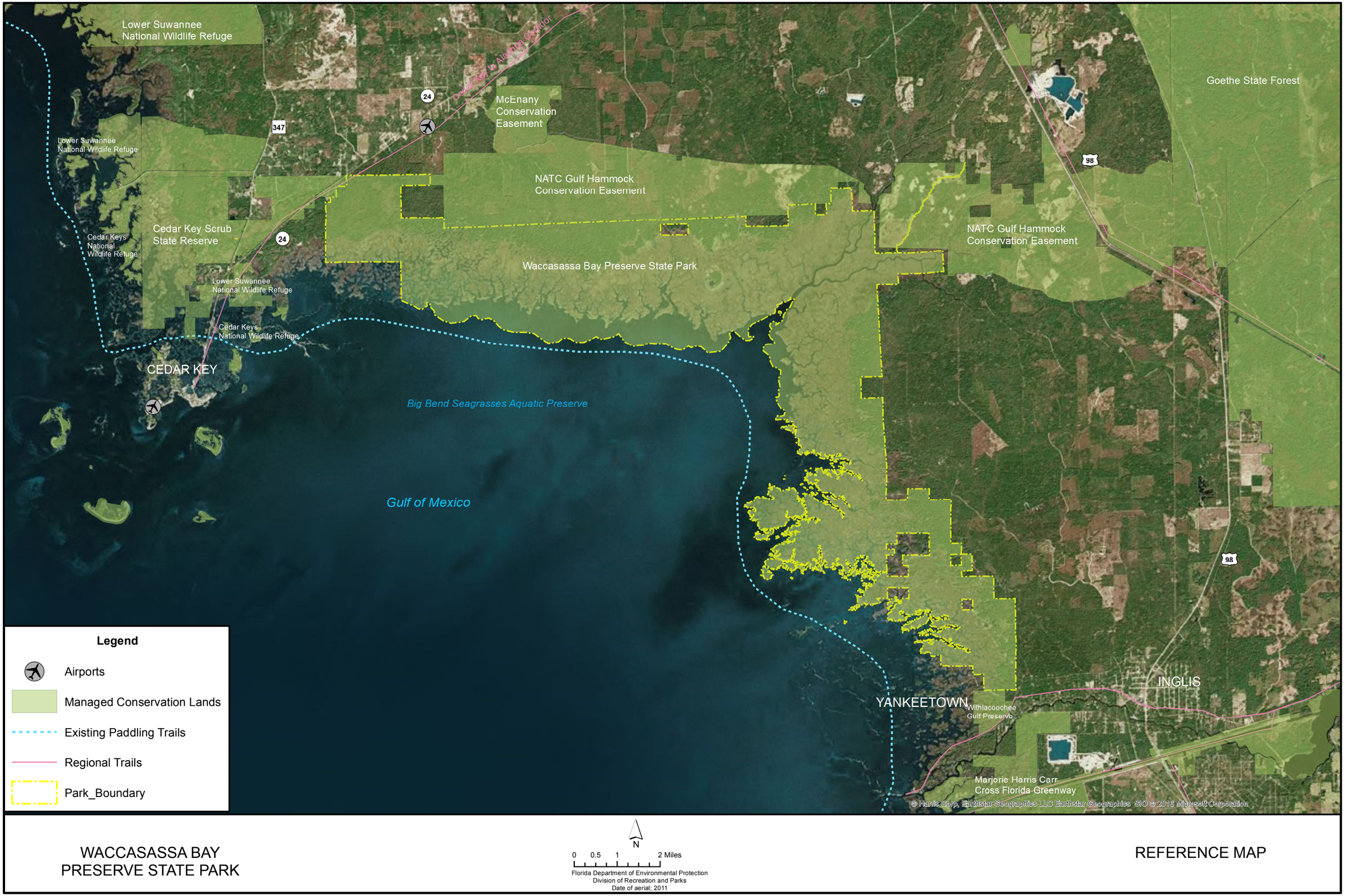


WACCASASSA BAY PRESERVE STATE PARK

0 1.25 2.5 5 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks

VICINITY MAP



Legend

- Airports
- Managed Conservation Lands
- Existing Paddling Trails
- Regional Trails
- Park_Boundary

WACCASASSA BAY
PRESERVE STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

REFERENCE MAP

granting of appropriate permits, easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state or federal agencies. This plan is also intended to meet the requirements for beach and shore preservation, as defined in Chapter 161, Florida Statutes, and Chapters 62B-33, 62B-36 and 62R-49, Florida Administrative Code.

In the development of this plan, the potential of the park to accommodate secondary management purposes was analyzed. These secondary purposes were considered within the context of the DRP's statutory responsibilities and the resource needs and values of the park. This analysis considered the park natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For this park, it was determined that no secondary purposes could be accommodated in a manner that would not interfere with the primary purpose of resource-based outdoor recreation and conservation. Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan.

The potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that multiple-use management activities would not be appropriate as a means of generating revenues for land management. Instead, techniques such as entrance fees, concessions and similar measures will be employed on a case-by-case basis as a means of supplementing park management funding.

DRP may provide the services and facilities outlined in this plan either with its own funds and staff or through an outsourcing contract. Private contractors may provide assistance with natural resource management and restoration activities or a concessionaire may provide services to park visitors in order to enhance the visitor experience. For example, a concessionaire could be authorized to sell merchandise and food and to rent recreational equipment for use in the park. A concessionaire may also be authorized to provide specialized services, such as interpretive tours, or overnight accommodations when the required capital investment exceeds that which DRP can elect to incur. Decisions regarding outsourcing, contracting with the private sector, the use of concessionaires, etc. are made on a case-by-case basis in accordance with the policies set forth in DRP's Operations Manual (OM).

Management Program Overview

Management Authority and Responsibility

In accordance with Chapter 258, Florida Statutes and Chapter 62D-2, Florida Administrative Code, the Division of Recreation and Parks (DRP) is charged with the responsibility of developing and operating Florida's recreation and parks system. These are administered in accordance with the following policy:

It shall be the policy of the Division of Recreation and Parks to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to acquire typical portions of the original domain of the state which will be accessible to all of the people, and of such character as to emblemize the state's natural values; conserve these natural values for all time; administer the development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them; to contribute materially to the development of a strong mental, moral, and physical fiber in the people; to provide for perpetual preservation of historic sites and memorials of statewide significance and interpretation of their history to the people; to contribute to the tourist appeal of Florida.

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) has granted management authority of certain sovereign submerged lands to the DRP under Management Agreement MA 68-086 (as amended January 19, 1988). The management area includes a 400-foot zone from the edge of mean high water where a park boundary borders sovereign submerged lands fronting beaches, bays, estuarine areas, rivers or streams. Where emergent wetland vegetation exists, the zone extends waterward 400 feet beyond the vegetation. The agreement is intended to provide additional protection to resources of the park and nearshore areas and to provide authority to manage activities that could adversely affect public recreational uses.

Many operating procedures are standardized system-wide and are set by internal direction. These procedures are outlined in the OM that covers such areas as personnel management, uniforms and personal appearance, training, signs, communications, fiscal procedures, interpretation, concessions, public use regulations, resource management, law enforcement, protection, safety and maintenance.

Park Management Goals

The following park goals express DRP's long-term intent in managing the state park:

- Provide administrative support for all park functions.
- Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.
- Restore and maintain the natural communities/habitats of the park.
- Maintain, improve or restore imperiled species populations and habitats in the park.
- Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.
- Protect, preserve and maintain the cultural resources of the park.
- Provide public access and recreational opportunities in the park.

- Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

Management Coordination

The park is managed in accordance with all applicable laws and administrative rules. Agencies having a major or direct role in the management of the park are discussed in this plan.

The Florida Department of Agriculture and Consumer Services (FDACS), Florida Forest Service (FFS), assists DRP staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FWC) assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. In addition, the FWC aids DRP with wildlife management programs, including imperiled species management. The Florida Department of State (FDOS), Division of Historical Resources (DHR) assists staff to ensure protection of archaeological and historical sites. The Florida Department of Environmental Protection (DEP), Florida Coastal Office (FCO) aids staff in aquatic preserves management programs. The DEP, Bureau of Beaches and Coastal Systems aids staff in planning and construction activities seaward of the Coastal Construction Control Line (CCCL). In addition, the Bureau of Beaches and Coastal Systems aid the staff in the development of erosion control projects.

Public Participation

DRP provided an opportunity for public input by conducting a public workshop and an Advisory Group meeting to present the draft management plan to the public. These meetings were held on Wednesday February 27, 2019 and Thursday February 28, 2019 , respectively. Meeting notices were published in the Florida Administrative Register on February 18, 2019 VOL 45/33, included on the Department Internet Calendar, posted in clear view at the park, and promoted locally. The purpose of the Advisory Group meeting is to provide the Advisory Group members an opportunity to discuss the draft management plan (see Addendum 2).

Other Designations

Waccasassa Bay Preserve State Park is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and it is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by the Department's Office of Greenways and Trails.

All waters within the park have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. Surface waters in this park are also classified as Class II and III waters by the Department. This park is adjacent to the Big Bend Seagrasses Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

RESOURCE MANAGEMENT COMPONENT

Introduction

The Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP) in accordance with Chapter 258, Florida Statutes, has implemented resource management programs for preserving for all time the representative examples of natural and cultural resources of statewide significance under its administration. This component of the unit plan describes the natural and cultural resources of the park and identifies the methods that will be used to manage them. Management measures expressed in this plan are consistent with the DRP's overall mission in natural systems management. Cited references are contained in Addendum 3.

The DRP's philosophy of resource management is natural systems management. Primary emphasis is placed on restoring and maintaining, to the degree possible, the natural processes that shaped the structure, function and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management for imperiled species is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes and should not imperil other native species or seriously compromise the park values.

The DRP's management goal for cultural resources is to preserve sites and objects that represent Florida's cultural periods, significant historic events or persons. This goal often entails active measures to stabilize, reconstruct or restore resources, or to rehabilitate them for appropriate public use.

Because park units are often components of larger ecosystems, their proper management can be affected by conditions and events that occur beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program that assesses resource conditions, evaluates management activities and refines management actions, and reviews local comprehensive plans and development permit applications for park/ecosystem impacts.

The entire park is divided into management zones that delineate areas on the ground that are used to reference management activities (see Management Zones Map). The shape and size of each zone may be based on natural community type, burn zone, and the location of existing roads and natural fire breaks. It is important to note that all burn zones are management zones; however, not all management zones include fire-dependent natural communities. Table 1 reflects the management zones with the acres of each zone.

Table 1. Waccasassa Bay Preserve State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
WB-1A	84.05	Y	Unknown
WB-1B	170.92	Y	Unknown
WB-1C	401.32		Unknown
WB-2	7624.63		Y
WB-3	7435.97		Y
WB-4	6345.01		Y
WB-5	6725.09		Y
WB-6A	87.07	Y	Unknown
WB-6B	156.93	Y	Y
WB-6C	5356.61		Y

Resource Description and Assessment

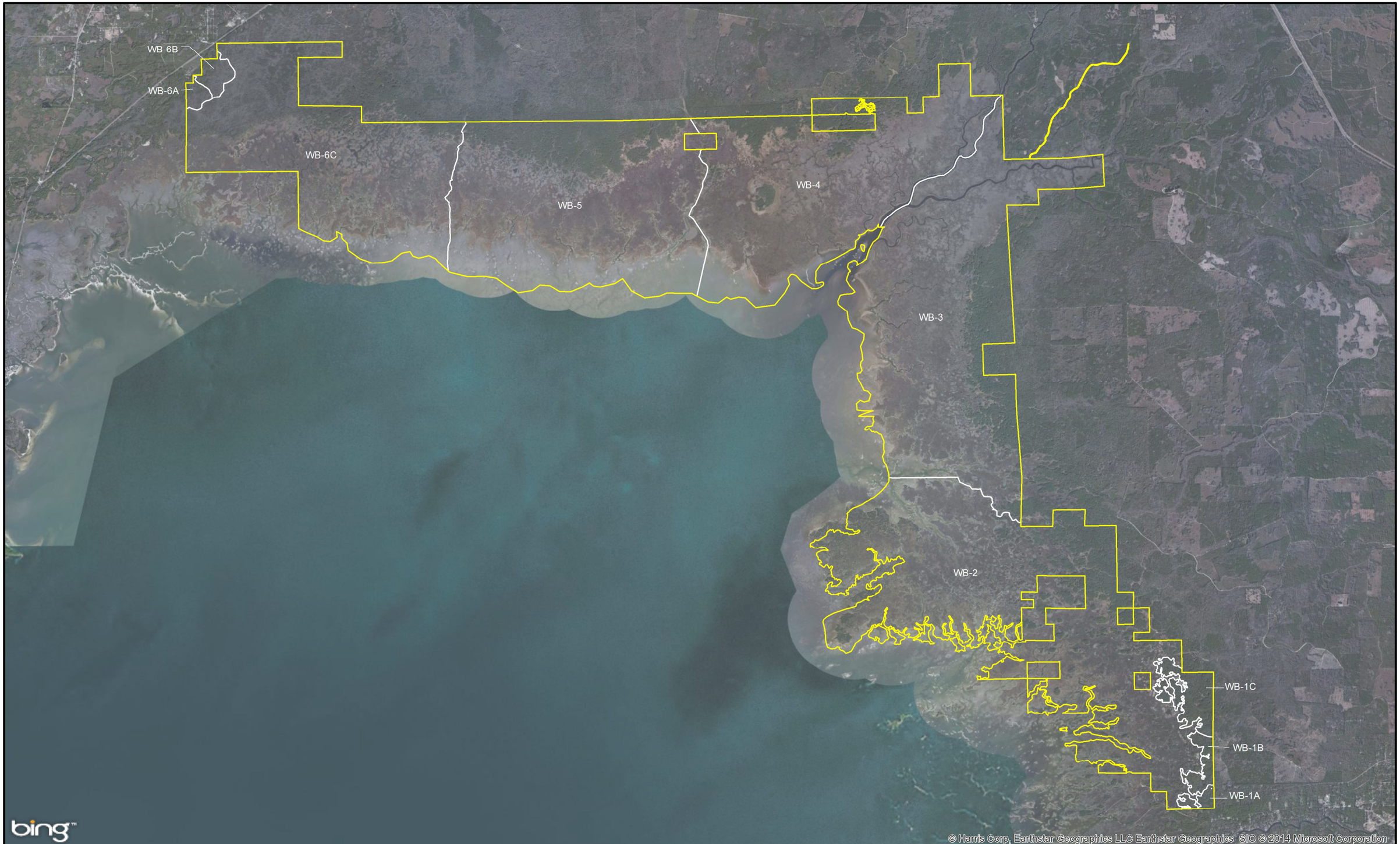
Natural Resources

Topography

Waccasassa Bay Preserve State Park (Waccasassa Bay) is located within the Gulf Coastal Lowlands of Florida in the heart of the Big Bend region, which is an expansive eight-county coastal area extending from Wakulla County in the north to Pasco County in the south (White 1970; Hine et al. 1988; Davis 1997). The portion of the Big Bend coastline from Waccasassa Bay north to the Suwannee Sound lies within a physiographic formation known as the Gulf Coastal Swamps, which is an area of low elevation coastal wetlands and drowned karst topography. It is a disjunct formation where a scarcity of sand prevents beaches from forming (White 1970; Hine et al. 1988; Wolfe 1990; Rupert and Arthur 1990). The Gulf Coastal Swamps serve as a major discharge zone for the Floridan aquifer system (SRWMD 2006; Raabe et al. 2010).

Elevations in the park range from below mean sea level (msl) within tidal flats along the western boundary to slightly higher than 10 feet msl at the northwest corner. The generally flat aspect of the park is disrupted only by winding stream channels, shallow wetland depressions, and occasional knolls or mounds, some of which may be of aboriginal origin. Drainage is primarily toward the Gulf through the numerous tidal creeks and marshes that extend into the park. The only known human-related topographic disturbances in the park are unimproved roads and tramways and the mounds produced by aboriginal activities.

Given the low elevation nature of this preserve, potential impacts of sea level rise to the property's natural and cultural resources are an important management concern (Scavia et al. 2002; Ellis et al. 2004; Dean et al. 2004).



WACCASASSA BAY PRESERVE
STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

MANAGEMENT ZONES MAP

Geology

In descending order, underlying deposits at Waccasassa Bay consist of the Pleistocene-age Pamlico Formation; the Eocene-age Ocala Limestone, Avon Park Formation, Lake City Limestone and Oldsmar Limestone; and the Paleocene-age Cedar Keys Formation. Surficial deposits in the park are considered part of the Pamlico Terrace. These deposits consist of a thin layer of marine quartz and clayey sands that were likely wind-blown from ancient dunes (White 1970). The surficial layers vary in thickness due to marine processes, erosion of the dune formations, and solution of the underlying karst. Sands that have occasionally accumulated to form more substantial deposits are considered part of the Silver Bluff marine terrace (Cooke 1945). Where limestone outcrops occur in the park, the sand deposits are often absent.

The Ocala Limestone, consisting of three distinct limestone deposits, is next in sequence. In descending order, deposits within the Ocala Limestone include the Crystal River Formation, the Williston Formation and the Inglis Formation. These deposits are differentiated on the basis of lithology and fossil content. The Crystal River Formation and upper portions of the Williston Formation are typically white to cream, abundantly fossiliferous, chalky limestones. The lower Williston Formation and the Inglis Formation are commonly alternating hard and soft, white, tan and gray, dolomitic and fossiliferous limestones. The Ocala Limestone may reach a thickness of 125 feet, but the average is 100 feet (Slabaugh et al. 1996).

Outcrops of these three formations are common in the park's forested uplands and salt marshes where overlying sands are less abundant or have eroded. The Ocala Limestone is an important aquifer-bearing unit, with enhanced porosity, cavernous flow, and permeable substrate. These permeable features allow for extensive dissolution and abundant groundwater flow through numerous preferential fracture pathways (Raabe and Bialkowska-Jelinska 2010).

Below the Ocala Limestone lies the Avon Park Formation, which is variable in lithology. It is commonly tan, buff and brown dolomite often interbedded with white, cream and yellow-gray limestone. The limestone commonly contains varying amounts of peat, lignite and plant remains. Some fossils are also present. The Avon Park Formation is commonly 150 feet thick, sometimes less, but it can also attain a thickness of 800 to 1,100 feet (Slabaugh et al. 1996).

Also of Eocene age is the Lake City Limestone, which in Levy County is varied in composition. In general, the fossiliferous limestone is tan to cream and flecked with peat; it sometimes contains coquina, gypsum and dolomite. This formation measures between 575 and 900 feet thick. Earliest of the Eocene deposits is Oldsmar Limestone, pervasively dolomitized and having seams of chert and anhydrite. This formation varies from just under 400 feet in thickness to slightly over 550 feet.

The oldest of the deposits is the Cedar Keys Formation, which is composed of interbedded tan to gray often fossiliferous limestone, as well as tan to brown and crystalline to chalky dolomite. Gypsum has impregnated large sections of the

formation and may occur as thin lenses. This formation is about 600 feet thick (Chen 1965).

There are no known alterations of geological formations in the park.

Soils

There are 17 soil types within Waccasassa Bay Preserve State Park (Slabaugh et al. 1996) (see Soils Map). Addendum 4 contains a list of these soils and complete soil descriptions. Nearly all of these soils are wet, ranging from somewhat poorly drained to flooded, with the majority being frequently flooded. Many of the soils are shallow and have limestone bedrock near the surface, commonly within six to 80 inches of the surface. The shallowest soils occur on low islands in the tidal marshes where soils overlying limestone are commonly only six inches deep or less. In low hydric hammocks, soils are commonly 11 - 18 inches deep. Deeper, mucky soils tend to be in wetland sloughs, along floodplains of creeks and rivers, and in some tidal marshes. Limited areas of better drained soils occur in the northwest corner of the park adjacent to Cedar Key Scrub State Reserve.

Some of the soil erosion along creeks and rivers within the park may be attributable to boat wakes. Other soil disturbances occurred during logging activities in the park conducted to suppress southern pine beetle outbreaks. Agricultural and road building activities have also caused some soil disturbance in the past. Management activities will follow the most up-to-date best management practices (BMPs) available (e.g., silvicultural BMPs) to prevent soil erosion and conserve soil and water resources on site (FDACS 2016)

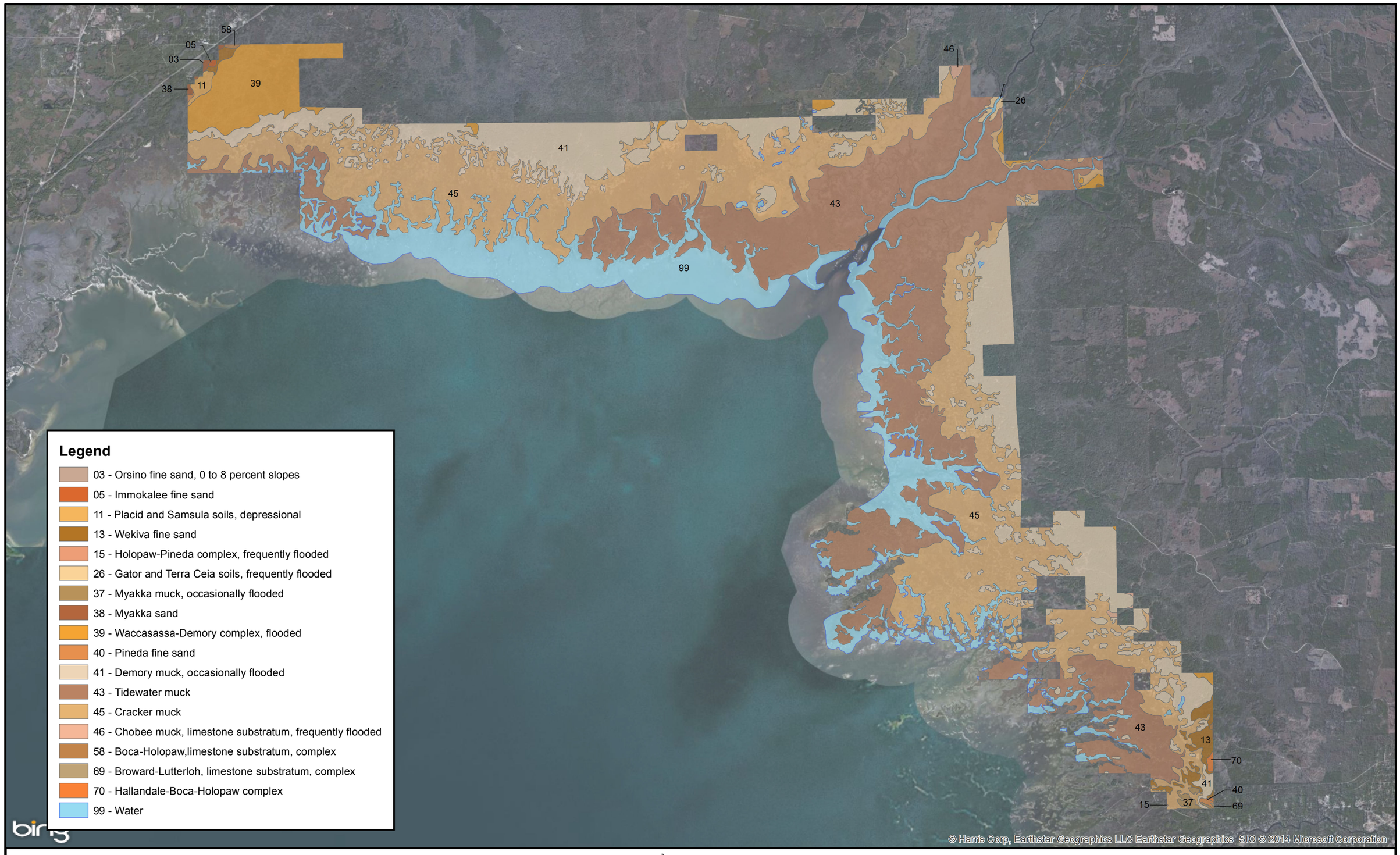
Minerals

Limestone from the Ocala Limestone deposits in the Waccasassa Bay area is commonly mined for use in road construction (Rupert and Arthur 1990). There are active limestone quarries near the park. Whether any deposits of commercial value exist within the park itself is unknown.

Hydrology

Among the many prominent hydrological features within Waccasassa Bay Preserve State Park are the Waccasassa River, numerous named tidal creeks, hundreds of coastal and submarine groundwater discharge (SGD) fractures, and one of the largest stands of hydric hammock remaining in Florida (Simons et al. 1989; Xinya et al. 2009). All these features contribute to the maintenance of a large, relatively stable estuarine environment at Waccasassa Bay. Much of Waccasassa Bay is encompassed within the Big Bend Sea Grasses Aquatic Preserve, which contains some of the largest seagrass beds in the state and is perhaps Florida's most significant publicly managed estuary (Mattson et al. 2007; FDEP 2014; Jones et al. 2015). Waccasassa Bay alone contains 72% of the known, mapped contiguous seagrass beds in the Suwannee River to Withlacoochee River region (Yarbro and Carlson 2013).

In the complex karst environment of the Waccasassa region, groundwater



WACCASASSA BAY PRESERVE
STATE PARK

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0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

SOILS MAP

discharge often takes place through openings in the limestone, including SGD fractures, that are scattered about in nearshore estuaries and embedded within the matrix of coastal hydric hammock, mangrove swamp, salt marsh, and seagrass beds of the region. The limestone openings provide a constant supply of freshwater to the Waccasassa estuarine system (Zieman and Zieman 1989; Raabe and Stumpf 1996). Maintenance of adequate groundwater discharge is critical to the health and productivity of this biologically diverse ecosystem (Cable et al. 1996; Taniguchi et al. 2002). Various researchers have documented the origin, density and locations of important underground fracture traces in western Levy County (Vernon 1951; Raabe and Bialkowska-Jelinska 2010; Lines et al. 2012; Xu et al. 2016). Coastal and SGD limestone features at the land surface are closely aligned with these traces, which developed over geologic time in response to sea level changes and fluctuations in freshwater discharge (Kindinger et al. 2000; Raabe and Bialkowska-Jelinska 2010).

Sustained groundwater discharge from coastal and SGD features is dependent on sea levels, tides, and specific aquifer levels (Cable et al. 1996). Coastal and SGD fractures at Waccasassa Bay are directly connected to the Floridan aquifer (Vernon 1951; Hine et al. 1988). Within the Waccasassa Bay region alone, water scientists have identified 864 to 1,165 independent Floridan discharge points associated with limestone fractures (Raabe and Bialkowska-Jelinska 2010). The amount of groundwater discharged across the entire Waccasassa Bay area is roughly equivalent to one 1st magnitude spring for every 1.5 to 2 miles of coastline, which would correspond to a total of about 70-90 1st magnitude springs along the entire Waccasassa coastline (Raabe et al. 2011).

Waccasassa Bay is part of the Big Bend region, but it is also positioned at the northern edge of a unique karst-dominated landscape called the Springs Coast (Wolfe 1990). In the northernmost reaches of the Springs Coast, freshwater from at least six named springs and numerous groundwater-supplied creek systems flows westerly through an immense matrix of forested wetlands and coastal marshes before eventually draining into the Waccasassa Bay estuarine system. The six named springs are LEV719991, Levy Blue Spring, Wekiva Spring, Lancaster Spring, Big Spring, and Little Spring (Spechler and Schiffer 1995), while the river/creek systems include the Waccasassa River, Spring Run, Winzy Creek, Jacks Creek, Kelly Creek, and Demory Creek. Although discharge points for most of the above-mentioned springs are not actually located within Waccasassa Bay Preserve State Park, much of their freshwater flow eventually passes through the park's upland and wetland systems in route to Waccasassa Bay. Levy Blue and Wekiva springs, for example, are both historic second magnitude springs that contribute to the upper tributaries of the Waccasassa River.

The Floridan aquifer is the principal groundwater source for the Waccasassa Bay region (Jones et al. 1997). Other groundwater sources include localized surficial aquifers such as those found in flatwoods and certain isolated wetlands where development of hardpans or impermeable organic layers may occur, creating perched water tables that can function at least temporarily as surficial aquifers. However, a distinct widespread surficial aquifer is not present in the coastal uplands

of the Waccasassa Bay region (Fretwell 1983).

The relative proportions of groundwater contributions to the Waccasassa Bay region from sources such as coastal and SGD fractures and Levy County springs are still unknown.

The Floridan aquifer is unconfined in Waccasassa Bay Preserve State Park. The upper boundary of the Floridan is at or very near the land surface, as evidenced by the predominance of various sized, scattered karst dissolution features such as limestone outcroppings (Raabe and Bialkowska-Jelinska 2010). Discharge from the Floridan occurs via groundwater seepage and springs. An intermediate confining layer is virtually absent and the limestone and dolomite formations are overlain by discontinuous and relatively thin sand deposits. This allows surface water runoff from uplands to freely enter the aquifer, creating the potential for significant local groundwater pollution to occur. During periods of low groundwater levels, salt water from the Gulf of Mexico flowing inland via tidal creeks may enter coastal and SGD fracture channels and mix with the Upper Floridan aquifer in a process called reverse flow (Tihansky 2004).

Kelly Creek is a significant 1 to 1.5-acre limestone outcropping located in the northern part of the park. Some of Waccasassa's largest surface outcroppings, such as at Beetree Slough, can reach three acres in size. Hundreds of wetlands scattered throughout the Waccasassa Bay region have limestone outcroppings that contain fractures and discharge groundwater. These wetlands, located either partially or entirely within the park, include more than 40 named and numerous unnamed creeks, an abundant number of small ponds and lakes, and one of the state's largest public holdings of hydric hammock natural community.

Most of the creeks that drain the park's forested wetlands are blackwater streams. A smaller number are spring-fed streams that gradually transform into tidal creeks that wind through the salt marsh into the estuary. Generally, the water source for the forested wetlands is local rainfall, however groundwater feeds a large proportion as well. Discharge from freshwater wetlands directly interfaces with salt water from the Gulf within the salt marsh community, creating a complex and biologically productive estuarine ecosystem. Because many of the freshwater wetlands are intimately connected with salt marsh, their flora are apt to be tolerant of brackish water. Nonetheless, wetlands that are situated closer to specific groundwater discharge sites, especially wetlands embedded within uplands, will often support a vastly different set of freshwater-adapted species (Abbott 1998, Abbott and Judd 2000; Raabe et al. 2011).

Over the past three decades, scientists have documented that shoreline natural communities along Florida's Gulf Coast have experienced dramatic changes from systems that were once freshwater-based to those that are now predominately saltwater influenced (Casteneda and Putz 2007). It is unknown how many freshwater wetlands in the preserve, especially those that contain groundwater fractures, have transformed into brackish wetlands as a result of lowered aquifer levels from significant historic droughts, increased groundwater demand or changes

associated with global sea level rise (Johnston and Bush 1988; Williams et al. 1999; Williams et al. 2003; Raabe et al. 2004; Knight 2015).
Many water management experts acknowledge that the two most recent long-term droughts in north Florida, in combination with the increased consumptive use of groundwater after 1970, have caused significant lowering of water tables and increased saltwater encroachment in coastal areas, as well as decreased discharge at several springs across the entire state (Mirti 2001; Swihart 2011; Still 2010; Copeland et al. 2011; Knight 2016). In 2012, for example, during a record regional drought, groundwater discharge from Levy Blue Spring ceased altogether (Moran 2013). Spring flows in not only Levy Blue Spring but also Wekiva Spring are predicted to decrease by the year 2020 due to projected increases in cumulative groundwater withdrawals (Sepulveda 2002; SRWMD 2010). Because of the cumulative effects of increased post-1970 groundwater withdrawals from the Upper Floridan, groundwater resources at Waccasassa Bay Preserve State Park are currently considered to be in fair to poor condition.

The Waccasassa River, which roughly divides the park in half, is a hydrologically unique 29-mile long, tidally influenced, highly braided blackwater stream. Numerous unnamed creeks and six major tributaries join it on its way to the Gulf, including Little Waccasassa River, Otter Creek, Magee Branch, Wekiva River, Cow Creek, and Tenmile Creek (SRWMD 2006). One of the more important complexities of the Waccasassa River and its embayment is that while several drainage areas within the Waccasassa Bay groundwater basin play an integral part in the overall contribution to the Waccasassa Bay estuaries, not all areas necessarily contribute to the flow of the Waccasassa River as well (Col et al. 1997; SRWMD 2006). Groundwater sources within the basin appear to be equally as important to the Waccasassa embayment as surface water flows. For example, three significant drainage areas that do not directly contribute surface water to the Waccasassa River but do discharge surface water and groundwater to Waccasassa Bay are located west of Otter Creek, south of Tenmile Creek, and east of Waccasassa Flats. Within the first two drainage areas there are at least 34 named streams including Lancaster Creek, Kelly Creek, Spring Run and Demory Creek. Similarly, there is a large disjunct area included within the Waccasassa groundwater basin that lies within a major karst plateau in southwestern Alachua and northern Levy counties. Overall, the surface/groundwater basin contributing area for Waccasassa Bay encompasses a total of 936 square miles, the majority of which lies outside the park boundary (Florida Rivers Assessment 1989; Hornsby et al. 1999; SRWMD 2006).

The headwaters of the Waccasassa River lie in Waccasassa Flats, a generally north-south aligned karstic landscape feature composed of a mosaic of depression wetlands located in southeastern Gilchrist and northeastern Levy counties. Waccasassa Flats contains numerous perched wetlands and karst depressions where surface waters funnel through numerous small swallets into the Upper Floridan aquifer and groundwater then moves westward toward the Waccasassa Bay (Vernon 1951; Col et al. 1997). At least two 2nd order spring systems significantly augment the flow of the Waccasassa River, namely Levy Blue and Wekiva. Levy Blue Spring and its close partner LEV719991 join the upper portion of

the Waccasassa River just above a large forested wetland called Devil's Hammock, while the Wekiva joins the river much further downstream, approximately 2 miles outside the park boundary. The Wekiva generally contributes about 30% of the total discharge of the Waccasassa River during median flow conditions, but during droughts it can total as much as 60% (SRWMD 2006). A Minimum Flows and Levels (MFL) determination was set for the Waccasassa River in 2006 (SRWMD 2006). Discharge from the Waccasassa River is variable and tidally influenced. For the period of record, the annual mean flow of the river is 283 cubic feet per second (cfs). The lowest daily mean flow is –2310 cfs (i.e., negative indicating a reversal of flow) recorded on August 31, 1985. The highest daily mean flow is 11400 cfs, recorded on September 12, 1964 (USGS 2016).

Within the park, the Waccasassa River has been designated as an Outstanding Florida Water and its entire length below the confluence with the Wekiva River is considered a Class II water body (i.e., open for shellfish harvesting, but often restricted). Upstream from the Wekiva confluence, the Waccasassa is a Class III system. Nearly all freshwater creeks within the park that drain to the Gulf are also considered Class II, but streams not flowing directly into the estuary are predominantly considered Class III water bodies (FDEP 2016a). Average annual rainfall for the Waccasassa region approaches 60 inches a year (Fernald and Purdum 1998).

For the most part, surface water drainage within Waccasassa Bay Preserve State Park is poor and large areas often flood. Most of the park's upland areas drain directly into hydric hammock, salt marsh, and tidal creeks, and eventually to estuarine waters. Tidal fluctuations occur throughout the park, transporting large quantities of brackish water through networks of perennial freshwater streams and tidal creeks. Wetlands are distributed through much of the park, including numerous brackish and freshwater karst ponds. Salinity levels in individual ponds generally determine their biotic nature (Abbott and Judd 2000). Water sources for the ponds may include the Floridan aquifer, rainfall, and tidal input from the Gulf of Mexico.

The coastal hydric hammock natural community, which occurs inland from the salt marsh, has a significant impact on hydrologic processes within the landscape (Wharton et al. 1977; Vince et al. 1989). During periods of heavy rainfall, hydric hammocks often flood. Surface water travels through this community as sheet flow, eventually entering streams that connect to estuarine waters. Through the temporary storage of surface water, hydric hammocks improve water quality and attenuate freshwater pulses into estuarine systems (Vince et al. 1989; Wolfe 1990). For at least 25 years, sea level rise has played a pivotal role in the conversion of numerous hydric hammock stands within the Waccasassa Bay and Crystal River Preserves into salt-dominated communities (e.g., salt marsh/mangrove) (Williams 2003; Ellis et al. 2004).

The natural functions of hydric hammock in the Waccasassa Bay area can be disrupted by various land use practices, particularly the conversion of hammock to pine plantation that has occurred in large areas of Gulf Hammock. Past road building activities and drainage improvements associated with silvicultural

operations both inside and outside the park have also affected natural hydrologic patterns. The channelization of surface waters by ditching and the impoundment of water by road building can contribute to the loss of natural functions in hydric hammocks and are therefore likely to affect estuarine systems within the park.

Complex interactions between surface waters and groundwater play a significant role in steering ecological processes in coastal ecosystems of the Waccasassa Bay (Raabe and Bialkowska-Jelinska 2007). Within the broad interface between estuarine and terrestrial systems in the region, major issues of concern include watershed alteration (i.e., especially within the hydric hammock natural community), saltwater encroachment, and nutrient enrichment.

Watershed Alteration

Land use development, excavation of mine pits and ditches, disruption or impoundment of natural sheet flow, and withdrawal of groundwater in the region are examples of watershed alterations that could negatively affect natural hydrological regimes in the park.

Generally speaking, large-scale development has not yet occurred within the Waccasassa region, however, there continues to be scattered small-scale land use development within the upland areas. There have been a number of camps and permanent residences that have been established near the park boundary along Tenmile Creek (i.e., a tributary of Cow Creek). This development may be responsible for lowered water quality as noted by Florida Marine Research Institute (FMRI) staff at the mouth of Cow Creek.

Several limestone and sand mining operations adjacent to the park (e.g., Gulf Hammock Quarries, Knight Farm, and Inglis Quarry) are currently active, including a nearly 5,000-acre operation on the eastern park boundary that in 2014 was issued the necessary state and federal approvals to proceed (i.e., King Road or Tarmac Mine). The potential cumulative impacts of these operations on water resources in the park are unknown, however water scientists suggest that extraction mining can adversely influence natural groundwater hydrology and ecological functions of natural communities (Bacchus 2006; Kinkaid and Meyer 2009; Lines et al. 2012; Xu et al. 2016).

In addition, past records indicate that sediment loads in the Waccasassa River have measured as high, possibly due to runoff from logging operations (Hand et al. 1994; FDNR 1989). In 2002, logging operations to control a southern pine beetle outbreak in some of the park's mesic flatwoods and hydric hammock likely altered natural hydrologic patterns. Ruts created by heavy equipment channeled surface waters and temporary roads built to accommodate logging trucks disrupted sheet flow (DRP District 2 files).

Other wetland alterations in the park have also caused disruption of natural sheet flow regimes. Access roads that pass through the park in various locations have fragmented some forested wetlands and tidally influenced communities to varying degrees. It is not uncommon for DRP personnel to observe flooded conditions along

various access roads within the park. In fact, certain roads in tidally influenced wetlands can also be particularly vulnerable to washouts. Elevations of many of the access roads that pass through the park were raised by using stockpiled dredge material from canal/ditch excavations that were conducted prior to state acquisition. Some of the ditch excavations are associated with retention ponds or with roadside drainage improvements. Mitigation of sheet flow disruptions caused by unpaved roadways within the park should be a focus of DRP restoration activities.

Many water managers have long been concerned about the unsustainable depletion of groundwater resources in the Floridan aquifer (Bush and Johnston 1988; Grubbs and Crandall 2007; Copeland et al. 2011; Knight and Clarke 2016). Concerns were heightened during the 1998-2002 and 2010-2012 droughts, as water scientists documented significant declines in spring discharge at nearly all of Florida's first magnitude springs, including those within the Waccasassa Basin (Copeland et al. 2011; Pittman 2012; Moran 2013). One recent statewide analysis concluded that the drought of 1999-2001 had precipitated significant negative health trends in all the spring systems in the state, including Crystal and Homosassa springs, because of lowered groundwater levels, significant saline encroachment, and simultaneous increases in groundwater use during one of Florida's worst droughts on record (Verdi et al. 2006).

Whether the evidence indicates that fluctuations in groundwater supply are natural (i.e., due to Atlantic multi-decadal oscillation) or anthropogenic (i.e., due to water supply withdrawals) is still being debated (Kelly 2004; Williams et al. 2011). Nonetheless, coastal springs have experienced significant increases in lateral saline encroachment compared to inland systems because of their proximity to the fresh/saline interface (Marella and Berndt 2005; Hydrogeologic Inc. 2011).

Saltwater Encroachment

Saltwater encroachment along Florida's coasts has long been recognized as a threat to groundwater quality (Fairchild and Bentley 1977; Fretwell 1983). In the Waccasassa Bay region, a natural saltwater wedge that diminishes in thickness landward extends inland from the Gulf, intruding into the Floridan aquifer. The depth of the saline wedge ranges from zero at the coast to around 250 feet inland (Fernald and Purdum 1998; Guvanasen et al. 2011). Boundaries of the zone of transition from saltwater (19,000 mg/L chloride) to freshwater (25 mg/L chloride) can fluctuate in response to changes in aquifer recharge and discharge (Fretwell 1983).

A recent statewide analysis of water quantity and quality variables compared groundwater and spring water parameters from 1991 to 2003 (Copeland et al. 2011). During that period, analysis specifically indicated that the Floridan aquifer's freshwater "lens" had decreased significantly in volume and that significant saltwater encroachment had occurred throughout most of the state. It is highly probable that saltwater encroachment within the Floridan aquifer contributes to the brackish nature of surface waters within the park, and that this phenomenon may continue to alter the water chemistry of the park's freshwater ponds over time.

As stated above, seawater can move inland through existing dissolution channels and mix directly with waters of the Floridan aquifer, especially during periods of low groundwater levels (Tihansky 2004; Shaban et al. 2005). In addition to these unique aquifer conduits (i.e., coastal and SGD channels), the limestone bedrock underlying the Floridan aquifer contains large interconnected fractures and faults that trend either northeast or northwest; these are referred to as "preferential flow pathways" (Lines et al. 2012). Flow pathways have the ability to extend adverse water quality or quantity impacts over a much larger region than just at a local point source (Bacchus et al. 2015). For example, saltwater intrusion in Pinellas County expanded significantly through preferential flow paths when groundwater levels were artificially lowered during localized extractions from water supply fields that were placed too close to the coastline (Tihansky 2004). During the statewide drought of 2010-12, drinking water wells in the town of Cedar Key were significantly impacted by saltwater intrusion. Similarly, during the major drought of 1998-2002, statewide water managers were equally concerned about the significant human-induced influence on surface water and groundwater resources statewide (Copeland et al. 2011). Water scientists now believe that the deteriorating estuarine and freshwater resources in this region are attributable to the cumulative effects of increased groundwater consumption, saltwater encroachment, and nutrient enrichment (Copeland et al. 2011).

Nutrient Enrichment

As one might expect from the discussion above, water quality issues within the various watersheds of the Waccasassa Basin are complex. Regular monitoring of water quality in the basin will be essential for maintaining ecosystem health. Surface water monitoring in the Waccasassa Basin has occurred and still occurs at numerous locations including freshwater and tidal creeks, oyster bars (DeHaven 2004; Kuhman 2007) and seagrass beds (Frazer and Hale 2001; Frazer et al. 2007). The Suwannee River Water Management District (SRWMD) maintains several surface water quality and biological monitoring stations along the Waccasassa River, including the two main spring systems, Levy and Wekiva (Hornsby et al. 1999; SRWMD 2016).

Groundwater monitoring data collected from hundreds of permanent wells that are scattered throughout the Waccasassa Basin are used to track changes in water quality within the basin (Putnam 1967; Dixon 1986; FDEP 2013b; FDEP 2016a; SRWMD 2016; FDEP 2016d). Project COAST, a long-term study led by University of Florida researchers, has been monitoring water quality along much of the lower Big Bend region since 1997 (Frazer et al. 2007).

Coordinated statewide assessments of shellfish (FDACS) and seagrass beds have been occurring for over 40 years (Kuhman 2007; Yarbro and Carlson 2013). In addition, the FDEP maintains biological monitoring stations on numerous tributaries along the Waccasassa River as part of the statewide total maximum daily load (TMDL) assessment program (FDEP 2016a).

In 1996, the FDEP initiated a formal statewide program for monitoring surface waters and groundwater, including those within the Waccasassa River Basin

(Maddox et al. 1992; FDEP 2009). This Integrated Water Resource Monitoring Program (IWRMP) took a comprehensive watershed approach based on natural hydrologic units. The 52 hydrologic basins in Florida were placed on a five-year rotating schedule, which allows water resource issues to be addressed at different geographic scales (Livingston 2003). In addition, the IWRMP assigned a waterbody identification number (WBID) to each waterbody; the WBID for the section of Waccasassa River in the park is 3699B. This watershed approach provides a framework for implementing TMDL requirements that will attempt to restore and protect waterbodies that have been declared impaired (Clark and DeBusk 2008). In the Waccasassa region, there are more than 12 different watersheds within the park that have been issued waterbody identification numbers and are directly connected to estuaries. These waterbodies have all undergone TMDL evaluation (FDEP 2016b), and based on various parameters, nearly all of them have been declared impaired.

According to FDEP basin status reports, the water quality of several waterbodies in the Waccasassa Basin became potentially impaired in 2003 because of excessive nutrients, total and fecal coliform bacteria, and mercury in fish tissue (Silvanima et al. 2008; FDEP 2003; FDEP 2013a). Based on the Impaired Waters Rule (IWR), the EPA in 2003 verified that those waterbodies were indeed impaired, which meant that their surface waters did not meet applicable state water quality standards (IWR, Chapter 62-303 F.A.C). This designation triggered a long chain of mandatory requirements that Florida would have to accomplish to achieve compliance with EPA regulations concerning polluted waterbodies. For the Waccasassa River, the compliance process started in 2013 with the assignment of a TMDL Numeric Nutrient Criteria (FDEP 2013b) and the initiation of a Basin Management Action Planning (BMAP). As of 2016, the BMAP for the waterbodies in the Waccasassa River Basin had not been completed.

Natural Communities

This section of the management plan describes and assesses each of the natural communities found in the state park. It also describes of the desired future condition (DFC) of each natural community and identifies the actions that will be required to bring the community to its desired future condition. Specific management objectives and actions for natural community management, exotic species management, imperiled species management [and population restoration] are discussed in the Resource Management Program section of this component.

The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI). The premise of this system is that physical factors such as climate, geology, soil, hydrology and fire frequency generally determine the species composition of an area, and that areas that are similar with respect to those factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, however, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub--two communities with similar species compositions--generally have quite different climatic environments, and these necessitate different

management programs. Some physical influences, such as fire frequency, may vary from FNAI's descriptions for certain natural communities in this plan.
When a natural community within a park reaches the desired future condition, it is considered to be in a "maintenance condition." Required actions for sustaining a community's maintenance condition may include; maintaining optimal fire return intervals for fire dependent communities, ongoing control of non-native plant and animal species, maintaining natural hydrological functions (including historic water flows and water quality), preserving a community's biodiversity and vegetative structure, protecting viable populations of plant and animal species (including those that are imperiled or endemic), and preserving intact ecotones that link natural communities across the landscape.

The park contains 16 distinct natural communities as well as altered landcover types (see Natural Communities Map). A list of known plants and animals occurring in the park is contained in Addendum 5.

LIMESTONE OUTCROP
Desired future condition: Limestone outcrops are associated with karst topography and are often found within other features such as sinkholes, or as isolated features within hydric hammocks. Various ferns, mosses and smaller herbs typically grow on the limestone surface or in crevices. Characteristic species in north Florida will include partridgeberry (*Mitchella repens*), brittle maidenhair (*Adiantum tenerum*), netted chain fern (*Woodwardia areolata*), jack-in-the-pulpit (*Arisaema triphyllum*), southern shield fern (*Thelypteris kunthii*), and various species of panicgrass (*Panicum* spp.). Other rare fern species may also occur on limestone outcrops.

Description and assessment: As might be expected given the karst landscape prevalent in the area, Waccasassa Bay Preserve contains numerous limestone exposures. These occur as limestone outcrops situated along the sides of depressions and as limestone boulders of varying sizes. Raised areas within the hydric hammock are often underlain by limestone which may be exposed in some cases. Due to their limited size and erratic distribution within a large area, limestone outcrops are not mapped, but are included within the hydric hammock.

The limestone outcrops in the park are considered to be in good to excellent condition. Most are located well away from trails or roads or are screened from public view by abundant vegetation. The only apparent threats from exotic plant infestations at this time is Chinese brake fern (*Pteris vittata*).

General management measures: Limestone outcrops in the park must be protected from disturbance. Staff should take measures to prevent runoff and erosion from degrading the outcrops, particularly near existing trails or roadways. Mapping of significant limestone outcrops, accompanied by surveys for imperiled plant species, will be necessary to ensure their long-term protection.

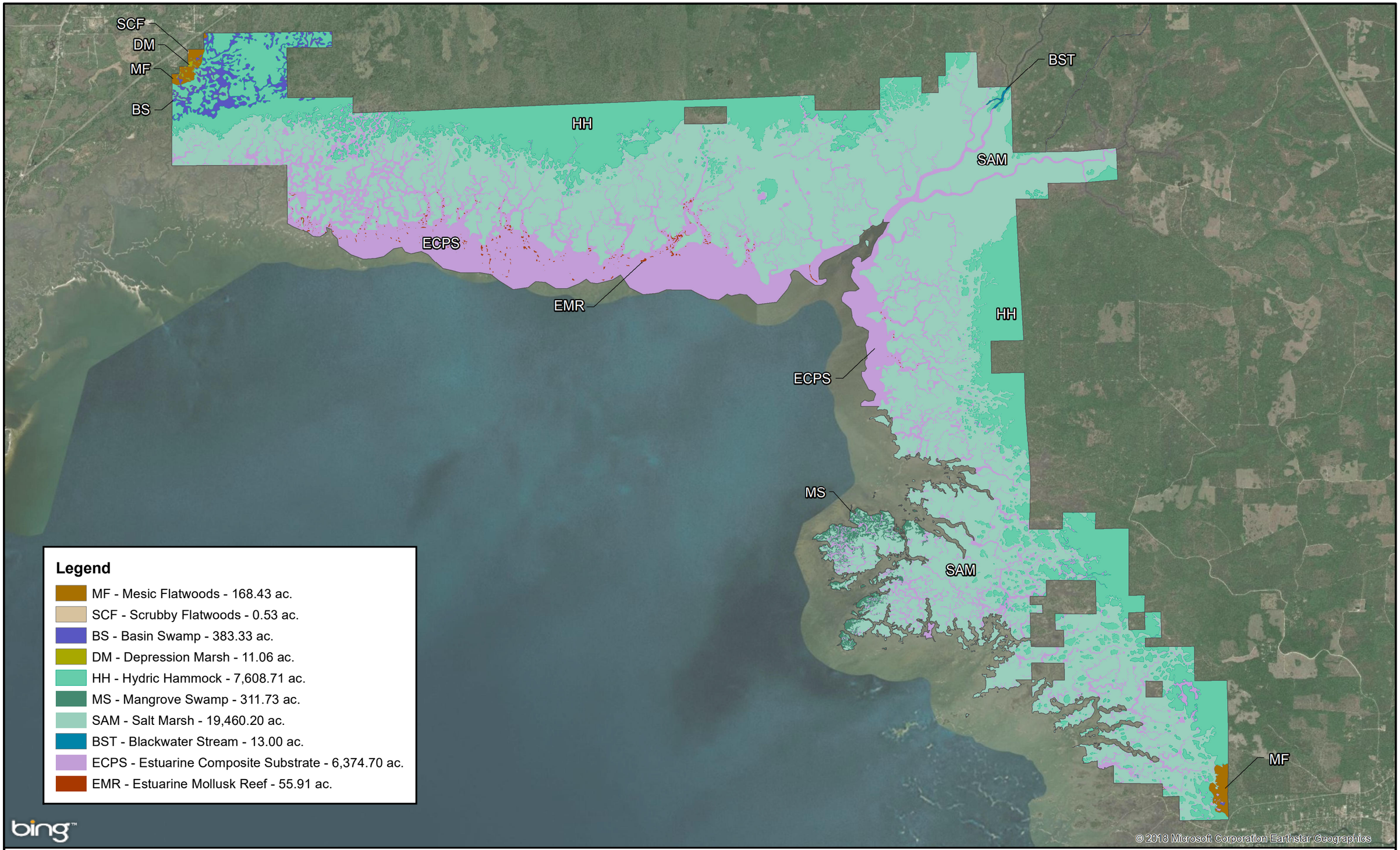
MESIC FLATWOODS
Desired future condition: In the typical mesic flatwoods of west central Florida, the dominant pine will usually be longleaf pine (*Pinus palustris*) with occasional stands

of slash pine (*Pinus elliottii)* in coastal situations adjacent to tidal and depression marshes. Native herbaceous groundcover will cover at least 50% of the area at a height of less than three feet. Saw palmetto (*Serenoa repens*) will comprise less than 50% of the total shrub cover, also at a height of less than 3 feet. Other common shrub species may include gallberry (*Ilex glabra*), winged sumac (*Rhus copallinum*), fetterbush (*Lyonia lucida*), wax myrtle (*Myrica cerifera*), yaupon holly (*Ilex vomitoria*), running oak (*Quercus pumila*), pawpaw (*Asimina* spp.), dwarf live oak (*Quercus minima*), shiny blueberry (*Vaccinium myrsinites*), coontie (*Zamia pumila*), bracken fern (*Pteridium aquilinum*) and dwarf huckleberry (*Gaylussacia dumosa*). These shrubs will generally be knee-high or less in height. Few if any large trunks of saw palmetto will run prostrate along the ground. Herbaceous species diversity will be high, vary with site moisture, and may include peas (*Galactia* spp.), goldenrods (*Solidago* spp.), queens delight (*Stillingia sylvatica),* blackroot (*Pterocaulon virgatum*), foxtail grass (*Setaria parviflora*), wiregrass (*Aristida stricta),* silkgrass *(Pityopsis graminifolia)* and multiple species from the *Liatris* and *Carphephorus* genera*.* The optimal fire return interval for this community is 2 to 3 years.

Description and assessment: Mesic flatwoods are found at the northwest end of the park and at the south end at slightly higher elevations than the hydric hammock and tidal marsh. The mesic flatwoods at the southern end are somewhat uncharacteristic in composition, possibly due to long-term fire exclusion, former timbering operations and the influence of sea level rise. Loblolly pine (*Pinus taeda*), cabbage palm (*Sabal palmetto*) and intermixed hydric hammock species occur along with slash pines. The understory is dominated by shrubs, primarily saw palmetto and yaupon holly. In scattered locales, there are remnant herbaceous species, and on some islands in the tidal marsh, certain scrub species have become established, possibly due to fire exclusion. Portions of the mesic flatwoods in the southern part of the park were logged in 1997 and 2000 to control outbreaks of southern pine beetles. Hydrologic patterns and water quality may have been affected by the logging as discussed above in the Hydrology section.

More typical mesic flatwoods occur in the northwest portion of the park. Although much of this area was logged and planted with loblolly pines, the native shrub layer is relatively intact and remnant slash and longleaf pines are common. Several areas were more recently planted with slash pines. Removal of offsite loblolly pines from these areas would help prevent or limit future outbreaks of southern pine beetles. Restoration activities have included a thinning of the planted pines in 2013 to a basal area of approximately 40 sq. ft. and subsequent prescribed fire.

Remnant slash pines occur in several locations with the mesic flatwoods of the park. These older trees may retain some of the original characteristics of the slash pines along the Gulf coast. Historically the south Florida slash pine, a variety or ecotype that more closely resembles the longleaf pine, may have extended into Levy County in the coastal flatwoods. These older slash pines will be preserved and protected during any thinning operations designed to remove planted slash pines. In general, the majority of the mesic flatwoods of the park are in fair condition. This



WACCASASSA BAY
PRESERVE STATE PARK

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NATURAL COMMUNITIES MAP

condition is expected to improve with removal of offsite pines and regular prescribed burning.

General Management Measures: Additional prescribed burning will be the primary restoration action needed for the mesic flatwoods. Additional longleaf pines or south Florida slash pines will be planted if necessary. Staff will continue to monitor these areas for invasive exotic plants.

SCRUBBY FLATWOODS

Desired future condition: The dominant tree in the scrubby flatwoods of north Florida will usually be longleaf pine (*Pinus palustris*) or slash pine (*Pinus elliotii*). Mature sand pines (*Pinus clausa*) will typically be absent. A diverse shrub understory will be characteristic, with up to 25 percent bare sand coverage. A scrub-type oak "canopy" will often be present that will vary in height from three to eight feet, and there will be a variety of oak age classes/heights across the landscape. Dominant shrubs will include sand live oak (*Quercus geminata*), myrtle oak (*Quercus myrtifolia*), Chapman's oak (*Quercus chapmanii*), saw palmetto (*Serenoa repens*), rusty staggerbush (*Lyonia ferruginea*), and tarflower (*Bejaria racemosa*). Herbaceous species cover will often be well below 40 percent. The optimal fire return interval for this community is regionally variable, but coastal scrub has shown an ability to reach fuel height and fire carrying potential faster than interior examples. Areas may be burned as frequently as every 5-15 years when burn prescriptions are designed to achieve a mosaic of burned and unburned areas.

Description and assessment: A very limited area of scrubby flatwoods occurs within the park along the boundary with the Cedar Key Scrub State Reserve. Although quite small, it is contiguous with larger areas of scrubby flatwoods within the adjacent reserve. Abbott (1998) describes some of the more xeric areas of mesic flatwoods that border tidal marshes in the southern flatwoods as being similar to scrubby flatwoods. These areas have been mapped as mesic flatwoods since they are probably not true scrubby flatwoods.

General Management Measures: The scrubby flatwoods at Waccasassa Bay Preserve will be burned along with the adjacent scrubby flatwoods within Cedar Key Scrub State Reserve.

BASIN SWAMP

Desired future condition: Basin swamps are forested basin wetlands that are highly variable in size, shape, and species composition and often hold water most days of the year. While mixed species canopies are common, the dominant trees in north Florida will be pond-cypress (*Taxodium ascendens*) and swamp tupelo (*Nyssa sylvatica* var. *biflora*). Other canopy species will typically include slash pine (*Pinus elliotii*), red maple (*Acer rubrum*), dahoon holly (*Ilex cassine*), sweetbay (*Magnolia virginiana*), loblolly bay (*Gordonia lasianthus*), and sweetgum (*Liquidambar styraciflua*). Depending upon fire history and hydroperiod, the understory shrub component will be distributed throughout or concentrated around the perimeter. Shrubs will include a variety of species including Virginia willow (*Itea virginica*),

swamp dogwood (*Cornus foemina*), and wax myrtle (*Myrica cerifera*). The herbaceous component will also be variable and may include a wide variety of species such as maidencane (*Panicum hemitomon*), ferns, arrowheads (*Sagittaria* spp.), lizard's tail (*Saururus cernuus*), false nettle (*Boehmeria cylindrica*), and sphagnum moss (*Sphagnum* spp.). Soils will typically be acidic nutrient-poor peats, often overlying a clay lens or another impervious layer.

Description and assessment: A large area of basin swamp occurs in the northwestern part of the park; it is dominated by bald-cypress (*Taxodium distichum*) but also contains some hardwood species like red maple, black gum and ashes (*Fraxinus* spp). The basin swamp is intermingled with the hydric hammock. A few inches of elevation determine community type in this area. The understory of the basin swamp and hydric hammock is unusual in that it is dominated by needle palm (*Rhapidophyllum hystrix*). A small basin swamp located in the southern part of the park is dominated by cypress, sweetbay, and ash trees; it borders a deep tidal channel that is fringed with salt marsh species. These areas are so small that they are unmapped. The basin swamps in the park are in good condition despite past logging activity. These systems are sensitive to changes in hydrologic patterns that could originate outside the park.

An elevated logging road built by the previous owners passes through the core of this basin swamp/hydric hammock complex. While the road may not affect the hydrology of the basin swamp to a great extent, it does provide a pathway for exotic plants into the park. Staff have treated the area for Chinese brake fern several times and continue to monitor for additional infestations. Chinese brake fern typically prefers areas with exposed limestone and may have been brought in with limerock fill during road construction.

General Management Measures: The primary management actions in the basin swamp will be removal and control of invasive exotic plants.

DEPRESSION MARSH

Desired future condition: Depression marshes in coastal north Florida will characteristically be smaller, open vista wetlands dominated by low, emergent herbaceous and shrub species. Trees will be few, and if present, will occur primarily in the deeper portions of the community. There will be little accumulation of dead grassy fuels due to frequent burning. The soil surface will often be visible through the vegetation when the community is not inundated. Dominant vegetation will typically include maidencane (*Panicum hemitomon*), panicgrasses (*Panicum* spp.), cutgrass (*Leersia* sp.), sand cordgrass (*Spartina bakeri*), sawgrass (*Cladium* jamaicense), pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria* spp.), common buttonbush (*Cephalanthus occidentalis*), St. John's-wort (*Hypericum tetrapetalum*), and Carolina willow (*Salix caroliniana*). The optimal fire return interval for this community is 2 to 10 years depending on the fire frequency of adjacent communities.

Description and assessment: The depression marshes are primarily located within the mesic flatwoods in the northwest end of the park. These isolated wetlands are

dominated by herbaceous rather than woody vegetation. Typically, these small wetlands will carry fire during periods of low water or when emergent grassy fuels are continuous over standing water. Depression marshes that dry out during extended droughts act as ephemeral wetlands that are critical breeding sites for many invertebrate and amphibian species whose larvae cannot coexist with fish in more permanent wetlands (Moler and Franz 1987). The gopher frog (*Lithobates capito*), a species of special concern that spends its non-breeding life in nearby scrub and scrubby flatwoods, is one such species.

Invasion of the depression marshes by woody plant species is normally kept in check by prescribed burning and natural flooding. Although there is some encroachment of woody vegetation, these marshes are in fairly good condition and are expected to improve as prescribed fires are used to manage the surrounding mesic flatwoods.

General Management Measures: Prescribed fire and control of invasive exotic plants are the primary management measures for depression marshes in the park.

HYDRIC HAMMOCK

Desired future condition: Hydric hammock is characterized as a closed canopy, evergreen hardwood and/or palm forest with a variable understory dominated by palms and with a sparse to moderate groundcover of grasses and ferns. Typical canopy species in the Big Bend region will include laurel oak (*Quercus laurifolia*), pignut hickory (*Carya glabra*), southern magnolia (*Magnolia grandiflora*), cabbage palm (*Sabal palmetto*), sugar hackberry (*Celtis laevigata*), live oak (*Quercus virginiana*), sweetbay (*Magnolia virginiana*), red cedar (*Juniperus virginiana*), swamp tupelo (*Nyssa sylvatica var. biflora*), American elm (*Ulmus Americana*), red maple (*Acer rubrum*), and other hydrophytic tree species. Yaupon holly (*Ilex vomitoria*) and needle palm (*Rhapidophyllum hystrix*) will be among the sparse understory components. Soils will be poorly drained but only occasionally flooded. Hydric hammock will occasionally burn when fires are allowed to spread naturally across ecotones from adjacent upland natural communities.

COASTAL HYDRIC HAMMOCK *(variant of Hydric Hammock)*

Desired Future Condition: Coastal hydric hammock is a closed canopy evergreen forest typically occurring in strips adjacent to salt marsh or other coastal communities. Species composition will be generally limited to salt tolerant species including cabbage palm (*Sabal palmetto*), live oak (*Quercus virginiana*), and red cedar (*Juniperus virginiana*). The soils, occurring in low flat areas, will be poorly drained and only occasionally flooded. Fire occurrence may be rare to occasional depending upon several factors including the adjacent community type. Red cedar is not fire-tolerant and the presence of mature individuals may indicate a long fire return interval.

Description and assessment: The most extensive forested community in the park is hydric hammock. The hydric hammock is generally in good condition despite having been selectively logged in the past. Several episodes of logging dating from before the turn of the century have occurred, each time targeting a partially different

group of species (Swindell 1949, Jennings 1951). Species diversity is relatively high, and there is a high diversity of species assemblages within the hydric hammock. Red cedar and cabbage palm are usually important canopy members, but they are most dominant in areas near salt marsh and on offshore islands within the salt marsh. These red cedar and cabbage palm forests are a coastal variant of hydric hammock. Species more characteristic of swamps and upland hardwood forests replace the red cedar and cabbage palm in the more inland portions of the hydric hammock. The presence of other species varies with the elevation, land use history, and distance from the salt marsh.

The make-up of this community is highly variable because the hydric hammock within the park once graded into upland hardwood forest, swamps of various types, and mesic flatwoods. The beginnings of the transition zones between these communities lie just within the park boundaries. The many small islands within in the salt marsh were likely places of slightly higher elevation within the hydric hammock, which were isolated as sea levels rose. Community boundaries and species distributions within communities are dynamic and will continue to change over time with the influence of sea level rise and storms.

Hydric hammocks play a critical role in the regional hydrology (Simons et al. 1989). They serve the important function of temporarily storing water in high rainfall periods, but typically retain scattered small pockets of standing water up to 70 days per year. Hydric hammocks occur on a variety of sand to muck soils, but are always low lying and situated over a limestone substratum that occasionally projects above ground as exposed outcrops or bare rock areas. Soil depth can be as little as 20 cm in these areas. Over the past 25 years, researchers have documented the gradual recession of the hydric hammock and a conversion of coastal hydric hammock islands to salt marsh. University of Florida researchers first established monitoring plots in the park in 1992 (Williams et al 1999; Williams 2003). Comparison of aerial photography graphically illustrates the die-off of sabal palms, oaks, and red cedars on islands within the salt marsh.

The many small, and sometimes large, rainwater depressions in the park constitute another variable component of the hydric hammock. These depressions have a longer hydroperiod and deeper water than is found in the surrounding hydric hammock; they occur because of breaks in the limestone bedrock near the surface. The freshwater pools can be ephemeral or permanent. The ponds are often brackish, probably because they are flooded by tidal surges. The vegetation characteristic of these ponds varies, often changing with time (Abbott 1998, Abbott and Judd 2000). Corkwood (*Leitneria floridana*) is common in some of the less dynamic, more permanent pools. Other species common in these pools include sawgrass and Carolina willow. The more ephemeral ponds often contain concentrations of herbaceous species that occur scattered throughout the surrounding hydric hammock. These pools are too numerous to count or map; most of them are small and do not adequately fit any FNAI category.

Logging activities earlier in the 20th century have affected the hydric hammock community in several ways. Loggers removed the most desirable timber trees, and

with them the most desirable genes. Because of the selective logging (i.e., high-grading), the remaining forest is probably less genetically diverse than it once was. The genetic pool, in terms of quality of timber trees, may be inferior to what once existed in Gulf Hammock (Vince et al. 1989). Another consequence of former logging practices is that loblolly pine stands may be denser in some areas now than in the past. In some areas with dense populations of loblolly pine, southern pine beetles infested large numbers of trees in the past. Accessible infested areas were logged in 1997 and 2000 to control the spread of the beetle to adjacent lands. Because of the logging, hydrologic patterns and water quality were likely affected. Hydrologic patterns have also been altered by activities outside park boundaries including conversion of hydric hammock to pine plantation and past construction of roads and drainage systems.

The impacts by invasive exotic plants within the hydric hammock are restricted to a few species in specific areas. Limited areas in the northwest may be impacted by Chinese brake fern and require monitoring and additional control. Cogongrass has also been a problem in certain areas. The greatest threat is from Brazilian pepper (*Schinus terebinthifolius*), which is expanding its range north along the Gulf coast. The Brazilian peppers are most likely to appear on the coastal hydric hammock islands which have a more open canopy and are more prone to disturbance from storm surges. Surveys in 2010 conducted by FNAI staff documented scattered plants on offshore islands at the southern end of the park. Scattered plants in the northern end of the park near Cedar Key have been treated, but significant infestations occur on other public and private lands near Cedar Key.

General Management Measures: Control of invasive exotics within the hydric hammock is a high priority, although much of the hydric hammock is free of exotic plant species. Staff will continue to monitor hydric hammocks for the presence of exotic plants and any changes in hydric hammock community that might be related to sea level rise. Staff will pursue additional surveys for Brazilian pepper using aerial photography or watercraft to determine treatment needs.

MANGROVE SWAMP

Desired future condition: Mangrove swamp occurs as a dense forest along relatively flat, low wave energy, marine and estuarine shorelines. The dominant overstory will typically be black mangrove (*Avicennia germinans*), with some red mangrove (*Rhizophora mangle*) as it expands its range to the north. These species may occur in mixed stands, or in monospecific zones based on varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves will typically dominate the deepest water, followed by black mangroves in the intermediate zone. Mangroves will typically occur in dense stands with little to no understory, but may be sparse, particularly in the upper tidal reaches where salt marsh species predominate. Soils will generally be anaerobic and are saturated with brackish water at all times, becoming inundated at high tides.

Description and assessment: Within the park, this community type occurs primarily south of Turtle Creek Bay. Cedar Key is near the northern limit for this system on the Gulf Coast. Mangroves are common in Cedar Key but uncommon in areas

further to the east to the Waccasassa River and south to Turtle Creek. Why this occurs is unknown, but the prevailing ocean currents or salinity levels may be responsible. Black mangrove may grow in relatively dense stands or as scattered individuals in tidal marsh. Hard freezes can damage black mangrove, so its dominance in the tidal marsh can vary with the severity of recent winters. The mangrove swamp appears to be in excellent condition.

Over the past 20 years there has been a tremendous expansion of mangroves within the saltmarsh and tidal creeks south of Turtle Creek Bay. Comparison of aerial photography from 1994 to 2016 shows an order of magnitude increase in mangrove density, but not range. While there are more scattered mangroves within the northern parts of the salt marsh, the largest increase is in the southern end. The densest stands of mangrove occur on the extreme western boundary of the park, presumably in the areas of highest salinity. The mangroves have expanded along the western margins of the salt marsh and along the tidal creeks that flow through the salt marsh.

General Management Measures: The primary threat to the mangrove swamp is Brazilian pepper, which like mangroves, is expanding its range northward. Fortunately, Brazilian pepper is limited by salinity and may not be able to germinate or survive in mangrove swamps in areas of higher salinity. Surveys for Brazilian pepper in these remote areas are difficult and time consuming. Staff will pursue surveys via aerial photography or watercraft to determine if Brazilian peppers are present and require treatment.

SALT MARSH

Desired future condition: Salt marsh is a largely herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater and protected from large waves. Salt marsh typically will have distinct zones of vegetation based on water depth and tidal fluctuations. Dominant plant species in this community include black needle rush (*Juncus roemerianus*) and saltmarsh cordgrass (*Spartina alterniflora*). Saltgrass (*Distichlis spicata*) will dominate the higher, less frequently flooded areas. Other characteristic species will include saltmeadow cordgrass (*Spartina patens*), Carolina sea lavender (*Limonium carolinianum*), perennial saltmarsh aster (*Symphyotrichum tenuifolium*), wand loosestrife (*Lythrum lineare*), and shoreline seapurslane (*Sesuvium portulacastrum*). A landward border of salt-tolerant shrubs including groundsel tree (*Baccharis halimifolia*), saltwater falsewillow (*Baccharis angustifolia*), marshelder (*Iva microcephala*), and Christmasberry (*Lycium carolinianum*) may occur. Soil salinity and flooding will be the two major environmental factors that influence salt marsh vegetation. While there is little data on natural fire frequency in salt marsh, fire probably will occur there sporadically and in a mosaic pattern, given the patchiness of the fuels and the influence of creeks and salt flats.

SALT FLAT *(variant of Salt Marsh)*

Desired Future Condition: Salt flats occur within salt marsh as areas of slightly higher elevation, flooded only by storms and extreme high tides and isolated from sources of freshwater, which become very saline and desiccated due to constant

evaporation. Many of these areas on the Big Bend coast have expanses of exposed limerock, washed free of soil due to the exclusion of thick vegetative cover. These areas are dominated by species that can tolerate the extreme salinity, including saltwort (*Batis marittima*), annual glasswort (*Salicornia bigelovii*), perennial glasswort (*Sarcocornia ambigua*) and bushy seaside oxeye (*Borrichia frutescens*), or short grasses such as saltgrass (*Distichlis spicata*), seashore paspalum (*Paspalum vaginatum*), and shoregrass (*Monanthochloe littoralis*).

Description and assessment: Salt marsh is the most extensive community in the park. Extensive stands of black needle rush and saltmarsh cordgrass dominate the salt marsh. Areas dominated by saltgrass and other herbs are common seaward of hydric hammock islands. Areas of bare limestone are also scattered throughout the salt marsh of the park.

As with the other estuarine natural communities, salt marshes are sensitive to runoff and pollution from adjacent uplands. According to Vince et al. (1989), the salt marsh system is linked to adjacent upland areas by a band of hydric hammock that modifies the quantity, timing and quality of freshwater entering the marsh. If the quantity, quality, or timing parameters of freshwater inputs rapidly change, this consequence can greatly modify the structure and productivity of a tidal community. Specifically, significant fluctuations of salinity outside of an extremely narrow water quality range could negatively impact this sensitive estuarine community, one that acts as a nursery for numerous invertebrate and fish species. Overall the salt marsh community appears to be in excellent condition.

General Management Measures: In general, salt marsh communities are quite resilient and require very little active management.

BLACKWATER STREAM

Desired future condition: A blackwater stream can be characterized as a perennial or intermittent watercourse originating in lowlands where extensive wetlands with organic soils collect rainfall and runoff and discharge it slowly to the stream. The stained waters will be laden with tannins, particulates, and dissolved organic matter derived from drainage through adjacent swamps, resulting in sandy bottoms overlain by organic matter. Emergent and floating vegetation [including golden club (*Orontium aquaticum*), smartweeds (*Polygonum* spp.), grasses and sedges] may occur but is often limited by steep banks and dramatic seasonal fluctuations in water levels. To achieve the desired future condition, it will be necessary to minimize disturbances and alterations and preserve adjacent natural communities.

Description and assessment: The only blackwater stream in the park is the Waccasassa River. Water quality of the river is monitored periodically. Currently the stream appears to be in good condition. Potential threats to the river include mining and timbering that occur in the surrounding watersheds. These activities could eventually lead to degradation of the community by decreasing water quality and by altering natural hydrologic processes. Another problem is streambank erosion caused by excessive boat wakes. Additional details about the Waccasassa River are provided in the Hydrology section above.

General Management Measures: DRP staff will continue to work with other agencies to monitor the condition of the Waccasassa River and monitor potential land use changes in the watershed that might impact the river.

ESTUARINE COMPOSITE SUBSTRATE

Desired future condition: Estuarine composite substrates will consist of a combination of natural communities that may include small patches of consolidated and unconsolidated substrate with or without sessile floral and faunal populations. Composite substrates may also be dominated by any combination of floral, faunal, and mineral substrates such as mollusk reefs or seagrass beds that are situated within the subtidal, intertidal, and supratidal zones. Because of the potential combination of community types in composite substrate ecosystems, species diversity is often greater than in the surrounding habitats.

Description and assessment: Estuarine composite substrate is a combination of mineral, fauna, and flora-based estuarine natural communities including estuarine seagrass bed, estuarine mollusk reef, estuarine consolidated substrate, and estuarine unconsolidated substrate. Due to the difficulties of mapping these subtidal and intertidal natural communities individually, they are lumped for mapping purposes as estuarine composite substrate, but are listed separately below to identify the types found within the park. Where possible, estuarine mollusk reefs have been mapped separately. These substrates are important since shellfish, particularly oysters, and seagrasses often colonize them, and they provide habitat for a variety of fish and wildlife, including marine turtles, that use the Waccasassa Bay area as feeding and nursery grounds.

General Management Measures: Protection of the estuarine communities from outside impacts and contamination is the primary management action.

ESTUARINE CONSOLIDATED SUBSTRATE

Desired future condition: Estuarine consolidated substrates are mineral-based natural communities generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. This community consists of open, relatively unvegetated areas, with solidified rock or other hardened substrates that are typically composed of limerock or shell conglomerate material. Limerock-based substrates primarily occur as outcrops of bedded sedimentary deposits consisting primarily of calcium carbonate.

These hardened substrate communities are important because they form the foundation for the development of other estuarine natural communities when conditions become appropriate. They may be sparsely inhabited by sessile, planktonic, epifaunal, and pelagic plants and animals, but house few infaunal organisms. To achieve the desired future condition, it will be necessary to minimize disturbances attributable to placement of fill material, vehicular traffic, or the accumulation of pollutants.

Description and assessment: Small limestone outcrops and larger limestone flats are common along the streambeds and coastal shores of the park. These outcrops are important since shellfish, particularly oysters, often colonize them. The extent of this community within the park is unknown at this time. As mentioned above, areas of estuarine consolidated substrate are not mapped individually but are included as part of the estuarine composite substrate.

General Management Measures: Protection of the estuarine communities from outside impacts and contamination is the primary management action.

ESTUARINE MOLLUSK REEF

Desired future condition: Estuarine mollusk reefs are faunal-based natural communities typically characterized as expansive concentrations of sessile mollusks occurring in intertidal and subtidal zones to a depth of 40 feet (FDEP 2014). Mollusk reefs occupy a unique position among estuarine invertebrates. They represent a dynamic community of estuarine ecology, creating refugia, nursery grounds and feeding areas for a myriad of other estuarine organisms (FDEP 2014). In Florida, the most developed mollusk reefs are generally restricted to estuarine areas and are dominated by the eastern oyster (*Crassostrea virginica*). Additionally, there are numerous sessile and benthic invertebrates that are also strongly associated with mollusk reef communities. Some common invertebrate inhabitants are burrowing sponge (*Hadromerida* sp.), mussels, clams, oyster drill (*Urosalpinx* spp.), polychaetes, oyster leech (*Stylochus* spp.), barnacles, blue crab (*Callinectes sapidus*), mud crab (Xanthidae), stone crab (*Menippe mercenaria*), amphipods, and starfish (Asteroidea). Several fish also frequently occur near or feed among mollusk reefs, including gulf menhaden (*Brevoortia patronus*), gafftopsail catfish (*Bagre marinus*), pinfish (*Lagodon rhomboides*), spotted seatrout (*Cynoscion nebulosus*), and striped mullet (*Mugil cephalus*).

When the desired future condition of mollusk reef is attained, the community will consist of hardened consolidated substrates on which planktonic larvae (i.e., spat) settle and complete their development, and the estuarine waters will have salinities ranging from 15 to 30 parts per thousand (ppt). Significant increases or decreases in salinity levels that result from both natural and/or anthropogenic alterations of freshwater inflow can be detrimental to oyster communities (Seavey et al. 2011).

Description and assessment: The mollusk reef is the only faunal-based estuarine system in the park. Oyster colonies form the bulk of this community. Mollusk reefs commonly occur as shoals in tidal creeks. Their total extent is unknown, but all the mollusk reefs that are visible in recent aerial photographs have been mapped.

The estuarine mollusk reefs in this part of the Gulf Coast are dominated by the American oyster, although other species of mollusks also occur on the reefs. In general, mollusk reefs are prone to impacts from water quality degradation. The mollusk reefs within the park occur within Class II waters, but shellfish harvesting is often restricted due to water quality concerns.

General Management Measures: Protection of the estuarine communities from outside impacts and contamination is the primary management action. In the case of mollusk reefs, harvesting of oysters should be restricted to sustainable levels.

ESTUARINE SEAGRASS BED

Desired future condition: Estuarine seagrass beds are typically characterized as expansive stands of vascular plants and are one of the most productive communities in the world (Zeiman and Zeiman 1989). Seagrass beds occur in clear coastal waters where wave energy is moderate. The three most common species of seagrass in Florida will be turtle grass, (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoalweed (*Halodule wrightii*). Other seagrasses of the genus *Halophila* may also occur but will be considerably less common.

Seagrass beds require unconsolidated substrate in order to establish their underground biomass root structure. They will typically be found in waters ranging from 20° to 30°C (68° to 86°F). Clear water is required for photosynthesis. Seagrass beds will generally not thrive in waters where there are high nutrient loads or increased turbidity levels, or where there is increased competition from undesirable algal species.

Description and assessment: Seagrass beds occur at scattered locations within estuarine areas of the park. Many of the seagrass areas in the Big Bend region have been mapped (FDEP 2014), but it is difficult to confirm the current extent of this submerged community type. As described above, seagrass bed acreage figures are included within the total for the estuarine composite substrate in the park. Large areas of sparse to dense seagrass beds occur southwest of the mouth of the Waccasassa River, both within and outside the park.

General Management Measures: Protection of the estuarine communities from outside impacts and contamination is the primary management action. In the case of seagrass beds, impacts from prop scarring are a constant threat. Public education about the importance of seagrass beds is one option to reduce damage from naïve boaters.

ESTUARINE UNCONSOLIDATED SUBSTRATE

Desired future condition: Estuarine unconsolidated substrates are mineral-based natural communities generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sessile plant and animal species. This community consists of expansive unvegetated, open areas with primarily unsolidified substrate such as shell, marl, mud, and/or sand. These soft substrates are important in that they form the foundation for the development of other estuarine natural communities when conditions become appropriate. Unconsolidated substrate communities are associated with and often grade into salt marsh, seagrass beds, and mollusk reef.

Estuarine consolidated substrates may support large populations of infaunal organisms as well as a variety of transient planktonic and pelagic organisms such as tube worms, sand dollars (*Clypeasteroida* spp.), mollusks, isopods, amphipods,

burrowing shrimp (*Thalassinidea* spp.), and an assortment of crabs. While these areas may seem relatively barren, the densities of infaunal organisms in subtidal zones can reach the tens of thousands per meter square, making these areas important feeding grounds for many bottom feeding fish such as red drum (*Sciaenops ocellatus*), southern flounder (*Paralichthys lethostigma*), spot (*Leiostomus xanthurus*), and sheepshead (*Archosargus probatocephalus*). The intertidal and supratidal zones are extremely important feeding grounds for many shorebirds and invertebrates. To achieve the desired future condition, it will be necessary to prevent soil compaction, dredging activities and similar disturbances, and the accumulation of pollutants.

Description and assessment: Most of the tidal creeks within the park have mud bottoms, and many have extensive supratidal mud flats that are important feeding areas for wading birds and shorebirds. Although some estuarine unconsolidated substrate may have limited amounts of sand deposition from adjacent uplands, much of this community along this low energy coastline is dominated by mud deposits.

General Management Measures: Protection of the estuarine communities from outside impacts and contamination is the primary management action.

DEVELOPED

Desired future condition: There are no current plans to convert any of the developed area back to the original natural community.

Description and assessment: The only developed area in the park is the fiber factory road that runs northeast from the park boundary towards the town of Gulf Hammock.

General Management Measures: Resource management along this road right-of-way will focus on removal of all priority invasive exotic plants (i.e., Florida Exotic Pest Plant Council (FLEPPC) Category I and II species).

Imperiled Species

Imperiled species are those that are (1) tracked by FNAI as critically imperiled (G1, S1) or imperiled (G2, S2); or (2) listed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC) or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened or of special concern.

Fourteen listed plant species occur within the park. Several of the park's rare plant species were documented during a floristic study in the late 1990s (Abbott 1998, Abbott and Judd 2000). One listed plant that is notably abundant in the park's hydric hammock is corkwood (*Leitneria floridana*). Corkwood typically occurs on the edges of low karst depressions within the hydric hammock. Several endangered plants also occur within the park's hydric hammock, including Florida pinkroot (*Spigelia loganioides*), pinewoods dainties (*Phyllanthus leibmannianus*), coralberry (*Symphoricarpos orbiculatus*), and crested coralroot (*Hexalectris spicata*).

All populations of endangered plant species in the park will be identified and mapped to the extent possible. Many of these have already been located by Abbott (1998); the GPS locations have been provided to the DRP and incorporated into DRP GIS. Additional locations were mapped by District 2 office staff during past field surveys. Since the majority of these listed plants occur in hydric hammock, no specific management is needed to maintain their populations. Logging activities associated with any future southern pine beetle control measures should be carefully monitored to prevent important plant populations from being harmed. DRP staff will continue to work with staff from the University of Florida Herbarium and other institutions, as well as FNAI staff, to locate and monitor plant species of conservation interest.

Many of the 22 imperiled animal species that occur within the park have populations that also range outside the park; however, the large, undisturbed expanses of the park likely serve as important foraging areas for many of these species. It is probable that many of the reptiles and mammals that have smaller home ranges breed successfully within the park. By 1950, the Florida black bear (*Ursus americanus floridanus*) was nearly extirpated from the Gulf Hammock region, although Florida panthers (*Puma concolor coryi*) were reported frequently (Pearson 1951). Waccasassa Bay Preserve lies within the Big Bend Bear Management Unit (BMU). This subpopulation was estimated to contain around 12-28 bears, mostly concentrated south of Waccasassa Bay. The minimum subpopulation target is 200 bears according to the Florida Black Bear Management Plan (FWC 2012). Unfortunately, the Big Bend BMU suffers from low levels of genetic diversity (Dixon et al 2007).

The Florida salt marsh vole (*Microtus pennsylvanicus dukecambelli*) has been a challenging small mammal for researchers to study, primarily due to the inaccessibility of their preferred habitat, namely salt marsh (Woods et al. 1982). For many years, this genetically distinct subspecies of the common meadow vole was only known from a single locality between the park and Cedar Key. Recent efforts by the University of Florida and the Florida Cooperative Fish and Wildlife Research Unit have documented salt marsh voles at additional sites on public land. The vole has been confirmed within the Lower Suwannee National Wildlife Refuge, Cedar Key Scrub State Reserve, and Waccasassa Bay Preserve State Park (McCleery and Zweig 2014). This species is listed as endangered on both federal and state lists and is considered critically imperiled within Florida by FNAI. The novel floating camera traps used to document the Florida salt marsh voles, have also detected a second rare mammal species within the park, the Gulf salt marsh mink (*Neovison vison halilimnetes*) in the same estuarine habitats (McCleery et al 2014).

Marian's marsh wren (*Cistothorus palustris marianae*) and Scott's seaside sparrow (*Ammodramus maritimus peninsulae)* are two imperiled, salt marsh dwelling birds known to occur at Waccasassa Bay Preserve State Park. The population status of these two species is still relatively unknown (Post et al. 1983; Kale 1996; Sauer et al. 2014). A recent biological review of Marian's marsh wren and Scott's seaside

sparrow conducted by avian experts and FWC concluded that increased monitoring efforts were needed because of ongoing threats to salt marsh habitat along the Gulf Coast and a trend of declining marsh wren populations in the area (FWC 2011; FWC 2013a). In 2016, FWC research staff collected updated observations within the Big Bend region, including at Cedar Key Scrub.

The only park record for scrub jay, made in the 1970s, was in the southern part of the park. Historically, scrub jays were known to occur near Yankeetown. The most recent sightings of scrub jays in this area were west of U.S. Highway 19, just south of the Withlacoochee River (Tom Mathews, pers. comm.). It is also possible that scrub jays may have entered the park where it shares a boundary with Cedar Key Scrub State Reserve to the north.

The gopher tortoise is known to occur in flatwoods at the south and northwest ends of the park. The FWC has adopted a statewide protocol for monitoring gopher tortoises based on a line transect distance sampling method (LTDS) (Smith et al. 2009). Any assessments of the status of gopher tortoise populations in the park should consider using this standard protocol.

The eastern indigo snake is a federally listed upland species that is becoming increasingly rare throughout its range due to loss and fragmentation of its critical habitat (Enge et al. 2013). Indigo snakes have historically been more frequently observed in the Gulf Hammock region. They are known to utilize hydric hammock and tidal marsh areas within the park. Anecdotal observations, or lack of observations, indicate that the indigo snake population within the park and the Gulf Hammock region has recently declined (Godley and Moler 2013). The eastern indigo (*Drymarchon corais*) was recently proposed to be recognized as two genetically distinct species, with the Gulf coastal form to be known as *Drymarchon kolpobasileus* (Krysko et al. 2016).

Several other imperiled or rare reptiles occur within the park, including the Gulf salt marsh snake (*Nerodia clarki clarki*), and ornate diamond-backed terrapin (*Malaclemys terrapin macrospilota)*. The Gulf salt marsh snake occurs within the estuarine communities of the park. This species is known to have a wide zone of intergradation with the southern form (known as the mangrove water snake) throughout Citrus County and Levy County. The ornate diamond-backed terrapin is another important and highly vulnerable species of greatest conservation need that resides within estuarine habitats of the park and the adjacent aquatic preserve (FWC 2012).

At least three species of marine turtle occur within the waters of the Gulf of Mexico and the adjacent estuaries within Waccasassa Bay Preserve, namely Kemp's ridley turtle (*Lepidochelys kempii*), loggerhead turtle (*Caretta caretta*) and green turtle (*Chelonia mydas*). Waccasassa Bay serves as an important developmental habitat for sub-adults of these species (Carr 1995; Younker et al. 1992). There are also historical accounts of Kemp's ridley and green turtles hibernating in mud bottoms off Cedar Key and Waccasassa Bay (Carr 1995). The estuarine resources of the Big Bend region are exceptionally diverse, with lush beds of submerged aquatic

vegetation (SAV) and highly productive benthic macroinvertebrate communities that attract young marine turtles throughout the year. The constant pulses of freshwater into estuaries that characterize this region are critical to maintaining the natural hydrology and sustaining water quality and quantity in the lush SAV and benthic communities. The West Indian manatee also uses the estuarine communities in the park and the Waccasassa River.

Coordination with the FWC and the U.S. Fish and Wildlife Service is essential for identification of threats to sea turtles and manatees and for the protection of resources vital to them. An active prescribed burn program in the mesic flatwoods natural community will improve habitat for gopher tortoises and indigo snakes.

Table 2 contains a list of all known imperiled species within the park and identifies their status as defined by various entities. It also identifies the types of management actions that are currently being taken by DRP staff or others, and identifies the current level of monitoring effort. The codes used under the column headings for management actions and monitoring level are defined following the table. Explanations for federal and state status as well as FNAI global and state rank are provided in Addendum 6.

Table 2. Imperiled Species Inventory

Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
PLANTS						
Chapman's sedge *Carex chapmanni*			LT	G3,S3	4	Tier 1
Wood spurge *Euphorbia commutata*			LE	G5,S2		Tier 1
Angle pod *Gonolobus suberosus*			LT			Tier 1
Crested coralroot *Hexalectris spicata*			LE			Tier 1
Corkwood *Leitneria floridana*			LT	G3, S3	4	Tier 1
Cardinal flower *Lobelia cardinalis*			LT		4	Tier 1

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Florida mayten *Maytenus phyllanthoides*			LT			Tier 1
Erect pricklypear *Opuntia stricta*			LT			Tier 1
Pinewoods dainties *Phyllanthus liebmannianus* ssp. *platylepis*			LE	G4T2, S2		Tier 1
Yellow butterwort *Pinguicula lutea*			LT		1,4	Tier 1
Pinnate-lobed coneflower *Rudbeckia triloba* var. *pinnatiloba*			LE	G5T3, S2		Tier 1
Florida pinkroot *Spigelia loganioides*			LE	G2Q, S2	4	Tier 1
Coralberry *Symphoricarpos orbiculatus*			LE	G5, S1		Tier 1
Redmargin zephyrlily *Zephyranthes simpsonii*			LT	G2G3, S2S3	4	Tier 1
FISH						
Gulf sturgeon *Acipenser oxyrinchus desotoi*	FT	LT		G3T2, S2		Tier 1
REPTILES						
American alligator *Alligator mississippiensis*	FT(S/A)	T(S/A)		G5, S4	4,10,13	
Loggerhead turtle *Caretta caretta*	FT	LT		G3, S3	4,13	Tier 1
Green turtle *Chelonia mydas*	FT	LT		G3, S2S3	4,13	Tier 1

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Eastern indigo snake *Drymarchon couperi*	FT	LT		G3, S3	1,10,13	Tier 1
Gopher tortoise *Gopherus polyphemus*	ST	C		G3, S3	1,10,13	Tier 1
Common kingsnake *Lampropeltis getula*				G5, S2S3	4,10	Tier 1
Kemp's ridley turtle *Lepidochelys kempii*	FE	LE		G1, S1	4,13	Tier 1
Gulf saltmarsh snake *Nerodia clarkii clarkii*				G4T3, S2	4,10	Tier 1
BIRDS						
Scott's Seaside Sparrow *Ammodramus maritimus peninsulae*	ST			G4T3Q, S3	2,4,13	Tier 2
Florida Scrub Jay *Aphelocoma coerulescens*	FT	LT		G2, S2	1,6,7,13	Tier 3
Marian's Marsh Wren *Cistothorus palustris marianae*	ST			G5T3, S3	2,4,13	Tier 2
Little Blue Heron *Egretta caerulea*	ST			G5, S4	4,10,13	Tier 1
Tricolored Heron *Egretta tricolor*	ST			G5, S4	4,10,13	Tier 1
Swallow-tailed Kite *Elanoides forficatus*				G5, S2	4	Tier 1
American Oystercatcher *Haematopus palliatus*	ST			G5, S2	4,10,13	Tier 1
Wood Stork *Mycteria americana*	FT	LT		G4, S2	4,10,13	Tier 1
Black Skimmer *Rynchops niger*	ST			G5, S3	4,10,13	Tier 1

Table 2. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
MAMMALS						
Florida salt marsh vole *Microtus pennsylvanicus dukecambelli*	FE	LE		G5T1, S1	4	Tier 2
Florida panther *Puma concolor coryi*	FE	LE				Tier 1
West Indian manatee *Trichechus manatus latirostris*	FT	LT		G2, S2	4,10,13	Tier 1

Management Actions

1. Prescribed Fire
2. Exotic Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from visitor impacts (establish buffers)/law enforcement
11. Decoys (shorebirds)
12. Vegetation planting
13. Outreach and Education
14. Other

Monitoring Level

Tier 1. Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches). Documentation may be in the form of Wildlife Observation Forms, or other district specific methods used to communicate observations.

Tier 2. Targeted Presence/Absence: includes monitoring methods/activities that are specifically intended to document presence/absence of a particular species or suite of species.

Tier 3. Population Estimate/Index: an approximation of the true population size or population index based on a widely accepted method of sampling.

Tier 4. Population Census: A complete count of an entire population with demographic analysis, including mortality, reproduction, emigration, and immigration.

Tier 5. Other: may include habitat assessments for a particular species or suite of species or any other specific methods used as indicators to gather information about a particular species.

Detailed management goals, objectives and actions for imperiled species in this park are discussed in the Resource Management Program section of this component and the Implementation Component of this plan.

Exotic and Nuisance Species

Exotic species are plants or animals not native to Florida. Invasive exotic species are able to out-compete, displace or destroy native species and their habitats, often because they have been released from the natural controls of their native range, such as diseases, predatory insects, etc. If left unchecked, invasive exotic plants and animals alter the character, productivity and conservation values of the natural areas they invade.

Exotic animal species include non-native wildlife species, free ranging domesticated pets or livestock, and feral animals. Because of the negative impacts to natural systems attributed to exotic animals, the DRP actively removes exotic animals from state parks, with priority being given to those species causing the greatest ecological damage.

In some cases, native wildlife may also pose management problems or nuisances within state parks. A nuisance animal is an individual native animal whose presence or activities create special management problems. Examples of animal species from which nuisance cases may arise include raccoons and alligators that are in public areas. Nuisance animals are dealt with on a case-by-case basis in accordance with the DRP's Nuisance and Exotic Animal Removal Standard.
Detailed management goals, objectives and actions for management of invasive exotic plants and exotic and nuisance animals are discussed in the Resource Management Program section of this component.

Three important invasive exotic species, cogongrass (*Imperata cylindrica*), Brazilian pepper and Chinese brake fern are known to occur within the park (Table 4). While Brazilian pepper is known to occur in the northern and southern portions of the park, the extent of the infestation is unknown. A survey of this species is needed before thorough treatment can occur. The park is remote, access is primarily by water, and there are many acres of hydric hammock that are vulnerable to invasion by Brazilian pepper. Some of the hydric hammock occurs as islands embedded within the salt marsh. DRP staff are treating Brazilian pepper in the northern portions of the park.

Chinese brake fern may have been introduced to the park on limerock used to stabilize roads. There are numerous areas of naturally occurring exposed limestone in the hydric hammock and other areas of the park. Many of these support native ferns and may be vulnerable to colonization by Chinese brake fern. Some invasion of limestone outcrops has occurred in the hydric hammock adjacent to infested limerock roads. Regular treatment has reduced the amount of brake fern and appears to be preventing it from invading further into the hydric hammock. Cogongrass occurs primarily in a former southern pine beetle harvest area; it was likely introduced on logging equipment. Another small patch occurs on State Road 24.

Since the last management plan was approved, 253 acres of invasive exotic plants have been treated in the park.

The most significant exotic animal in the park is the feral hog. Hogs are plentiful in the park and cause significant damage to marshes and other seasonally wet areas. While it may not be feasible to control feral hogs within the park, they are hunted aggressively in the wildlife management areas and private hunting leases that border the park.

In 2002, the red bay ambrosia beetle (*Xyloborus glabratus*) was first detected in the United States in southeast Georgia. The beetle carries the fungal pathogen (*Raffaelea lauricola*) which it transmits to red bay trees (*Persea borbonia*) and other species in the Lauraceae family, causing laurel wilt disease and death. The beetle and its associated pathogen spread rapidly, and by 2005 it had appeared in Duval County, Florida. In 2010, the disease was discovered in Levy County. The beetle (and laurel wilt) has now spread throughout most of Florida and into many of the neighboring states. Although most of the adult red bays have been top-killed, the trees continue to resprout from their roots. It may be that members of the Lauraceae family will continue to survive in shrub form as the remnant tree root systems continue to resprout. At this point, much remains unknown about the long term impacts of this disease on red bays and other Lauraceae. Staff should continue to restrict the movement of firewood into and out of the park and educate visitors about the issue.

Table 3 contains a list of the Florida Exotic Pest Plant Council (FLEPPC) Category I and II invasive, exotic plant species found within the park (FLEPPC 2015). The table also identifies relative distribution for each species and the management zones in which they are known to occur. An explanation of the codes is provided following the table. For an inventory of all exotic species found within the park, see Addendum 5.

Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species

Common and Scientific Name	FLEPPC Category	Distribution	Management Zone (s)
PLANTS			
Cogongrass *Imperata cylindrica*	I	2	WB-1B, WB-1C, WB-6B
		3	WB-1B
Chinese brake fern *Pteris vittata*	II	2	WB-6A, WB-6B, WB-6C
		6	WB-6A
Brazilian pepper *Schinus terebinthifolius*	1	2	WB-1B, WB-2
		3	WB-2

Distribution Categories:

0 No current infestation: All known sites have been treated and no plants are currently evident.
1 Single plant or clump: One individual plant or one small clump of a single species.

2 Scattered plants or clumps: Multiple individual plants or small clumps of a single species scattered within the gross area infested.
3 Scattered dense patches: Dense patches of a single species scattered within the gross area infested.
4 Dominant cover: Multiple plants or clumps of a single species that occupy a majority of the gross area infested.
5 Dense monoculture: Generally, a dense stand of a single dominant species that not only occupies more than a majority of the gross area infested, but also covers/excludes other plants.
6 Linearly scattered: Plants or clumps of a single species generally scattered along a linear feature, such as a road, trail, property line, ditch, ridge, slough, etc. within the gross area infested.

Special Natural Features

Waccasassa Bay Preserve State Park contains some of the last undisturbed remnants of the once great Gulf Hammock. The Gulf Hammock was an old-growth hydric hammock some 100,000 acres in size that stretched from Yankeetown to Cedar Key. It is estimated that 80% of the Gulf Hammock was clear-cut for conversion to loblolly pine plantations between 1970 and the mid-1980s (Simons et al 1989). Much of what remained was sold to the State of Florida to form the core of Waccasassa Bay Preserve State Park.

The extensive outcrops of limestone in the preserve are a notable geologic feature. The limestone underlying the Florida peninsula is exposed at the land surface along the Levy County coastline where the Floridan aquifer leaks out into the Gulf of Mexico. The flatness of the topography at the coast also provides interesting opportunities for study of the effects of sea level rise. Sea level changes have shaped the boundaries of plant communities in the preserve over time and will continue to do so. Die-offs of cabbage palms, cedars and oaks on islands in the park have been attributed to sea level rise (Perry and Williams 1996) (Williams et al. 1999; Williams et al. 2003; Ellis et al. 2004). Climate change may accelerate global sea level rise and the transformation of preserve's plant communities.

A unique botanical feature of the preserve is the number of plant species occurring at either the northern or southern limits of their ranges. A floristic survey of Waccasassa Bay Preserve State Park has documented 29 species that occur at or near their contiguous southern limit in Florida (Abbott 1998). Likewise, 45 species were documented that occur at or near their contiguous northern limit in Florida.

Cultural Resources

This section addresses the cultural resources present in the park that may include archaeological sites, historic buildings and structures, cultural landscapes and collections. The Florida Department of State (FDOS) maintains the master inventory of such resources through the Florida Master Site File (FMSF). State law requires that all state agencies locate, inventory and evaluate cultural resources that appear to be eligible for listing in the National Register of Historic Places. Addendum 7 contains the FDOS, Division of Historical Resources (DHR) management procedures for archaeological and historical sites and properties on state-owned or controlled properties; the criteria used for evaluating eligibility for listing in the National Register of Historic Places, and the Secretary of Interior's definitions for the various preservation treatments (restoration, rehabilitation, stabilization and preservation).

For the purposes of this plan, significant archaeological site, significant structure and significant landscape means those cultural resources listed or eligible for listing in the National Register of Historic Places. The terms archaeological site, historic structure or historic landscape refer to all resources that will become 50 years old during the term of this plan.

Condition Assessment

Evaluating the condition of cultural resources is accomplished using a three-part evaluation scale, expressed as good, fair and poor. These terms describe the present condition, rather than comparing what exists to the ideal condition. Good describes a condition of structural stability and physical wholeness, where no obvious deterioration other than normal occurs. Fair describes a condition in which there is a discernible decline in condition between inspections, and the wholeness or physical integrity is and continues to be threatened by factors other than normal wear. A fair assessment is usually a cause for concern. Poor describes an unstable condition where there is palpable, accelerating decline, and physical integrity is being compromised quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action is needed to reestablish physical stability.

Level of Significance

Applying the criteria for listing in the National Register of Historic Places involves the use of contexts as well as an evaluation of integrity of the site. A cultural resource's significance derives from its historical, architectural, ethnographic or archaeological context. Evaluation of cultural resources will result in a designation of NRL (National Register or National Landmark Listed or located in an NR district), NR (National Register eligible), NE (not evaluated) or NS (not significant) as indicated in the table at the end of this section.

There are no criteria for determining the significance of collections or archival material. Usually, significance of a collection is based on what or whom it may represent. For instance, a collection of furniture from a single family and a particular era in connection with a significant historic site would be considered highly significant. In the same way, a high quality collection of artifacts from a significant archaeological site would be of important significance. A large herbarium collected from a specific park over many decades could be valuable to resource management efforts. Archival records are most significant as a research source. Any records depicting critical events in the park's history, including construction and resource management efforts, would all be significant.

The following is a summary of the FMSF inventory. In addition, this inventory contains the evaluation of significance.

Prehistoric and Historic Archaeological Sites

Desired future condition: All significant archaeological sites within the park that represent Florida's cultural periods or significant historic events or persons are

preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: There are 74 archaeological sites and 1 linear resource group in the park that have been recorded with the FMSF; all known sites have been recorded.

The majority of the sites in the park are prehistoric and are from the Weeden Island and Woodland cultures dating to about 1000 AD. The Deptford and Safety Harbor cultures are represented on a much smaller scale. These sites include shell middens, prehistoric habitations and campsites, burial sites, and procurement sites. Some sites lack pottery and thus are designated prehistoric. There is a wealth of archaeological information within the park that could greatly increase our knowledge about the evolution of aboriginal cultures along the Gulf coast.

A few sites in the park are historic, ranging from the Territorial Development period of 1821-45 to the early 20th Century. The sole linear resource in the park, the Florida Railroad (LV228), is from the Territorial Development period.

A predictive model has been completed for the park (Collins et al. 2012).

There are numerous archaeological sites within the Big Bend coastal region, including Waccasassa Bay Preserve that are situated on cabbage palm hammock islands, limestone highs around artesian sources, tidal bars, as well as on relict dunes. Because most of this region along Florida's west coastline is undergoing rapid change due to sea level rise, land subsidence, and wave/tidal action, it is expected that landscape modifications in the form of hammock and upland loss and scouring of limestone islands will cause a future loss of archaeological sites at Waccasassa Bay.

Condition Assessment: Archaeological sites at Waccasassa Bay are remote and primarily accessible by water. Most need to be reassessed during the tenure of this plan. Current condition data is not available. Because many sites are located in low-lying coastal areas, the primary threat is erosion and sea level rise. Looting is also a threat, but the remoteness of the area may aid in protecting the sites.

General Management Measures: Division staff should develop a plan to assess the sites, protect the sites from looting, and address any management concerns found during assessments.

Natural erosional processes are degrading many of the known aboriginal sites, and many are being gradually inundated due to sea level rise. As discussed in previous archaeological surveys of the Gulf Hammock and Waccasassa Bay area, much of the information about aboriginal cultures will be lost as these sites erode and are destroyed (Jones and Borremans 1991, Jones 1993, Vojnovski et al 2000). Study of these sites should be encouraged. Advice from the Division of Historical Resources

will be sought on appropriate actions to protect and/or salvage information from these sites.

Historic Structures

Desired future condition: All significant historic structures and landscapes that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: There are no historic structures at Waccasassa Bay Preserve.

Condition Assessment: There are no historic structures at Waccasassa Bay Preserve.

General Management Measures: There are no historic structures at Waccasassa Bay Preserve.

Collections

Desired future condition: All historic, natural history and archaeological objects within the park that represent Florida's cultural periods, significant historic events or persons, or natural history specimens are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

Description: The park does not have any collections.

Condition Assessment: The park does not have any collections.

General Management Measures: The park does not have any collections.

Detailed management goals, objectives and actions for the management of cultural resources in this park are discussed in the Cultural Resource Management Program section of this component. Table 4 contains the name, reference number, culture or period, and brief description of all the cultural sites within the park that are listed in the Florida Master Site File. The table also summarizes each site's level of significance, existing condition and recommended management treatment. An explanation of the codes is provided following the table.

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
LV34 Lone Cedar Island	Weeden Island	Archaeological Site	NE	G	P
LV47 North Bank Mouth of Waccasassa River	Prehistoric/Unspecified	Archaeological Site	NE	NE	P
LV48 Mouth of Rocky Creek	Prehistoric/Unspecified	Archaeological Site	NE	G	P
LV49 Rocky Creek I	Prehistoric/Unspecified	Archaeological Site	NE	NE	P
LV50 Rocky Creek II	Prehistoric/Unspecified	Archaeological Site	NE	NE	P
LV52 Waccasassa I	Prehistoric/Unspecified	Archaeological Site	NE	NE	P
LV133 Salt Works at Salt Island	Civil War Era	Archaeological Site	NE	NE	P
LV228 Florida Railroad – Site of	American, 1821-present	Linear Resource	NE	NE	P
LV298 Rocky Run Island	Prehistoric/Unspecified Woodland	Archaeological Site	NE	NE	P
LV299 Rocky Run II	Prehistoric/Unspecified Woodland; Historic/ Early to Mid-20th Century	Archaeological Site	NE	NE	P
LV300 Primitive Campsite II	Prehistoric/Unspecified Weeden Island	Archaeological Site	NE	NE	P
LV301 Primitive Campsite	Prehistoric/Unspecified Weeden Island	Archaeological Site	NE	NE	P
LV302 Mud Creek	Weeden Island	Archaeological Site	NE	NE	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
LV303 Cow Creek	Unknown	Archaeological Site	NE	NE	P
LV304 WAC (W. of Stafford island)	Weeden Island, Deptford, American 1900-	Archaeological Site	NE	NE	P
LV305 Tange Shell Mound	Weeden Island	Archaeological Site	NE	NE	P
LV306 McCord Site	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV307 Leaning Oak Site	Weeden Island, Safety harbor	Archaeological Site	NE	NE	P
LV308 Gator Mound	Weeden Island	Archaeological Site	NE	NE	P
LV309 Shell Scatter	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV310 Cowpen Site	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV311 Kelly Creek I	Aboriginal unspecified	Archaeological Site	NE	NE	P
LV312 Kelly Creek II	Weeden Island, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV313 Kelly Creek III	Aboriginal unspecified	Archaeological Site	NE	NE	P
LV314 Kelly Creek IV	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV315 Kelly Creek V	Unknown culture	Archaeological Site	NE	NE	P
LV316 Kelly Creek VI	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV317 Transect 5	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV318 Leaning Oak II	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV319 Square Well	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P
LV320 Square Well Rd. II	Woodland, Aboriginal unspecified	Archaeological Site	NE	NE	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture / Period**	**Description**	**Significance**	**Condition**	**Treatment**
LV322 Barn at Loop Rd. Entrance	Early 20th Century	Archaeological Site	NE	NE	P
LV323 Hearth Kelly Creek	American 1900-	Archaeological Site	NE	NE	P
LV324 Rocky Run Still	American 1900-	Archaeological Site	NE	NE	P
LV325 The Cowpens	American 1821-	Archaeological Site	NE	NE	P
LV435 Gnat Island	Aboriginal unspecified	Archaeological Site	NE	NE	P
LV436 Sandfly Point	Weeden island	Archaeological Site	NE	NE	P
LV437 Little Gnat Island	Woodland	Archaeological Site	NE	NE	P
LV438 Demory Stub	Woodland	Archaeological Site	NE	NE	P
LV439 Thousand point A	Late Archaic	Archaeological Site	NE	NE	P
LV440 Thousand point B	Woodland	Archaeological Site	NE	NE	P
LV441 Thousand point C	Prehistoric	Archaeological Site	NE	NE	P
LV442 Clothesline Island	Woodland Historic unspecified	Archaeological Site	NE	NE	P
LV443 Bee Island	Woodland	Archaeological Site	NE	NE	P
LV444 Sandfly Point	Woodland	Archaeological Site	NE	NE	P
LV445 Sherd Island	Woodland	Archaeological Site	NE	NE	P
LV446 Gnat Island 2	Woodland	Archaeological Site	NE	NE	P
LV447 Snake Eyes Point	Woodland	Archaeological Site	NE	NE	P
LV448 Fawn Island	Woodland	Archaeological Site	NE	NE	P
LV450 Demory Tip	Woodland	Archaeological Site	NE	NE	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
LV452 Plentiful Island	Weeden Island	Archaeological Site	NE	NE	P
LV454 Lowes Bay 1	Woodland	Archaeological Site	NE	NE	P
LV455 Lowes Bay 2	Weeden Island	Archaeological Site	NE	NE	P
LV456 Lowes Bay 4	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV457 Sandfly Point B	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV458 Confusion Point	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV460 Hospitality Island	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV461 Blue Ball Island	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV463 Shotgun Island	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV466 House Site	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV467 Opus P Site	Prehistoric lacking pottery	Archaeological Site	NE	NE	P
LV468 Crackerville	Deptford, 700 B.C.-300 B.C.	Archaeological Site	NE	NE	P
LV469 Spring Run Burial Mound	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV470 Thousand Mile Creek	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV471 Old Fiber Factory	Nineteenth century American, 1821-1899	Archaeological Site	NE	NE	P
LV472 South Point	Archaic, 8500 B.C.-1000 B.C.	Archaeological Site	NE	NE	P
LV473 South Beach	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV474 Trout Creek	Prehistoric lacking pottery	Archaeological Site	NE	NE	P

Table 4. Cultural Sites Listed in the Florida Master Site File					
Site Name and FMSF #	**Culture/Period**	**Description**	**Significance**	**Condition**	**Treatment**
LV475 Sheephead Creek	Prehistoric with pottery	Archaeological Site	NE	NE	P
LV476 Thousand Island	Other	Archaeological Site	NE	NE	P
LV529 Spring Run Hammock	Nineteenth century American, 1821-1899	Archaeological Site	NE	NE	P
LV532 Turtle Creek North	Weeden Island, A.D. 450-1000	Archaeological Site	NE	NE	P
LV540 Potlid Pinellas	Weeden Island, A.D. 450-1000	Archaeological Site	NE	NE	P
LV542 Turtle Creek Well	Nineteenth century American, 1821-1899	Archaeological Site	NE	NE	P
LV824 Tilting Oak	Prehistoric with pottery	Archaeological Site	NE	NE	P

Significance
NRL National Register listed
NR National Register eligible
NE not evaluated
NS not significant

Condition
G Good
F Fair
P Poor
NA Not accessible
NE Not evaluated

Recommended Treatment
RS Restoration
RH Rehabilitation
ST Stabilization
P Preservation
R Removal
N/A Not applicable

Resource Management Program

Management Goals, Objectives and Actions

Measurable objectives and actions have been identified for each of the DRP's management goals for Waccasassa Bay Preserve State Park. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of

progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While, the DRP utilizes the ten-year management plan to serve as the basic statement of policy and future direction for each park, a number of annual work plans provide more specific guidance for DRP staff to accomplish many of the resource management goals and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire management, exotic plant management and imperiled species management. Annual or longer-term work plans are developed for natural community restoration and hydrological restoration. The work plans provide the DRP with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system.

The work plans are reviewed and updated annually. Through this process, the DRP's resource management strategies are systematically evaluated to determine their effectiveness. The process and the information collected is used to refine techniques, methodologies and strategies, and ensures that each park's prescribed management actions are monitored and reported as required by Sections 253.034 and 259.037, Florida Statutes.

The goals, objectives and actions identified in this management plan will serve as the basis for developing annual work plans for the park. The ten-year management plan is based on conditions that exist at the time the plan is developed. The annual work plans provide the flexibility needed to adapt to future conditions as they change during the ten-year management planning cycle. As the park's annual work plans are implemented through the ten-year cycle, it may become necessary to adjust the management plan's priority schedules and cost estimates to reflect these changing conditions.

Natural Resource Management

Hydrological Management

Goal: Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.

The natural hydrology of most state parks has been impaired prior to acquisition to one degree or another. Florida's native habitats are precisely adapted to natural drainage patterns and seasonal water level fluctuations, and variations in these factors frequently determine the types of natural communities that occur on a particular site. Even minor changes to natural hydrology can result in the loss of plant and animal species from a landscape. Restoring state park lands to original natural conditions often depends on returning natural hydrological processes and conditions to the park. This is done primarily by filling or plugging ditches, removing obstructions to surface water "sheet flow," installing culverts or low-water crossings on roads, and installing water control structures to manage water levels.

Objective A: Conduct/obtain an assessment of the park's hydrological restoration needs.

Action 1 Continue to cooperate with other agencies and independent researchers in hydrological research and monitoring programs, including the continuation of Thermal imagery research.

Action 2 Continue to monitor and track surface and groundwater quality issues within the region, especially concerning natural and cultural resource impacts associated with sea level rise.

Action 3 Continue to monitor land use or zoning changes in the region and offer comments as appropriate.

Action 4 Seek funding for dye trace studies to determine groundwater sources for karst features within the park.

Action 5 Conduct dye trace studies to determine groundwater sources for karst features within the park.

Action 6 Continue to cooperate with the SRWMD in implementation of MFLs for the park in order to ensure maintenance of historic groundwater levels.

Significant hydrological features in Waccasassa Bay Preserve State Park include coastal hydric hammocks, brackish ecosystems containing portions of over 40 major tidal creeks, and hundreds of submarine groundwater discharge karst fractures. Preservation of surface water and groundwater quality, plus control of erosion and sedimentation into the park's freshwater wetlands, estuarine creek systems and karst features, will remain top priorities for the DRP. The following are hydrological assessment actions recommended for the park.

The DRP will continue its tradition of close cooperation with state and federal agencies and independent researchers engaged in hydrological research and monitoring programs within the park and the adjacent coastal resources, and it will encourage and facilitate additional research in those areas. Agencies such as the SRWMD, USGS, and FDEP will be relied upon to keep the DRP apprised of any declines in surface water quality or any suspected contamination of groundwater in the region. Park and District staff will continue to monitor and document any potential changes within hydric hammock or coastal forest communities as well as any known archeological resources that might be impacted by sea level rise. District 2 staff will continue to monitor Environmental Resource Permit (ERP) and Water Use Permit (WUP) requests for the region in order to provide timely and constructive comments that promote protection of the park's water resources. Additional cooperative efforts may include facilitating the review and approval of research permits and providing researchers with assistance in the field. Recommendations derived from the monitoring and research activities will be essential to the decision making process during management planning.

The proximal sources of flow from the Floridan aquifer to SGD karst features in the park are still unknown. To remedy that, the DRP should continue to encourage hydrological research that would help identify those sources. Thermal imagery research has been an important tool to help identify these groundwater resources. In order for water managers to be able to protect water quality and potentially

restore groundwater levels to their historic levels, they will need to know the extent of those groundwater sources. The DRP should also seek funding for dye trace studies to determine groundwater sources for SGD karst features in the park.

Staff will continue to monitor land use or zoning changes within lands bordering the park. Major ground disturbances on neighboring properties or inadequate treatment of runoff into local streams could ultimately cause significant degradation of resources in the park. When appropriate, District 2 staff will provide comments to other agencies regarding proposed changes in land use or zoning that may affect the park. In addition, District 2 staff will closely monitor major mining operations in the watershed upstream of the park and watch for significant changes that may adversely affect resources in the park.

The DRP will continue to work closely with the SRWMD to ensure that MFLs developed for the Waccasassa River are implemented conscientiously and that historic groundwater flows are protected.

Objective B: Restore natural hydrological conditions and functions to approximately 10 acres of hydric hammock natural community

Action 1 Conduct assessments and evaluate hydrological impacts in the park, including drainage ditches and areas where natural sheetflow has been interrupted.

Action 2 Develop a hydrological restoration plan that includes prioritized projects for the park.

Staff will initiate hydrological restoration measures for natural systems in the park wherever wetland communities have been artificially impounded or ditched and where ecological functions have been disrupted. If it is determined that roads passing through wetland communities are significantly altering natural hydrological regimes, then the DRP, using best management practices, will initiate corrective actions such as installing low water crossings or culverts in appropriate locations. In some cases, complete removal of above-grade roads may be warranted, especially if they no longer serve a useful purpose. These roads should be abandoned and elevations restored to the historic grade of the adjacent natural landscape.

Natural Communities Management

Goal: Restore and maintain the natural communities / habitats of the park.

The DRP practices natural systems management. In most cases, this entails returning fire to its natural role in fire-dependent natural communities. Other methods to implement this goal include large-scale restoration projects as well as smaller scale natural communities' improvements. Following are the natural community management objectives and actions recommended for the state park.

Prescribed Fire Management

Prescribed fire is used to mimic natural lightning-set fires, which are one of the primary natural forces that shaped Florida's ecosystem. Prescribed burning

increases the abundance and health of many wildlife species. A large number of Florida's imperiled species of plants and animals are dependent on periodic fire for their continued existence. Fire-dependent natural communities gradually accumulate flammable vegetation; therefore, prescribed fire reduces wildfire hazards by reducing these wild land fuels.

All prescribed burns in the Florida state park system are conducted with authorization from the FDACS, Florida Forest Service (FFS). Wildfire suppression activities in the park are coordinated with the FFS.

Objective A: Within 10 years, have 180 acres of the park maintained within the optimum fire return interval.

Action 1 Develop/update annual burn plan.

Action 2 Manage fire dependent communities by burning between 45 - 90 acres annually.

Table 5 contains a list of all fire-dependent natural communities found within the park, their associated acreage and optimal fire return interval, and the annual average target for acres to be burned.

Table 5. Prescribed Fire Management

Natural Community	Acres	Optimal Fire Return Interval (Years)
Mesic Flatwoods	168	2-3
Depression Marsh	11	2-10
Scrubby Flatwoods	0.5	5-15
Annual Target Acreage	55 – 90 Acres	

Prescribed fire is planned for each burn zone on the appropriate interval. The park's burn plan is updated annually because fire management is a dynamic process. To provide adaptive responses to changing conditions, fire management requires careful planning based on annual and very specific burn objectives. Each annual burn plan is developed to support and implement the broader objectives and actions outlined in this ten-year management plan.

Mesic flatwoods is the primary fire-type community in the park. Its fire frequency is every two to three years on average (FNAI 2010). Some of the areas that require burning are located within the corporate boundaries of the City of Yankeetown, whose ordinances prohibit open burning. Coordination with town officials will be required for completion of prescribed burning objectives. Much of the mesic flatwoods in the southern end of the park was heavily impacted by the southern pine beetle outbreak and many offsite loblolly pines were removed along with the resident slash pines. Prescribed burns will be an integral part of the restoration of the clear-cut areas and will help prevent recolonization by loblolly pines. The mesic flatwoods in the northwest corner of the park will also be managed with prescribed fire to facilitate restoration. Winter or dormant season fires may be used to reduce

fuel loading while minimizing stress on pines. Ultimately, all mesic flatwoods zones will be burned during the lightning season. Between 55 and 90 acres will need to be burned each year on average to maintain the recommended fire-return interval for mesic flatwoods

Occasionally lightning fires occur under dry conditions in the hydric hammock community within the park. Most of these fires are slow creeping fires. If these fires require suppression, staff will attempt to extinguish these fires with hand tools or allow them to burn out to avoid damaging the hydric soils with heavy equipment. The park staff will coordinate and work with the local Florida Forest Service staff regarding the development of a plan for addressing wildfire suppression within the park boundary. An element of the wildfire suppression plan may be an element regarding rehabilitation of fire lines and any other related impacts.

Maintenance of the fire-type natural communities in the park is essential for management of animal and plant species that are fire-adapted. Species like the eastern indigo snake and Florida black bear have large home ranges that may span a variety of habitats, but both rely on fire-maintained natural communities including mesic flatwoods. Fire is also a critical management tool for gopher tortoises that occur within the mesic and scrubby flatwoods. Regular burning of depression marshes maintains important breeding habitats for certain amphibian species that breed in herbaceous wetlands.

In order to track fire management activities, the DRP maintains a statewide burn database. The database allows staff to track various aspects of each park's fire management program including individual burn zone histories and fire return intervals, staff training and experience, backlog, etc. The database is also used for annual burn planning which allows the DRP to document fire management goals and objectives on an annual basis. Each quarter the database is updated and reports are produced that track progress towards meeting annual burn objectives.

Natural Community Restoration

In some cases, the reintroduction and maintenance of natural processes is not enough to reach the desired future conditions for natural communities in the park, and active restoration programs are required. Restoration of altered natural communities to healthy, fully functioning natural landscapes often requires substantial efforts that may include mechanical treatment of vegetation or soils and reintroduction or augmentation of native plants and animals. For the purposes of this management plan, restoration is defined as the process of assisting the recovery and natural functioning of degraded natural communities to desired future condition, including the re-establishment of biodiversity, ecological processes, vegetation structure and physical characters.

Examples that would qualify as natural community restoration, requiring annual restoration plans, include large mitigation projects, large-scale hardwood removal and timbering activities, roller-chopping and other large-scale vegetative modifications. The key concept is that restoration projects will go beyond management activities routinely done as standard operating procedures such as

routine mowing, the reintroduction of fire as a natural process, spot treatments of exotic plants, and small-scale vegetation management.

Following are the natural community/habitat restoration and maintenance actions recommended to create the desired future conditions in the mesic flatwoods community (see Desired Future Conditions Map).

Objective B: Conduct habitat/natural community restoration activities on 0 acres of 0 natural communities

No Restoration activities are planned.

Natural Community Improvement

Improvements are similar to restoration but on a smaller, less intense scale. This typically includes small-scale vegetative management activities or minor habitat manipulation. Following are the natural community/habitat improvement actions recommended at the park.

Objective C: Conduct natural community/habitat improvement activities on 40 acres of mesic flatwoods natural community.

Action 1 Conduct supplemental plantings of the appropriate pine species (longleaf pine and south Florida slash pine) in the mesic flatwoods.

The mesic flatwoods in Waccasassa Bay Preserve need more frequent prescribed fire, followed by planting of appropriate pine species. At the north end of the park, longleaf pine is the desired species, while at the south end south Florida slash pine or a mix of the two species may be more appropriate. Mechanical treatment may be necessary to facilitate planting and survival of pines. If possible, DRP staff should determine if wet flatwoods are also present in the park.

Imperiled Species Management

Goal: Maintain, improve or restore imperiled species populations and habitats in the park.

The DRP strives to maintain and restore viable populations of imperiled plant and animal species primarily by implementing effective management of natural systems. Single species management is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes, and should not imperil other native species or seriously compromise park values.

In the preparation of this management plan, DRP staff consulted with staff of the FWC's Imperiled Species Management or that agency's Regional Biologist and other appropriate federal, state and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant

species, DRP staff consulted with FDACS. Data collected by the USFWS, FWC, FDACS and FNAI as part of their ongoing research and monitoring programs will be reviewed by park staff periodically to inform management of decisions that may have an impact on imperiled species at the park. Management of imperiled species will be guided by Florida's Imperiled Species Management Plan (FWC 2016) and appropriate Species Action Plans.

Ongoing inventory and monitoring of imperiled species in the state park system is necessary to meet the DRP's mission. Long-term monitoring is also essential to ensure the effectiveness of resource management programs. Monitoring efforts must be prioritized so that the data collected provides information that can be used to improve or confirm the effectiveness of management actions on conservation priorities. Monitoring intensity must at least be at a level that provides the minimum data needed to make informed decisions to meet conservation goals. Not all imperiled species require intensive monitoring efforts on a regular interval. Priority must be given to those species that can provide valuable data to guide adaptive management practices. Those species selected for specific management action and those that will provide management guidance through regular monitoring are addressed in the objectives below.

Objective A: Update baseline imperiled species occurrence inventory lists for plants and animals.

Objective B: Monitor and document 5 selected imperiled animal species in the park.

Action 1 Develop monitoring protocols for 5 selected imperiled animal species.

Action 2 Implement monitoring protocols for 5 imperiled animal species including Florida scrub-jay, eastern indigo snake, Florida salt marsh vole, Scott's seaside sparrow and Marian's marsh wren.

Monitoring of Florida scrub-jays in cooperation with FWC, Audubon Jay Watch, and park volunteers on the adjacent Cedar Key Scrub State Reserve will document any scrub-jays that cross over into Waccasassa Bay Preserve. Documentation of sightings of eastern indigo snakes will provide important information about the status of this species in the park. Any sightings of indigo snakes will be reported to FWC and the Florida Museum of Natural History. Monitoring of Scott's seaside sparrow and Marian's marsh wren will be conducted through cooperative survey efforts with FWC. Any additional monitoring of the salt marsh vole will be conducted by FWC and the University of Florida in cooperation with the USFWS.

Objective C: Monitor and document 2 selected imperiled plant species in the park.

Action 1 Develop monitoring protocols for 2 selected imperiled plant species including coralberry and Florida pinkroot.

Action 2 Implement monitoring protocols for 2 imperiled plant species.

A floristic study within the park documented and vouchered both coralberry and Florida pinkroot (Abbott 1998). District and park staff will develop and implement a monitoring plan to identify and document additional populations of these species within the park. The park will also continue to cooperate with FNAI and other researchers in documenting imperiled plants within the park.

Exotic Species Management

Goal: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.

The DRP actively removes invasive exotic species from state parks, with priority being given to those causing the ecological damage. Removal techniques may include mechanical treatment, herbicides or biocontrol agents.

Objective A: Annually treat 3 acres of exotic plant species in the park.

Action 1 Annually develop/update exotic plant management work plan.

Action 2 Implement annual work plan by treating 3 acres in the park annually and continuing maintenance and follow-up treatments, as needed.

In addition to treating Brazilian pepper and the other exotics in-house, District 2 staff should continue efforts to obtain a survey of all Brazilian pepper in the park. Once this information is available, staff will seek funding for initial and maintenance treatment of all known infestations of Brazilian pepper in the park.

Objective B: Prevent the introduction and spread of invasive exotic plants into the park.

Action 1 Develop and implement preventative measures to avoid the introduction and spread of invasive exotic plants in the park.

Invasive exotic plants are often introduced or spread to natural areas on equipment, in fill dirt or mulch, and in ornamental plantings. The park should develop and implement preventative measures that reduce the likelihood of introducing and spreading invasive exotic plants in the park. This would include inspecting equipment and fill dirt to ensure that everything entering the park is free of exotics.

Objective C: Survey the entire park for invasive exotics at least 1 time over 10 years.

Action 1 Develop and implement a method of surveying the entire park for invasive exotic plants one time over the course of 10 years.

Because the park has populations of Brazilian pepper, is remote, and has difficult access, DRP staff should seek creative mechanisms for surveying the park for Brazilian pepper. This would allow staff to target their treatment efforts and seek funding to treat specific areas.

Objective D: Implement control measures on 1 exotic animal species in the park.

Action 1 Evaluate current methods of controlling hogs in the park and implement additional methods where possible.

Feral hog rooting in the park has caused observable damage to native groundcover species and wetlands. The park should continue to evaluate its current methods of controlling hogs and implement additional methods where possible to increase the number of hogs removed. Efforts should focus on finding methods that capture the entire sounder.

Cultural Resource Management

Cultural resources are individually unique, and collectively, very challenging for the public land manager whose goal is to preserve and protect them in perpetuity. The DRP will implement the following goals, objectives and actions, as funding becomes available, to preserve the cultural resources found in Waccasassa Bay Preserve State Park.

Goal: Protect, preserve and maintain the cultural resources of the park.

The management of cultural resources is often complicated because these resources are irreplaceable and extremely vulnerable to disturbances. The advice of historical and archaeological experts is required in this effort. All activities related to land clearing, ground disturbing activities, major repairs or additions to historic structures listed or eligible for listing in the National Register of Historic Places must be submitted to the FDOS, Division of Historical Resources (DHR) for review and comment prior to undertaking the proposed project. Recommendations may include, but are not limited to concurrence with the project as submitted, pre-testing of the project site by a certified archaeological monitor, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effect. In addition, any demolition or substantial alteration to any historic structure or resource must be submitted to the DHR for consultation and the DRP must demonstrate that there is no feasible alternative to removal and must provide a strategy for documentation or salvage of the resource. Florida law further requires that DRP consider the reuse of historic buildings in the park in lieu of new construction and must undertake a cost comparison of new development versus rehabilitation of a building before electing to construct a new or replacement building. This comparison must be accomplished with the assistance of the DHR.

Objective A: Assess and evaluate 6 of 75 recorded cultural resources in the park.

Action 1 Complete 6 assessments/evaluations of archaeological sites. Prioritize preservation and stabilization projects.

No Historic Structure Reports are needed because there are no historic structures.

Archaeological sites Waccasassa Bay Preserve are currently subject to greater wave action, higher tidal surges, and unknown changes due to global sea level rise. As the threat of significant disturbance from these factors along this coastline region increases, additional precautions may be needed within the preserve, including more intensive archaeological evaluation.

Over the life of this plan, DRP staff should consult with DHR and develop an approach to assessing all the cultural sites in priority order of vulnerability to looting, erosion, and ease of access. Due to the remoteness of the park and its difficulty of access, the stated goal is to assess only 6 sites, however DRP staff will assess as many sites as possible over the life span of this plan. National Register listed or eligible sites should be given the highest priority initially.

Objective B: Compile reliable documentation for all recorded historic and archaeological resources.

- Action 1 Ensure all known sites are recorded or updated in the Florida Master Site File.
- Action 2 Seek assistance to conduct Phase 1 archaeological survey for high and medium priority areas identified by the predictive model (Collins et al. 2012)
- Action 3 Collaborate with DHR to encourage research into the aboriginal people who inhabited this area of the Gulf coast, including their culture.
- Action 4 Conduct oral history interviews to gather historical information about Gulf Hammock.

Ideally, more archaeological information should be gathered from sites before they are inundated or eroded by sea level rise, which is already observable in the park. Staff should communicate with BNCR and DHR to determine if resources are available to conduct additional research on archaeological sites within the park. The DRP should continue to collaborate with archaeological researchers.

Objective C: Bring 0 of 73 recorded cultural resources into good condition.

- Action 1 Design and implement a practical monitoring programs for the cultural sites within the park.

Because of the remote nature of the park and its limited access, even for DRP staff, the first need is to develop a practical monitoring method for cultural sites within the park. Staff should collaborate with BNCR and the Division of Historic Resources to develop a practical approach to monitoring the cultural sites. A discussion of any need, practicality and plan for cyclical maintenance should be included in the monitoring plan. For this property, monitoring is probably much more important than maintenance.

Special Management Considerations

Timber Management Analysis

Chapters 253 and 259, Florida Statutes, require an assessment of the feasibility of managing timber in land management plans for parcels greater than 1,000 acres if the lead agency determines that timber management is not in conflict with the primary management objectives of the land. The feasibility of harvesting timber at this park during the period covered by this plan was considered in context of the DRP's statutory responsibilities and an analysis of the park's resource needs and values. The long-term management goal for forest communities in the state park system is to maintain or re-establish old-growth characteristics to the degree practicable, with the exception of those communities specifically managed as early successional.

Waccasassa Bay Preserve State Park (Waccasassa Bay) is designated as a single-use park. As such, timber management is only permitted as a method of natural community restoration and maintenance rather than as an ongoing extractive activity. The feasibility of managing/harvesting timber at Waccasassa Bay during the period covered by the UMP was considered pursuant to the DRP statutory responsibilities to analyze the park's resource needs and values. The long-term management goal for forest communities in the state park system is to maintain or re-establish natural characteristics to the degree practicable, except in those natural communities specifically managed for a structure that differs from that described in the timber assessment found at reference sites for those communities established by the Florida Natural Areas Inventory (FNAI). In the case of imperiled species, the management of certain natural communities may differ from standard treatments to provide optimum habitat conditions within the park.

Most natural communities evaluated at Waccasassa Bay had pine overstory stocking levels within the range identified for corresponding FNAI Reference Sites. Conversely, most natural communities evaluated at the park had non-pine (hardwood) overstory stocking levels above the range identified for corresponding FNAI Reference Sites. The Timber Management Analysis found in Addendum 8 provides additional details. Overstory thinning is a management tool that may be utilized in areas which have overstocked conditions. However, the specific management goals and objectives for each natural community are detailed in the Resource Management Component.

Arthropod Control Plan

All DRP lands are designated as "environmentally sensitive and biologically highly productive" in accordance with Ch. 388 and Ch. 388.4111 Florida Statutes. If a local mosquito control district proposes a treatment plan, the DRP works with the local mosquito control district to achieve consensus. By policy of DEP since 1987, aerial adulticiding is not allowed, but larviciding and ground adulticiding (truck spraying in public use areas) is typically allowed. The DRP does not authorize new physical alterations of marshes through ditching or water control structures. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation.

Waccasassa Bay Preserve State Park does not have an Arthropod Management Plan.

Sea Level Rise

Potential sea level rise is now under study and will be addressed by Florida's residents and governments in the future. The DRP will stay current on existing research and predictive models, in coordination with other DEP programs and federal, state, and local agencies. The DRP will continue to observe and document the changes that occur to the park's shorelines, natural features, imperiled species populations, and cultural resources. This ongoing data collection and analysis will inform the Division's adaptive management response to future conditions, including the effects of sea level rise, as they develop.

At Waccasassa Bay Preserve, sea level rise has dramatically influenced both natural and cultural resources of the park as described above under the hydrology, natural communities and cultural sections of this plan.

Sea level rise, substantial changes to the Floridan aquifer, salt water intrusion and abnormal storm surge events have all contributed to regional vegetation die-off's within the coastal hydric hammock communities of the preserve. As these important upland habitats are lost and limestone platform base soils are scoured and eroded through natural forces, large numbers of archaeological sites have been and will continue to be displaced or destroyed. Specific alterations that are occurring are hydric hammock communities being converted into salt-dominated communities, conversion of freshwater wetlands into brackish systems, and erosion and loss of important archeological resources.

Planning efforts concerning these changes will need well thought out monitoring and research initiatives in order for park staff to best preserve, protect and conserve these resources at risk.

Additional Considerations

Levy County's population is growing at a steady rate like the majority of the state of Florida. This growth is causing northward expansion toward Cedar Key Scrub and Waccasassa Bay Preserve at a steady rate. Parcels within the optimum boundary should be monitored and pursued as they become available to prevent encroachment on the parks.

Resource Management Schedule

A priority schedule for conducting all management activities that is based on the purposes for which these lands were acquired, and to enhance the resource values, is located in the Implementation Component of this management plan.

Land Management Review

Section 259.036, Florida Statutes, established land management review teams to determine whether conservation, preservation and recreation lands titled in the name of the Board of Trustees are being managed for the purposes for which they were acquired and in accordance with their approved land management plans. The considered recommendations of the land management review team and updated this plan accordingly.

Waccasassa Bay Preserve State Park was subject to a land management review on November 5, 2013 and August 17, 2018. The review team made the following determinations:

- The land is being managed for the purpose for which it was acquired.
- The actual management practices, including public access, complied with the management plan for this site.

LAND USE COMPONENT

Introduction

Land use planning and park development decisions for the state park system are based on the dual responsibilities of the Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP). These responsibilities are to preserve representative examples of original natural Florida and its cultural resources, and to provide outdoor recreation opportunities for Florida's citizens and visitors.

The general planning and design process begins with an analysis of the natural and cultural resources of the unit, and then proceeds through the creation of a conceptual land use plan that culminates in the actual design and construction of park facilities. Input to the plan is provided by experts in environmental sciences, cultural resources, park operation and management. Additional input is received through public workshops, and through environmental and recreational-user groups. With this approach, the DRP objective is to provide quality development for resource-based recreation throughout the state with a high level of sensitivity to the natural and cultural resources at each park.

This component of the unit plan includes a brief inventory of the external conditions and the recreational potential of the unit. Existing uses, facilities, special conditions on use, and specific areas within the park that will be given special protection, are identified. The land use component then summarizes the current conceptual land use plan for the park, identifying the existing or proposed activities suited to the resource base of the park. Any new facilities needed to support the proposed activities are expressed in general terms.

External Conditions

An assessment of the conditions that exist beyond the boundaries of the unit can identify any special development problems or opportunities that exist because of the unit's unique setting or environment. This also provides an opportunity to deal systematically with various planning issues such as location, regional demographics, adjacent land uses and park interaction with other facilities.

Waccasassa Bay Preserve State Park is located within Levy County, about 1 mile east of Cedar Key and about 1 mile north of Yankeetown in the north central part of the state. Approximately 261,000 people live within 30 miles of the park (U.S. Census 2010). According to U.S. Census data (2010), approximately 15% of residents in Levy County identify as black, Hispanic or Latino, or another minority group. About 62% of the population in Levy County is considered to be of working age, which is defined as being between 16 and 65 years old. In 2015, Levy County’s per capita personal income ranked 40th in the state at $32,457, below the statewide average of $42,429 (U.S. Bureau of Economic Analysis 2016).

The table below identifies significant resource-based recreation opportunities within 15 miles of Waccasassa Bay Preserve State Park. Property managers include the U.S. Fish and Wildlife Service (USFWS), Florida Department of Environmental Protection (FDEP), Suwannee River Water Management District (SRWMD), Florida Forest Service (FFS), and Levy County.

Table 6. Resource-Based Recreational Opportunities Near Waccasassa Bay Preserve State Park

Name	Biking	Hiking	Swim / Beach Access	Boating / Paddling	Fishing	Wildlife Viewing	Overnight Stay	Hunting	Equestrian Facilities
Lower Suwannee National Wildlife Refuge (USFWS)					✓	✓		✓	
Cedar Key Scrub State Reserve (FDEP)	✓	✓		✓	✓	✓		✓	✓
Cedar Keys National Wildlife Refuge (USFWS)				✓	✓	✓			
Upper Waccasassa Conservation Area (SRWMD)	✓	✓			✓	✓		✓	✓
Big Bend Seagrasses Aquatic Preserve (FDEP)			✓	✓	✓	✓			
Goethe State Forest (FFS)	✓	✓			✓	✓	✓	✓	✓
Withlacoochee Gulf Preserve (Levy County)		✓		✓		✓			
Marjorie Harris Carr Cross Florida Greenway State Recreation and Conservation Area (FDEP)	✓	✓		✓	✓	✓	✓		✓
Crystal River Preserve State Park (FDEP)	✓	✓		✓	✓	✓			

The park is located in the North Central Vacation Region, which includes Alachua, Bradford, Columbia, Dixie, Gadsden, Gilchrist, Hamilton, Jefferson, Lafayette, Leon, Levy, Madison, Suwannee, Taylor, Union, and Wakulla counties (Visit Florida 2014). According to the 2014 Florida Visitor Survey, approximately 1.8% of domestic visitors to Florida visited this region. Roughly 89% visitors to the region traveled to the North Central for leisure purposes. The top activities for domestic visitors were visiting friends or relatives. Winter (36%) was the

most popular travel season, but fall visitation was a close second at 34%. Nearly all visitors traveled by non-air (91%), reporting an average of 3.7 nights and spending an average of $63 per person per day (Visit Florida 2014).

Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicates that participation rates in this region for freshwater beach activities, saltwater boat fishing, saltwater and freshwater boat ramp use, freshwater (boat and non-boat) fishing, paddling, visiting archaeological and historic sites, wildlife viewing, nature study, bicycle riding, hiking, horseback riding, picnicking, camping, and hunting are higher than the state average with demand for additional facilities increasing through 2020 (FDEP 2013).

Existing Use of Adjacent Lands

A majority, if not all, of the lands adjacent to Waccasassa Bay Preserve State Park are undeveloped. The NATC Gulf Hammock Conservation Easement is along nearly the entire northern boundary of the park. Forestry operations are prioritized in the areas around the park, and residential development is essentially non-existent. The southeastern tip of the park boundary abuts the municipal jurisdiction of Yankeetown.

Planned Use of Adjacent Lands

The Levy County future land use map indicates that all of the lands surrounding Waccasassa Bay Preserve State Park have a future land use designation of forestry/rural residential. According to the Levy County Land Development Code (2016), forest products are an essential part of the local economy and preserving this land base from encroaching uses is essential. As such, the forestry/rural residential district is intended to allow limited low-density residential and prioritize commercial forests.

Florida Greenways and Trails System (FGTS)

The Florida Greenways and Trails System (FGTS) is made up of existing, planned and conceptual non-motorized trails and ecological greenways that form a connected, integrated statewide network. The FGTS serves as a green infrastructure plan for Florida, tying together the greenways and trails plans and planning activities of communities, agencies and non-profit organizations throughout Florida. Trails include paddling, hiking, biking, multi-use and equestrian trails. The Office of Greenways and Trails maintains a priority trails map and gap analysis for the FGTS to focus attention and resources on closing key gaps in the system.

In some cases, existing or planned priority trails run through or are adjacent to state parks, or they may be in close proximity and can be connected by a spur trail. State parks can often serve as trailheads, points-of-interest, and offer amenities such as camping, showers and laundry, providing valuable services for trail users while increasing state park visitation.

The Florida Circumnavigational Saltwater Paddling Trail, or the CT, spans 1,515 miles along Florida's coast, from Big Lagoon State Park in Pensacola to Fort Clinch State Park north of Jacksonville. Segment 6 (the Big Bend segment) spans 153.5 miles, beginning at the Lower Aucilla River launch and ending at the Cross Florida Greenway spoil island campsite near Yankeetown. This segment runs past Waccasassa Bay Preserve State Park, and paddlers can access four primitive campsites (Hall Creek, Kelly Creek, Waccasassa River, and Turtle Creek) on the park property.

Property Analysis

Effective planning requires a thorough understanding of the unit's natural and cultural resources. This section describes the resource characteristics and existing uses of the property. The unit's recreation resource elements are examined to identify the opportunities and constraints they present for recreational development. Past and present uses are assessed for their effects on the property, compatibility with the site, and relation to the unit's classification.

Recreational Resource Elements

This section assesses the park's recreational resource elements, those physical qualities that, either singly or in certain combinations, can support various resource-based recreation activities. Breaking down the property into such elements provides a means for measuring the property's capability to support potential recreational activities. This process also analyzes the existing spatial factors that either favor or limit the provision of each activity.

Land Area

Waccasassa Bay State Preserve is one of the most remote areas in the state. The preserve has been designated as a National Natural Landmark, providing an extensive, undisturbed example of the coastal ecosystems that occur in northern Florida. There is currently limited public upland access to the site, and recreational uses are focused on the water resources of the preserve.

Water Area

The property encompasses an expansive stretch of salt marsh, dotted with picturesque wooded islands, interlaced by numerous tidal creeks. The extensive salt marshes and tidal creeks are breeding and nursery areas for hundreds of species of saltwater fish and shellfish. Waccasassa Bay has the distinction of containing one of the northernmost mangrove forests in Florida, providing essential habitat to large numbers of water birds that breed in the preserve. The unique ecosystem in Waccasassa makes for an exceptional place for bird-watching and over-all wildlife observation. The Waccasassa River roughly divides the preserve in two as it drains into the Gulf of Mexico. The Waccasassa River and Bay offers opportunity for paddling, boating and fishing as this park is only accessible by boat.

Natural Scenery
The horizon-to-horizon expanses of salt marsh are broken up with dense tree-islands of red cedar, cabbage palm and live oak. The islands, tidal creeks, and salt marshes provide a scenic backdrop for boating, fishing, and wildlife observation. The hydric hammock that borders the estuary is one of the last remaining remnants of the once vast Gulf Hammock. It is now protected as a reminder of the expansive hardwood forest that was once a feature of Florida's outstanding natural areas. The Waccasassa River also provides a unique boating experience as it passes through the hydric hammock, through the estuary and drains into the Gulf of Mexico.

Significant Habitat
Many endangered and threatened species are found or have historically been found within the preserve's boundaries. Active bald eagle nests have been consistently recorded within the preserve by the FWC. Turtles such as the Kemp's ridley turtle, green turtle and loggerhead turtle have been identified using the seagrass beds and other estuarine and marine communities in the preserve. The West Indian manatee also uses the estuarine communities of the preserve and the Waccasassa River. Many other endangered animals and plants are also known to be present in the preserve such as black bears, Florida salt marsh voles, indigo snakes, Florida pinkroot, and pinewood dainties. The presence of these rare plants and animals attracts visitors interested in seeing rare Florida habitat and outstanding Florida waters.

Natural Features
The extensive limestone outcroppings in the preserve are a notable geologic feature. The flatness of the topography at the coast creates interesting opportunities for the study of effects of sea level rise. A unique botanical feature of the preserve is the number of plant species occurring either at the northern or southern limits of their ranges. The expansive 19,000 acres of salt marsh and tidal creeks are the dominant features of this park and make for beautiful and unique Florida scenery. The park's uplands protect a remnant of the Gulf Hammock that once spanned thousands of acres between the Suwannee and Withlacoochee rivers. Those marshes and the creeks contained within them provide important estuarine habitat for many of Florida's salt water sport fish. Waccasassa Bay's tidal marshes are also home to the endangered Florida salt marsh vole. The integrated estuarine ecosystem of the Waccasassa Bay Preserve State Park provides for sweeping vistas of natural landscapes uninterrupted by buildings, powerlines, and bridges.

Archaeological and Historical Features
The cultural and historical resources of Waccasassa Bay Preserve State Park are extensive. The Florida Master Site File (FMSF) lists 75 sites within the unit. The vast majority of the recorded sites are shell middens; most of them are classified as eroding. In most cases, the erosion is due to natural processes such as tidal fluctuations, stream flow, storm surges and rain events. Other documented aboriginal sites include camps, lithic scatters, village/habitation sites, and two burial mounds (Jones and Borremans 1991, Jones 1993,

Vojnovski et al, 2000). In addition to prehistoric sites, there are numerous historical resources within the preserve. There are remnants of a salt works in the northern portion of the preserve that dates from the mid-to-late nineteenth century (Dickinson and Edwardson 1984). Various other documented and undocumented historical resources occur scattered throughout the preserve. Documented resources include an old hearth, a moonshine still site, a cow pen, and a territorial fort called Fort Three. This unique Fort Three, which was once located at the mouth of the Waccasassa River, no longer exists due to natural erosion. Undocumented cultural resources include several possible wells (up to four known locations) scattered throughout the preserve.

Assessment of Use

All legal boundaries, significant natural features, structures, facilities, roads and trails existing in the unit are delineated on the base map (see Base Map). Specific uses made of the unit are briefly described in the following sections.

Past Uses

The uplands within the preserve were used for timber production, hunting and cattle grazing before acquisition by the state.

Future Land Use and Zoning

The DRP works with local governments to establish designations that provide both consistency between comprehensive plans and zoning codes and permit typical state park uses and facilities necessary for the provision of resource-based recreation.

The Future Land Use and zoning designation for the park is Natural Reservation (NR). Development of structures within the NR category shall be limited to the type and intensity that is compatible with the operation and management of these areas (Levy County 2016). Existing land use and zoning designations are consistent with current and projected future uses of the park.

Current Recreational Use and Visitor Programs

The current recreational activities are associated with the water resources of the preserve. Fishing in the Waccasassa River and the numerous tidal creeks is the primary recreational pursuit at the unit. Boaters and anglers in the preserve have an opportunity to experience a large segment of unspoiled Florida wilderness. The shallow waters of the preserve are ideal for canoeing and kayaking. The preserve also offers excellent opportunities for nature study and wildlife observation.

Waccasassa Bay Preserve State Park recorded 109,230 visitors in FY 2017/2018. By DRP estimates, the FY 2017/2018 visitors contributed $8.9 million in direct economic impact, the equivalent of adding 125 jobs to the local economy (FDEP 2018).

Other Uses
The nearly pristine condition of the property makes it an ideal site to study natural ecosystems. Researchers from the University of Florida and other institutions have conducted various studies within the preserve.

Protected Zones
A protected zone is an area of high sensitivity or outstanding character from which most types of development are excluded as a protective measure. Generally, facilities requiring extensive land alteration or resulting in intensive resource use, such as parking lots, camping areas, shops or maintenance areas, are not permitted in protected zones. Facilities with minimal resource impacts, such as trails, interpretive signs and boardwalks are generally allowed. All decisions involving the use of protected zones are made on a case-by-case basis after careful site planning and analysis.

At Waccasassa Bay Preserve State Park all wetlands and floodplain as well as known imperiled species habitats have been designated as protected zones. The park's current protected zone is delineated on the Conceptual Land Use Plan.

Existing Facilities

Waccasassa Bay has limited recreational and support facilities due to the natural communities present at the park (see Base Map). Support facilities for the park are shared with Cedar Key Scrub State Reserve.

Recreation Facilities
Parkwide
Primitive Campsites (4)

Conceptual Land Use Plan

The following narrative represents the current conceptual land use proposal for this park. The conceptual land use plan is the long-term, optimal development plan for the park, based on current conditions and knowledge of the park's resources, landscape and social setting (see Conceptual Land Use Plan). The conceptual land use plan is modified or amended, as new information becomes available regarding the park's natural and cultural resources or trends in recreational uses, in order to adapt to changing conditions. Additionally, the acquisition of new parkland may provide opportunities for alternative or expanded land uses. The DRP develops a detailed development plan for the park and a site plan for specific facilities based on this conceptual land use plan, as funding becomes available.

During the development of the conceptual land use plan, the DRP assessed the potential impact of proposed uses or development on the park resources and applied that analysis to determine the future physical plan of the park as well as the scale and character of proposed development. Potential resource impacts are also identified and assessed as part of the site planning process once funding is available for facility development. At that stage, design elements (such as existing topography and vegetation, sewage disposal and stormwater management) and design constraints

(such as imperiled species or cultural site locations) are investigated in greater detail. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Creation of impervious surfaces is minimized to the greatest extent feasible in order to limit the need for stormwater management systems, and all facilities are designed and constructed using best management practices to limit and avoid resource impacts. Federal, state and local permit and regulatory requirements are addressed during facility development. This includes the design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, park staff monitors conditions to ensure that impacts remain within acceptable levels.

Potential Uses

Public Access and Recreational Opportunities

Goal: Provide public access and recreational opportunities in the park.

The existing recreational activities and programs of this state park are appropriate to the natural and cultural resources contained in the park and should be continued. New and improved activities and programs are also recommended and discussed below.

Objective: Maintain the park's current recreational carrying capacity of 32 users per day.

Despite its size, Waccasassa Bay has a limited carrying capacity due to the natural limitations on recreational opportunities at the park. Primitive camping is the only activity hosted at the park although paddlers and fisherman often explore the waters of Waccasassa Bay.

Objective: Expand the park's recreational carrying capacity by 0 users per day.

There is no proposed development which would expand the carrying capacity of Waccasassa Bay.

Objective: Continue to provide the current repertoire of 1 interpretive, educational and recreational programs on a regular basis.

Park staff hosts several guided paddles each year through the bay and many rivers and streams of the park.

Objective: Develop 2 new interpretive, educational and recreational programs.

Though not located in the park, park staff set up booths at the Cedar Key Arts Festival and the Cedar Key Seafood Festival to educate festivalgoers on the interpretive and recreational features of the park. Participation in these festivals is new and should continue into the future, perhaps expanding to new festivals and events.

WACCASASSA BAY PRESERVE
STATE PARK

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0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2012

BASE MAP

Proposed Facilities

Capital Facilities and Infrastructure

Goal: Develop and maintain the capital facilities and infrastructure necessary to implement the recommendations of the management plan.

The existing facilities of this state park are appropriate to the natural and cultural resources contained in the park and should be maintained. New construction, as discussed further below, is recommended to improve the quality and safety of the recreational opportunities, to improve the protection of park resources, and to streamline the efficiency of park operations. The following is a summary of improved and new facilities needed to implement the conceptual land use plan for Waccasassa Bay Preserve State Park:

Objective: Maintain all public and support facilities in the park.

All capital facilities, trails and roads within the park will be kept in proper condition through the daily or regular work of park staff and/or contracted help.

Objective: Improve/repair 4 existing facilities.

Major repair projects for park facilities may be accomplished within the ten-year term of this management plan, if funding is made available. These include the modification of existing park facilities to bring them into compliance with the Americans with Disabilities Act (a top priority for all facilities maintained by DRP). The following discussion of other recommended improvements and repairs are organized by use area within the park.

The four existing primitive campsites should be improved and maintained to provide exemplary paddle-in camping opportunities for visitors.

Objective: Construct 1 new facilities.

A Wilderness Preserve designation is recommended for the majority of the park. A Wilderness Preserve is an area within a state park that retains its primeval character and is managed to preserve and interpret its natural character and values. A designated Wilderness Preserve generally appears to have been shaped by the unaltered forces of nature, with the imprint of human influence substantially unnoticeable. A Wilderness Preserve offers outstanding opportunities for the conditions of solitude and remoteness that are essential for a wilderness experience. The area may contain environmental, archaeological, or other kinds of features of scenic, educational, natural, or historic value. Facilities are often limited to those considered essential for resource management and for the specified public uses.

The area proposed for designation as a Wilderness Preserve consists of approximately 33,826 acres along the Gulf of Mexico, Waccasassa Bay and several rivers and includes basin swamp, hydric hammock, salt marsh, and estuarine composite substrate natural communities. This will provide for

interpretive opportunities for visitors and may be accessed by boat or canoe to explore the numerous channels, creeks, and rivers within the park.

Facilities Development

Preliminary cost estimates for these recommended facilities and improvements are provided in the Ten-Year Implementation Schedule and Cost Estimates (Table 8) located in the Implementation Component of this plan. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist DRP in budgeting future park improvements, and may be revised as more information is collected through the planning and design processes. New facilities and improvements to existing facilities recommended by the plan include:

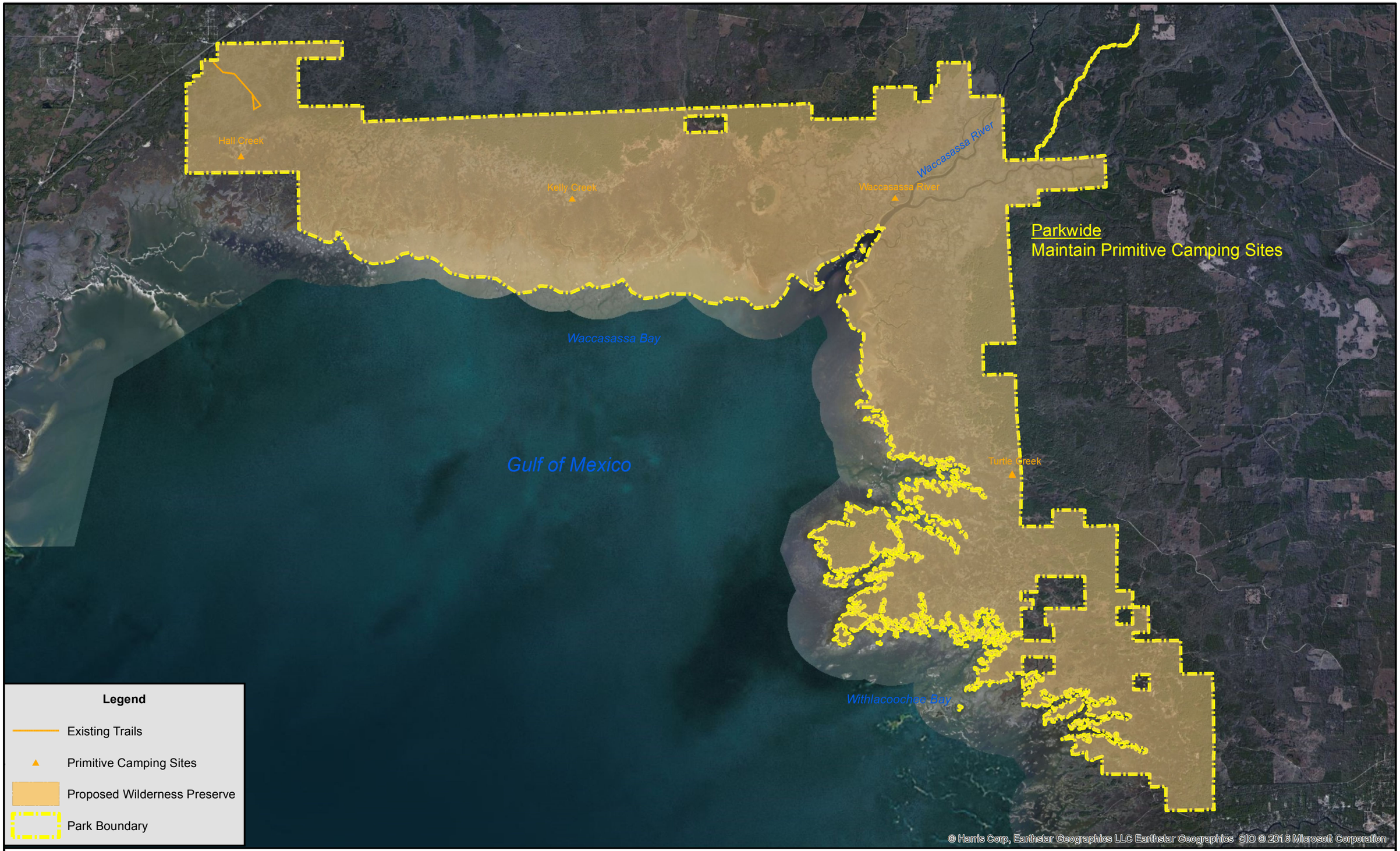
Recreation Facilities

Parkwide
Maintain existing primitive campsites (4)
Designate park as a Wilderness Preserve

Recreational Carrying Capacity

Carrying capacity is an estimate of the number of users a recreation resource or facility can accommodate and still provide a high quality recreational experience and preserve the natural values of the site. The carrying capacity of a unit is determined by identifying the land and water requirements for each recreation activity at the unit, and then applying these requirements to the unit's land and water base. Next, guidelines are applied which estimate the physical capacity of the unit's natural communities to withstand recreational uses without significant degradation. This analysis identifies a range within which the carrying capacity most appropriate to the specific activity, the activity site and the unit's classification is selected (see Table 7).

The recreational carrying capacity for this park is a preliminary estimate of the number of users the unit could accommodate after the current conceptual development program has been implemented. When developed, the proposed new facilities would approximately increase the unit's carrying capacity as shown in Table 7.



WACCASASSA BAY
PRESERVE STATE PARK

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0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

CONCEPTUAL LAND USE PLAN

Table 7. Recreational Carrying Capacity						
	Existing		Proposed		Estimated	
Activity / Facility	One Time	Daily	One Time	Daily	One Time	Daily
Camping						
Primitive	32	32	0	0	32	32
TOTAL	**32**	**32**	**0**	**0**	**32**	**32**

*Existing capacity revised from approved plan according to DRP guidelines.

Optimum Boundary

The optimum boundary map reflects lands considered desirable for direct management by the DRP as part of the state park. These parcels may include public or privately owned land that would improve the continuity of existing parklands, provide the most efficient boundary configuration, improve access to the park, provide additional natural and cultural resource protection or allow for future expansion of recreational activities. Park lands that are potentially surplus to the management needs of DRP are also identified. Park Planning consulted with District and Park staff to determine if any lands could be considered surplus to the needs of the park. As additional needs are identified through park use, development, and research, and as land use changes on adjacent property, modification of the park's optimum boundary may be necessary.

Identification of parcels on the optimum boundary map is intended solely for planning purposes. It is not to be used in connection with any regulatory purposes. Any party or governmental entity should not use a property's identification on the optimum boundary map to reduce or restrict the lawful rights of private landowners. Identification on the map does not empower or suggest that any government entity should impose additional or more restrictive environmental land use or zoning regulations. Identification should not be used as the basis for permit denial or the imposition of permit conditions.

The rate of population growth in western Levy County is relatively low in comparison to that of other, more southerly counties along the Gulf Coast. However, the Cedar Key residential area is expanding northward at a steady rate along State Road 24 into uplands near Waccasassa Bay Preserve. The narrow strip of uplands between Cedar Key Scrub State Reserve and Waccasassa Bay Preserve State Park along State Road 24 encompasses only about 400 acres, so developable real estate in proximity to the town of Cedar

Key is at a premium. Most of these lands are included within the Optimum Boundaries for Waccasassa Bay Preserve and Cedar Key Scrub State Reserve. A development company acquired much of this land for the construction of home sites. At one point, a golf course was even considered. An already platted subdivision adjacent to Cedar Key Scrub State Reserve was purchased by the same company, and single-family residential lots were sold despite attempts by the State to purchase this property. Even scattered development outside the park can severely hamper the proper management and preservation of the natural resources within the park.

Fortunately, the optimum boundary parcels south of SR 24, originally purchased for development, have now been incorporated into the Florida Gulf Coast Mitigation Bank. As the wetlands and uplands in the mitigation bank are restored, and the credits are sold, it is likely that the properties will be transferred into public ownership for management in perpetuity.

Encompassed within the relatively narrow confines of the Additions & Inholdings projects for Waccasassa Bay Preserve State Park and Cedar Key Scrub State Reserve are such disparate natural communities as scrub, scrubby flatwoods, hydric hammock, and salt marsh. These communities form the Cedar Key Scrub/Gulf Hammock complex that has long been recognized as one of the state's truly unique natural systems. The area attracts much research interest because of the geographic isolation of its wildlife populations and its abundance of rare and threatened plant and animal species.

Waccasassa Bay Preserve also includes numerous small and large private inholdings within the hydric hammock and estuarine areas. Access to these private parcels across state lands has had direct impacts on park property, particularly in wetland areas. Acquisition of these inholdings would allow restoration of these access routes and would prevent further damage to park lands.

Acquisition of the Additions and Inholdings parcels would preserve the linkages among the natural areas of this remarkable region. It would greatly enhance the prospect that one day a continuous band of public land would extend north from Yankeetown through the Big Bend region of the Gulf Coast. Completion of these acquisition projects would save unspoiled salt marshes that provide the last refuge for the endangered Florida salt marsh vole. Cultural resources, including at least three archaeological sites registered in the Florida Master Site File, would also be protected. The long-term preservation of the park and all of its components depends on the future protection and preservation of the entire ecosystem within which it lies.

Legend

Acquisition

Park Boundary

bing™

WACCASASSA BAY
PRESERVE STATE PARK

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0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

OPTIMUM BOUNDARY MAP

IMPLEMENTATION COMPONENT

The resource management and land use components of this management plan provide a thorough inventory of the park's natural, cultural and recreational resources. They outline the park's management needs and problems, and recommend both short and long-term objectives and actions to meet those needs. The implementation component addresses the administrative goal for the park and reports on the Division of Recreation and Parks (DRP) progress toward achieving resource management, operational and capital improvement goals and objectives since approval of the previous management plan for this park. This component also compiles the management goals, objectives and actions expressed in the separate parts of this management plan for easy review. Estimated costs for the ten-year period of this plan are provided for each action and objective, and the costs are summarized under standard categories of land management activities.

MANAGEMENT PROGRESS

Since the approval of the last management plan for Waccasassa Bay Preserve State Park in 2005, significant work has been accomplished and progress made towards meeting the DRP's management objectives for the park. These accomplishments fall within three of the five general categories that encompass the mission of the park and the DRP.

Acquisition

- In 2010 DSL received a donation of a 640 acre outparcel (Diamond parcel) which was leased to the park for management.
- Currently working with FDOT on possible mitigation options for additions to the park.
- Continue to work with State Lands on acquisitions within Optimum Boundary

Park Administration and Operations

- Since 2005 approximately 1,281 volunteer hours have been contributed to the park to assist with park maintenance, visitor services, administration, interpretation, protection and resource management activities.

Resource Management

Natural Resources

- 2013 Mesic Flatwoods timber thinning restoration project with assistance of FFS
- From 2010-13 numerous fire equipment updates including ATV 12-gallon water tank UTV 25-gallon, Type 6 engine pump, plumbing and safety lights, and repairs to engine water fill plumbing
- From 2005 to 2017, over 270 acres burned.
- In 2010, cooperated with University of Florida (UF) USFWS Cooperative Fish & Wildlife Research Unit for an assessment of the federally imperiled saltmarsh

vole. In 2013 multiple successful trappings of Florida Saltmarsh Vole within WBPSP boundaries
- 2009-10 Received FWC Invasive Plant Management (IPM) grant to retreat cogon grass
- 2010-11 Received IPM grant to retreat cogon grass
- 2011-12 Received IPM grant to retreat cogon grass
- 2013-14 Received IPM grant to retreat cogon grass
- 2005-2017 – over 165 acres of exotic plants treated
- 2012-13 Acquired two feral hog traps in Preserve
- Secured FDEP Springs Initiative funding in 2009-10 and cooperatively implemented Thermal Imaging project with USGS
- Continued cooperation with SRWMD on numerous MFL issues for the Waccasassa River including review of final MFL that was adopted in 2006
- Worked through FDEP Office of Water Policy on numerous MFL issues including annual priority lists.
- Ongoing mapping of culverts and wells throughout Preserve

Cultural Resources

- The park underwent a cultural resource Predictive Model Assessment in 2011. The outcome of the predictive model assessment will be used to further understand the placement of protected zones in the park.

Recreation and Visitor Services

- In 2011 the Citizen Support Organization for Cedar Key Museum State Park expanded its mission to include Waccasassa Bay Preserve, and changed their name to the Friends of Cedar Key State Parks

- Development of a new park brochure to include Waccasassa Bay Preserve

Park Facilities

(Located in Cedar Key Scrub State Reserve)

- In 2012 two new volunteer RV sites were installed near the shop.
- 2015 Park office replaced outside walls and insulation.
- 2016 Office restoration project, new flooring, interior walls, and added shelf space.

MANAGEMENT PLAN IMPLEMENTATION

This management plan is written for a timeframe of ten years, as required by Section 253.034 Florida Statutes. The Ten-Year Implementation Schedule and Cost Estimates (Table 8) summarizes the management goals, objectives and actions that are recommended for implementation over this period, and beyond. Measures are identified for assessing progress toward completing each objective and action. A time frame for completing each objective and action is provided. Preliminary cost estimates for each action are provided and the estimated total costs to complete each objective are computed. Finally, all costs are consolidated under the following five standard land management categories: Resource Management, Administration

and Support, Capital Improvements, Recreation Visitor Services and Law Enforcement.

Many of the actions identified in the plan can be implemented using existing staff and funding. However, a number of continuing activities and new activities with measurable quantity targets and projected completion dates are identified that cannot be completed during the life of this plan unless additional resources for these purposes are provided. The plan's recommended actions, time frames and cost estimates will guide the DRP's planning and budgeting activities over the period of this plan. It must be noted that these recommendations are based on the information that exists at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that the DRP can adjust to changes in the availability of funds, improved understanding of the park's natural and cultural resources, and changes in statewide land management issues, priorities and policies.

Statewide priorities for all aspects of land management are evaluated each year as part of the process for developing the DRP's annual legislative budget requests. When preparing these annual requests, the DRP considers the needs and priorities of the entire state park system and the projected availability of funding from all sources during the upcoming fiscal year. In addition to annual legislative appropriations, the DRP pursues supplemental sources of funds and staff resources wherever possible, including grants, volunteers and partnerships with other entities. The DRP's ability to accomplish the specific actions identified in the plan will be determined largely by the availability of funds and staff for these purposes, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Table 8 may need to be adjusted during the ten-year management planning cycle.

Table 8
Waccasassa Bay Preserve State Park Ten-Year Implementation
Schedule and Cost Estimates Sheet 1 of 5

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Goal I: Provide administrative support for all park functions.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Continue day-to-day administrative support at current levels.**	Administrative support ongoing	C	**$83,745**
Objective B	**Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.**	Administrative support expanded	C	**$83,745**
Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Conduct/obtain an assessment of the park's hydrological needs.**	Assessment conducted	ST or LT	**$39,400**
Action 1	Continue to cooperate with other agencies and independent researchers in hydrological research and monitoring programs.	Cooperation on-going	C	$3,500
Action 2	Continue to monitor and track surface and groundwater quality issues within the region.	Monitoring on-going	C	$2,500
Action 3	Continue to monitor land use or zoning changes in the region and offer comments as appropriate.	Monitoring on-going	C	$1,500
Action 4	Seek funding for dye trace studies to determine groundwater sources for karst features within the park.	Funding acquired	ST	$400
Action 5	Conduct dye trace studies to determine groundwater sources for karst features within the park.	Project completed	UFN	$30,000
Action 6	Continue to cooperate with the SRWMD in implementation of MFLs for the park in order to ensure maintenance of historic groundwater levels.	Cooperation on-going	C	$1,500
Objective B	**Restore natural hydrological conditions and function to approximately 10 acres of hydric hammock natural community.**	# Acres restored or with restoration underway	UFN	**$3,000**
Action 1	Conduct an assessment and evaluate the hydrological impacts in the park including drainage ditches and areas where natural sheetflow has been interrupted	Assessment conducted	ST	$2,000
Action 2	Develop a hydrological restoration plan that includes prioritized projects for the park	Plan developed	ST	$1,000
Goal III: Restore and maintain the natural communities/habitats of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**

* 2015 Dollars

ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

Table 8
Waccasassa Bay Preserve State Park Ten-Year Implementation
Schedule and Cost Estimates Sheet 2 of 5

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.				
Objective A	**Within 10 years have 180 acres of the park maintained within optimal fire return interval.**	# Acres within fire return interval target	LT	**$62,000**
Action 1	Develop/update annual burn plan.	Plan updated	C	$16,000
Action 2	Manage fire dependent communities for ecosystem function, structure and processes by burning between 45 - 90 acres annually, as identified by the annual burn plan.	Average # acres burned annually	C	$46,000
Objective B	**Conduct habitat/natural community restoration activities on 0 acres of natural community.**	# Acres restored or with restoration underway	ST or LT	**$0**
Objective C	**Conduct habitat/natural community improvement activities on 40 acres of mesic flatwoods natural community.**	# Acres improved or with improvements underway	ST or LT	**$7,000**
Action 1	Conduct supplemental plantings of the appropriate pine species		ST	$7,000
Goal IV: Maintain, improve or restore imperiled species populations and habitats in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Update baseline imperiled species occurrence inventory lists for plants and animals, as needed.**	List updated	C	**$3,500**
Objective B	**Monitor and document 5 selected imperiled animal species in the park.**	# Species monitored	C	**$5,000**
Action 1	Develop monitoring protocols for 0 selected imperiled animal species	# Protocols developed	ST	$0
Action 2	Implement monitoring protocols for 5 imperiled animal species including Florida scrub-jay, eastern indigo snake, Florida salt marsh vole, Scott's seaside sparrow and Marian's marsh wren.	# Species monitored	C	$5,000
Objective C	**Monitor and document 2 selected imperiled plant species in the park.**	# Species monitored	C	**$3,500**
Action 1	Develop monitoring protocols for 2 selected imperiled plant species including coralberry and Florida pinkroot.	# Protocols developed	ST	$200
Action 2	Implement monitoring protocols for 2 including those listed in Action 1 above.	# Species monitored	C	$3,300
Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Annually treat 3 acres of exotic plant species in the park.**	# Acres treated	C	**$22,000**
Action 1	Annually develop/update exotic plant management work plan.	Plan developed/updated	C	$16,000
Action 2	Implement annual work plan by treating 3 acres in park, annually, and continuing maintenance and follow-up treatments, as needed.	Plan implemented	C	$6,000
Objective B	**Prevent the introduction and spread of invasive exotic plants into the park.**	Protocol developed	C	**$2,600**
Objective C	**Survey the entire park for invasive exotics at least 1 time over 10 years**	Survey completed	C	**$21,000**

* 2015 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

Table 8
Waccasassa Bay Preserve State Park Ten-Year Implementation
Schedule and Cost Estimates Sheet 3 of 5

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.				
Objective D	**Implement control measures on 1 exotic and nuisance animal species in the park.**	# Species for which control measures implemented	C	**$10,000**
Goal VI: Protect, preserve and maintain the cultural resources of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Assess and evaluate 6 of 75 recorded cultural resources in the park.**	Documentation complete	LT	**$10,000**
Action 1	Complete 6 assessments/evaluations of archaeological sites. Prioritize preservation and stabilization projects.	Assessments complete	LT, ST	$10,000
Objective B	**Compile reliable documentation for all recorded historic and archaeological sites.**	Documentation complete	LT or UFN	**$37,000**
Action 1	Ensure all known sites are recorded or updated in the Florida Master Site File.	# Sites recorded or updated	ST	$3,000
Action 2	Seek assistance to conduct Level 1 archaeological survey for high and medium priority areas identified by the predictive model (Collins et al. 2012)	Survey completed	UFN	$20,000
Action 3	Collaborate with DHR to encourage research into the aboriginal people and their culture who inhabited this area of the Gulf coast.	Research completed	UFN	$10,000
Action 4	Conduct oral history interviews to gather history of Gulf Hammock.	Interviews complete	LT	$4,000
Objective C	**Bring 0 of 73 recorded cultural resources into good condition.**	# Sites in good condition	LT	**$5,000**
Action 1	Design and implement a practical monitoring programs for the cultural sites within the park.	# Sites monitored	C	$5,000
Goal VII: Provide public access and recreational opportunities in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain the park's current recreational carrying capacity of 32 users per day.**	# Recreation/visitor	C	**$83,745**
Objective B	**Expand the park's recreational carrying capacity by 0 users per day.**	# Recreation/visitor	ST or LT	**$83,745**
Objective C	**Continue to provide the current repertoire of 1 interpretive, educational and recreational programs on a regular basis.**	# Interpretive/education programs	C	**$5,000**
Objective D	**Develop 2 new interpretive, educational and recreational programs.**	# Interpretive/education programs	ST or LT	**$14,000**
Goal VIII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain all public and support facilities in the park.**	Facilities maintained	C	**$125,617**

* 2015 Dollars
ST = actions within 2 years
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UFN = currently unfunded need

Table 8
Waccasassa Bay Preserve State Park Ten-Year Implementation
Schedule and Cost Estimates Sheet 4 of 5

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.				
Objective B	**Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.**	Plan implemented	ST or LT	**$0**
Objective C	**Improve and/or repair 1 existing facilities as identified in the Land Use Component.**	# Facilities/Miles of Trail/Miles of Road	LT	**$5,200**
Objective D	Construct **0 new facilites as identified in the Land Use Component.**	# Facilities/Miles of Trail/Miles of Road	LT	**$0**
Objective E	**Expand maintenance activities as existing facilities are improved and new facilities are developed.**	Facilities maintained	C	**$125,617**

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Table 8
Waccasassa Bay Preserve State Park Ten-Year Implementation
Schedule and Cost Estimates Sheet 5 of 5

NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.

Summary of Estimated Costs

Management Categories		Total Estimated Manpower and Expense Cost* (10-years)
Resource Management		$231,000
Administration and Support		$167,489
Capital Improvements		$130,817
Recreation Visitor Services		$167,489
Law Enforcement Activities	Note: Law enforcement activities in Florida State Parks are conducted by the FWC Division of Law Enforcement and by local law enforcement agencies.	

* 2015 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

Addendum 1—Acquisition History

LAND ACQUISITION HISTORY REPORT

Park Name	Waccasassa Bay Preserve State Park
Date Updated	10/18/2016
County	Levy County, Florida
Trustees Lease Number	Lease No. 2599
Legal Description	A legal description is available upon request from the Department of Environmental Protection
Current Park Size	34,397.02 acres
Purpose of Acquisition	The State of Florida acquired Waccasassa Bay Preserve State Park mainly to manage it as a part of the Recreation and Parks System of the State.

Acquisition History (incudes only acquisitions with areas of 10 acres or more)

Parcel Name or Parcel DM-ID	Date Acquired	Initial Seller	Initial Purchaser	Size in acres	Instrument Type
MDID 3113	12/10/1971	Georgia Pacific Corporation	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	15,518.08	Indenture
MDID 12764	9/9/1991	Certificate of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida	Not Applicable	1,783.00	Certificate
MDID 328440	7/26/2002	Dr. David Ohlwwiler	The Town of Yankeetown	418.231	Warranty Deed
MDID 15154	11/17/1998	The Trust For Public Land	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	279.618	Warranty Deed
MDID 310291	1/11/1999	Georgia Pacific Corporation	Trustees	226.61	Warranty Deed
MDID 12765	9/9/1991	Certificate	Not Applicable	120.774	Certificate
MDID 310292	6/14/2000	North American Timber Corporation	Trustees	43.823	Limited Warranty Deed
MDID 1561	4/15/1999	Gulf Rock Inc.	Trustees	40.489	Warranty Deed
MDID 3112	12/10/1971	Georgia Pacific Corporation	Trustees	40.218	Indenture
MDID 12766	9/9/1991	Certificate	Not Applicable	39.914	Certificate
MDID 6956	4/4/1981	Georgia Pacific Corporation	Trustees	20.187	Corrective Warranty Deed

Management Lease

Parcel Name or Lease Number	Date Leased	Initial Lessor	Initial Lessee	Current Term	Expiration Date
Lease No. 2599	4/6/1972	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida	The State of Florida Department of Natural Resources for the use and benefit of the Division of Recreation and Parks	99 years	4/5/2071

Outstanding Issue	Type of Instrument	Brief Description of the Outstanding Issue	Term of the Outstanding Issue
No related outstanding issue that affects the use of Waccasassa Bay Preserve State Park			

Addendum 2—Advisory Group Members and Report

Dale Register
Mayor
City of Cedar Key

John Meeks
Commissioner
Levy County Commission

Jacob Sache
Chairman
Levy County Soil and Water

Virginia Johns
Chair
Suwannee River WMD

Norberto Fernandez
Biologist
FWC North Central Region

Matt Chopp
Hunting Biologist
FWC North Central Region

Michael Edwards
Senior Forester
Florida Forest Service

Ferlain Hoover
Park Manager
Division of Recreation and Parks

John Kimball
Local Property Owner

Katherine Dunlap
Local Property Owner

Charles & Nancy Reed
Local Property Owner

Rick Anthony
President
Florida Nature Coast Conservancy

Andrew Gude
Manager
Lower Suwannee National Wildlife Refuge

Gail Taylor
President
Florida Native Plant-Citrus Chapter

Jay Bushnell
President
Cedar Key Audubon Society

Bob Simons
President
Sierra Club Suwannee-St. Johns

Greg McCandless
President
Levy County Horse Club

Jeff Glen
Chair
Florida Trail Association-Sandhill

Brack Barker
Owner
Wild Florida Adventures

David Poeklik
Executive Director
Nature Coast Development Council

Dr. Michael Allen
UF-IFAS Nature Coast Biological Station

The Advisory Group meeting to review the proposed unit management plans (UMP) for Cedar Key Scrub State Reserve and Waccasassa Bay Preserve State Park was held in Cedar Key at the FWC Senator George G. Kirkpatrick Marine Laboratory on Thursday February 28, 2019 at 9:00 AM.

Doug Maple joined Jay Bushnell in representing the Cedar Keys Audubon Society. Tara Maillard attended the meeting representing Levy Soil and Water in place of Jacob Sache. Appointed members unable to attend included Dale Register, John Meeks, Virginia Johns, Matt Chopp, Michael Edwards, John Kimball, Charles & Nancy Reed, Andrew Gude, Gail Taylor, Bob Simons, Jeff Glen, and Brack Barker.

Attending Division of Recreation and Parks (DRP) staff members from the two parks, district office, and the Office of Park Planning were Richard Owen, Daniel Pearson, Ferlain Hoover, Brian Fugate, Clif Maxwell, Chris Camargo, and Joel Allbritton.

Mr. Allbritton began the meeting by explaining the purpose of the advisory group and thanked everyone for attending. Mr. Allbritton then asked each member of the advisory group to express their comments on the draft management plans. After all the comments were shared, Mr. Allbritton described the next steps for drafting the plans and the meeting was adjourned.

Summary of Advisory Group Comments

Dr. Michael Allen (UF-IFAS) began the meeting by commenting on the comprehensiveness of the plans. Mr. Allen stated that some of the data on imperiled and endangered species is dated and that we should try to work with FWC to update the data as we can. Mr. Allen commented on access to the parks and ways to make the parks more accessible especially in regard to kayak and canoe access to Waccasassa Bay. Mr. Allen explained thermal imaging in regards to hydrological issues like mangrove migration and tropical fish species and how using this data could help the park and surrounding areas to combat these and other issues in the future. Mr. Allen encouraged the participation with other agencies and groups to regularly map groundwater seeps. Dan Pearson commented on importance of this topic and explained funding constraints and the need to partner with other agencies to work on these issues. Mr. Allen explained the future grants and opportunities that may be available in the coming years and how we should pursue them as a united group. Clif Maxwell commented the need to show this as an action item for the life of the plan and explained the differences between federal researching and park service researching. Dan Pearson explain the Hydrological Management Objectives and how they relate to the topic. Rick Owen commented on the dye trace studies that are mentioned in the Hydrology sections and how we could expand further to include these mapping opportunities. Mr. Allen asked about the timing of the management plans and Clif Maxwell detailed the 10-year timing of management plan updates. Rick Owen commented on the Scrub Jay and other outdated data and how they did not want to lose any of the historical data for these species. Dan Pearson commented on the Scrub Jay populations in Cedar Key Scrub.

Mr. Allen asked when was the last time that Scrub Jays were observed in the park. Chris Camargo detailed that the last Scrub Jay siting was May of 2018. Mr. Camargo commented on the kayak access for Waccasassa Bay and the priority of the plan to better maintain the campsites that are currently on the property.

David Poeklik (Nature Coast Development Council) applauded the authors and efforts put into both plans. Mr. Poeklik commented that the scrub jay data and explanations at the public meeting and advisory group meeting was eye opening. Mr. Poeklik explained parallels of challenges in plans with the challenges that the development council faces in regard to sea level rise, salt water intrusion, and other issues. Mr. Poeklik stated that the Nature Coast Development Council supports the efforts that were put into the plans and the implications that are presented. Mr. Poeklik commented that it was great to have a better awareness of the impacts that these two parks have for the region and state as a whole.

Jay Bushnell (Cedar Keys Audubon Society) asked about increased access to the land portion of Waccasassa Bay and any trails that could be made available. Mr. Bushnell commented that they are currently in the process of developing a strategic plan that better identifies the commitment to Florida wildlife. Mr. Bushnell commented that he had given Chris some signage made by The Florida Wildlife Federation that talks about gopher tortoises and could educate people on this species. Mr. Bushnell encouraged park staff to put the signage up to aid in saving gopher tortoises. Mr. Bushnell asked where the planting of the longleaf pines was going to take place at. Dan Pearson explained the areas where the longleaf pines would be planted in and detailed the differences between longleaf and slash pines. Mr. Bushnell talked about the cabbage palms and how they are taking over in some areas as well as control measures for the palms. Dan Pearson explained how fire can aid in removing young cabbage palms and the need to have more frequent fire return intervals for areas with cabbage palms. Clif Maxwell talked about the changes of natural community types and how the parks can address this issue. Ferlain Hoover explained future access of Waccasassa Bay and access to the trails. Dan Pearson and Clif Maxwell further explained additional access of Waccasassa Bay and difficulties of getting to the upland areas of the park. Mr. Maxwell commented on the difficulties of kayak and canoe access. Mr. Bushnell asked how the areas held up to the hurricane, if they were stable, and of tree loss. Chris Camargo commented on the current conditions of sites as well as tree fall that was a result of hurricanes.

Katherine Dunlop (Adjacent Property Owner) detailed the plant ID cards for the Railroad Trestle Nature Trail that have been made to educate users on the plants that can be seen in the area. Mrs. Dunlap stated that the plant ID cards will be posted on the Florida's Nature Coast Conservancy website for educational interpretation for everyone. Mrs. Dunlop applauded the efforts of putting the plans together and thanked the group for the inclusion of equestrian opportunities in the plan.

Greg McCandless (Levy County Horse Club) stated that his comments are strictly for Cedar Key Scrub oriented. Mr. McCandless commented that he found the

discussions on preservation of water quality and slash pines importance for species protection from the public meeting very interesting. Mr. McCandless detailed scrub jay data collection efforts and how they have not seen any since slash pines were cut down along the trails. Mr. McCandless commented that he would like to see a balance of trees along the edges of the trails to provide shade for trail users. Mr. McCandless stated that if there are more trees along the trails and more shade that more visitors would use the trails. Mr. McCandless commented on the additional kayak or canoe access to Waccasassa Bay and that we should share our trail maps to local users' groups. Additionally, Mr. McCandless commented that we should model our paddling trail maps after the Lower Suwannee Refuge trail maps and explained how their maps look and are made. Clif Maxwell explained that once the plans are approved that there would be an interest in reaching out for assistance in figuring out what the needed equestrian and paddling improvements would be. Chris Camargo commented that research shows that scrub jays are poor flyers and that they do better with lower tree cover and then detailed that this is why trees were removed. Mr. Camargo commented that he is hopeful that the tree removal and brush mowing will bring back any neighboring scrub jays to the park as well as detailing the potential efforts to relocate scrub jays to the area through FWC cooperation. Mr. McCandless asked if an increase or decrease in raptors had been noticed at the parks over the last ten years. Mr. Camargo detailed that he has seen less of some birds. Mr. Maxwell commented a reason that scrub jays do not like tall trees is that they help predator birds prey on lesser birds. Mr. McCandless restated that his comments were to add some taller trees for shade along the perimeter of areas to provide shade for trail users. Doug Maples detailed how he participates in bird rescues and that they had rescued multiple owls in the area.

Tara Maillard (Levy County Soil and Water) detailed that at this time she did not have any comments but that they were having a board meeting the following week and she would provide any comments that came up at the meeting to Joel Allbritton. Mrs. Maillard commented that she was very excited for the trail riders of Levy County to use the parks and the idea of additional paddling access. Joel Allbritton detailed that ways that comments could be given to him within the two-week commenting period.

Rick Anthony (Florida Nature Coast Conservancy) asked about the permanent restroom that is proposed without a lot of detail and whether it would be an advanced system or septic. Mr. Anthony asked about the carrying capacity numbers that were established for the park and how we came up with the capacity. Mr. Anthony asked if we are considering opening permanent trails on the south side on highway 24. Mr. Anthony detailed that there are numerous organizations that could be partners in surveying for scrub jays or other species. Mr. Anthony asked about the park being used as a gopher tortoise mitigation area and it we had thought about participating. Mr. Anthony commented that he likes the preserve designation for Waccasassa Bay. Clif Maxwell commented that the parks would want to partner with local birding organizations or anyone that could help. Mr. Maxwell detailed the process and statutes that constrain our management of imperiled or endangered species as well as the balance that we strive to achieve with managing these

species. Dan Pearson explained the carrying capacity increases and how the carrying capacities numbers are derived. Mr. Pearson explained how FWC wanted to do a gopher tortoise survey at Cedar Key Scrub and that the gopher tortoise density was too low to justify the efforts to count them. Mr. Maxwell detailed the short-term goal of a grass parking lot off of highway 24 to allow access to the trails in Waccasassa Bay. Brian Fugate commented that the new restrooms would be advanced septic systems. Joel Allbritton explained the current efforts of the Office of Park Planning in looking into a more scientific method of evaluating carrying capacities at parks throughout the state based off of methods that the national park service uses. Mr. Maxwell clarified the changing of carrying capacities would be based on changes to the resources and actions taken based on degradation that we may observe.

Norberto Fernandez (Florida Fish and Wildlife) stated that he did not have any comments at this time. Tara Maillard asked about FWC incentive programs for gopher tortoise habitat. Mr. Fernandez detailed that there are programs and grants that are available to help private landowners in this area. Joel Allbritton asked if there were any go backs or additional comments that anyone would like to give. Joel Allbritton detailed the next steps for the management plans and the meeting was adjourned.

Written Advisory Group Comments

Matt Chopp (Florida Fish and Wildlife) provided comments via email and suggested changing hunting language to read that the Panther Ridge area would be a limited entry quota hunt to align with the FWC hunting brochure. Additional suggestions included edits to the carrying capacity to accurately depict the hunting that is currently happening at the park and for the Panther Ridge area to be a more flexible carrying capacity number to allow for future growth.

Michael Edwards (Florida Forest Service) provide comments via email for both parks. For Cedar Key Scrub Mr. Edwards suggests that each natural community needs to have specific goals and objectives describing how the desired future conditions will be accomplished. Mr. Edwards also suggests that the 2018 Timber Assessment should include the Panther Ridge Tract and potential timber sale for the tract as well as restoration for the Pine Plantation clear cut. Mr. Edwards would like to see new goals and objective in the plan for the scrub that is more broadly focused on multiple species. Mr. Edwards suggest that the UMP describe specific goals and objectives for monitoring and surveying natural communities for listed species, fire effects, other habitats, and invasive species. Mr. Edwards commented that the property needs a comprehensive study for archaeological and historic sites and a protection plan for sites that are rated as fair to poor. Mr. Edwards stated that the UMP should address the control of pests and pathogens as well as discussing the process that is used to determine if there are any surplus lands at the park. For Waccasassa Bay Preserve Mr. Edwards suggests that each natural community needs to have specific goals and objectives describing how the desired

future conditions will be accomplished. MR. Edwards also suggests that the 2005 Timber Assessment should be updated and a thinning timber sale be conducted in conjunction with Cedar Key Scrub to make a viable timber sale. Mr. Edwards would like to see the UMP develop a treatment plan that targets brazilian pepper in the mangrove swamps on the south side of Waccasassa Bay as well as working with local hunt clubs for assistance with feral hog removal. Mr. Edwards stated that new fire lines need to be installed as well as increased fire frequency for the park. Mr. Edwards suggests that the shop be improved to provide additional shelter for equipment. Mr. Edwards suggests that the primitive sites need to be better maintained and interpretive signage added to the sites.

Summary of Public Comments

Leslie Stunner (UF Shellfish Researcher) commented that she was not able to attend the public meeting so she wanted to sit in and listen to the comments about the management plan. Chris Camargo asked about if there is any work being done in Waccasassa Bay for shellfish. Mrs. Stunner explained the research areas that are assessed for shellfish and that they do not currently work in Waccasassa Bay but there may be potential to look at sites in Waccasassa Bay. Mr. Allen asked if the water monitoring stops at Corgan's Reef. Mrs. Stunner commented that no the monitoring is maintained in Waccasassa Bay as well. Dan Pearson asked if the clams prefer soft substrate to which Mrs. Stunner commented that they need soft substrate but not too soft or too rocky.

Doug Maple (Cedar Keys Audubon) commented that he was encouraged from the public meeting that the scrub will be managed for eventual scrub jay habitat and that there is talk about additional access to Waccasassa Bay. Mr. Maple detailed the critical nesting habitat areas at Cedar Key and Waccasassa Bay and the need to ensure that nesting birds are minimally disturbed while they are preparing for their return migrations. Mr. Maple detailed the birds that are in the area and that are in need of nesting habitats. Mr. Maple commented that we need to keep this minimal disturbance in mind when planning for additional kayak or canoe access to the area.

Staff Recommendations

- The species list for both parks will be updated to reflect any updated status changes for plants and animals.
- Additional language will be added to the plans to detail new restrooms should have high efficiency advanced septic systems to protect the hydrology of the area.

Notes on Composition of Advisory Group

Florida Statutes Chapter 259.032 Paragraph 10(b) establishes a requirement that all state land management plans for properties greater than 160 acres will be reviewed by an advisory group:

"Individual management plans required by s. 253.034(5), for parcels over 160 acres, shall be developed with input from an advisory group. Members of this advisory group shall include, at a minimum, representatives of the lead land managing agency, co-managing entities, local private property owners, the appropriate soil and water conservation district, a local conservation organization, and a local elected official."

Advisory groups that are composed in compliance with these requirements complete the review of State park management plans. Additional members may be appointed to the groups, such as a representative of the park's Citizen Support Organization (if one exists), representatives of the recreational activities that exist in or are planned for the park, or representatives of any agency with an ownership interest in the property. Special issues or conditions that require a broader representation for adequate review of the management plan may require the appointment of additional members. The DRP's intent in making these appointments is to create a group that represents a balanced cross-section of the park's stakeholders. Decisions on appointments are made on a case-by-case basis by Division of Recreation and Parks staff.

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Addendum 4—Soil Descriptions

(3) Orsino fine sand, 0 to 8 percent slopes - This moderately well drained, very deep, nearly level to gently rolling soil is on dunes and ridges. Individual areas are generally circular or elongated and range from 2 to nearly 750 acres in size.

Typically, the surface layer is gray fine sand about 4 inches thick. The subsurface layer is fine sand. It is very pale brown to a depth of about 8 inches and white to a depth of 13 inches. The subsoil is fine sand. It is brownish yellow to a depth of about 48 inches, light yellowish brown to a depth of 58 inches, and brownish yellow to a depth of 70 inches. The underlying material to a depth of 80 inches or more is white fine sand.

On 95 percent of the acreage mapped as Orsino fine sand, 0 to 8 percent slopes, Orsino and similar soils make up about 88 to 100 percent of the mapped areas. Dissimilar soils make up less than about 12 percent of the mapped areas.

Included in mapping are soils that are similar to the Orsino soil but do not have a leached subsurface layer; have a surface layer that is made up dominantly of shell fragments; have limestone bedrock below a depth of 60 inches; have a dark, organically stained subsoil; have a seasonal high water table at a depth of 20 to 42 inches; or do not have a seasonal high water table within a depth of 60 inches.

In most years the seasonal high water table is at a depth of 48 to 60 inches in the Orsino soil for 1 to 6 months. Permeability is very rapid. Available water capacity is very low.

(5) Immokalee fine sand - This poorly drained, very deep, nearly level soil is on flatwoods. Individual areas are generally irregular in shape and range from 2 to nearly 1,700 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 9 inches thick. The subsurface layer is fine sand. It is gray to a depth of about 16 inches and light gray to a depth of 38 inches. The subsoil is very dark grayish brown, organically coated fine sand to a depth of about 43 inches and dark brown fine sand to a depth of 80 inches or more.

On 95 percent of the acreage mapped as Immokalee fine sand, Immokalee and similar soils make up about 91 to 100 percent of the mapped areas. Dissimilar soils make up lass then 9 percent. On 5 percent of the acreage, the dissimilar soils make up more than 9 percent of the mapped areas.

Included in mapping are soils that are similar to the Immokalee soil but have and organically stained subsoil that is within a depth of 30 inches or below a depth of 50 inches, do not have an organically stained subsoil, have a limestone bedrock

below a depth of 60 inches, have a loamy subsoil below a depth of 40 inches, or have a sandy texture in the surface layer.

In most years, the seasonal high water table is at a depth of 6 to 18 inches in the Immokalee soils for 1 to 4 months. The water table may recede to a depth of about 60 inches during droughty periods. Permeability is moderate. Available water capacity is low.

(11) Placid and Samsula soils, depressional – These very poorly drained, very deep, nearly level soils are in depressions on flatwoods. They are ponded. Individual areas are generally oval or irregular in shape and range from 2 to nearly 2,000 acres in size. Slopes are 0 to 1 percent.

Typically, the surface layer of the Placid soil is black muck to a depth of about 3 inches and very dark gray fine sand to a depth of 14 inches. The underlying material is light gray fine sand to a depth of about 24 inches, brown fine sand to a depth of 45 inches, and very pale brown fine sand to a depth of 80 inches.

Typically, the surface layer of the Samsula soil is dark brown muck to a depth of about 6 inches and black muck to a depth of 47 inches. The underlying material is grayish brown fine sand to a depth of about 62 inches and light brownish gray fine sand to a depth of 80 inches or more.

Some of the areas of the map unit are made up of Placid and similar soils, some are made up of Samsula and similar soils, and some are made up of both soils. The relative proportion of the combinations of the soils varies. Areas of the individual soils are large enough to map separately, but because of present and predicted use they were mapped as one unit.

On 95 percent of the acreage mapped as Placid and Samsula soils, depressional, Placid, Samsula, and similar soils make up about 88 to 100 percent of the map unit. Dissimilar soils make up more than 12 percent of the mapped areas.

Included in mapping are soils that are similar to the Placid soils but have an organic surface layer that is less than 3 inches thick; have a dark, organically coated subsoil or a loamy subsoil below a depth of 20 inches; do not have a dark surface layer as much as 10 inches in thickness; or have bedrock between depth of 40 and 80 inches. Also included are soils that are similar to the Samsula soil but have a loamy layer or a dark, organically coated, sandy layer below the organic surface layer; have an organic surface layer that is more than 51 inches thick or less than 16 inches thick; have a loamy material underlying the organic surface layer; are more alkaline in the surface layer; or have bedrock between depths of 40 and 80 inches.

During most years the seasonal high water table is above the surface in the Placid and Samsula soils for more than 6 months and is within a depth of 12 inches during the rest of the year. Permeability is rapid in both soils. Available water capacity is low in the Placid soil and high in the Samsula soil.

(13) Wekiva fine sand - This poorly drained, shallow to moderately deep, nearly level soil is on low ridges. Individual areas are generally irregular in shape and range from 2 to more than 10,000 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 9 inches is grayish brown fine sand. The subsoil, to a depth of about 18 inches, is yellowish brown sandy clay loam. Below this is limestone bedrock.

On 90 percent of the acreage mapped as Wekiva fine sand, Wekiva and similar soils make up about 75 to 100 percent of the mapped areas. Dissimilar soils make up less than 25 percent. On 10 percent of the acreage, the dissimilar soils make up more than 25 percent of the mapped areas.

Included in mapping are soils that are similar to the Wekiva soil but do not have a sandy surface layer that is 7 or more inches thick, have limestone bedrock below a depth of 30 inches or at a depth of 4 to 9 inches, do not have a loamy subsoil, or have a loamy subsoil at a depth of 20 to 40 inches.

In most years the seasonal high water table is within a depth of 12 inches in the Wekiva soil for 2 to 6 months. It is above the surface for 1 to 2 weeks following heavy rains. The water table recedes into crevices and solution holes in the bedrock during droughty periods. Permeability is moderately slow. Available water capacity is very low.

(15) Holopaw-Pineda complex, frequently flooded - These are poorly drained, very deep, nearly level soils on flood plains along rivers and creeks. Individual areas are generally elongated and range from 3 to nearly 300 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer of the Holopaw soil is very dark gray fine sand about 3 inches thick. The subsurface layer is light brownish gray fine sand to a depth of about 50 inches and pale brown fine sand to a depth of 60 inches. The subsoil is gray sandy clay loam to a depth of 80 inches or more.

Typically, the surface layer of the Pineda soil is black fine sand about 4 inches thick. The upper part of the subsoil is brown fine sand to a depth of about 14 inches. The underlying material is light gray fine sand to a depth of about 28 and white fine sand to a depth of 35 inches. The lower part of the subsoil is light gray

fine sandy loam to a depth of about 52 inches. The underlying material is gray fine sand to a depth of 80 inches or more.

Generally, the mapped areas average about 55 percent Holopaw and similar soils and 29 percent Pineda soils and similar soils. The components of this map unit are so intermingled that it is not practical to map them separately at the scale used in mapping. However, the proportions of the Holopaw and Pineda soils and of the similar soils are fairly consistent in most mapped areas.

On 80 percent of the acreage mapped as Holopaw-Pineda complex, frequently flooded, Holopaw, Pineda, and similar soils make up about 76 to 93 percent of the mapped areas. Dissimilar soils make up about 7 to 24 percent. On 20 percent of the acreage, the dissimilar soils make up more than 24 percent of the mapped areas.

Included in mapping are soils that are similar to the Holopaw soil but do not have a loamy subsoil within a depth of 80 inches, have a dark surface layer that is more than 7 inches thick, or have a subsurface layer that has colors in shades of yellowish brown. Also included are soils that are similar to the Pineda soil but do not have a sandy subsoil that is more than 4 inches thick, do not have sandy pockets and intrusions in the upper 2 to 10 inches of the loamy subsoil, or have a dark surface layer that is more than 10 inches thick. Also included are soils that are similar to the Pineda and Holopaw soils but have bedrock or layers of shell fragments below a depth of 60 to 80 inches or have a surface layer of muck, loamy sand, or sandy loam that is more than 3 inches thick.

In most years, the seasonal high water table is within a depth of 12 inches in the Holopaw and Pineda soils for 2 to 6 months, but it can recede to a depth of about 60 inches during droughty periods. Areas of this map unit are flooded by adjacent rivers or creeks for periods of 1 to 4 months during most years. Permeability is moderate in the Holopaw soils and slow or very slow in the Pineda soil. Available water capacity is low in both soils.

(26) Gator and Terra Ceia soils, frequently flooded – These very poorly drained, very deep nearly level soils are on flood plains along rivers and creeks. Individual areas are generally elongated and range from 2 to nearly 4,000 acres in size. Slopes are 0 to1 percent.

Typically, the surface layer of the Gator soil is very dark brown muck about 38 inches thick. The underlying material is gray fine sandy loam to a depth of 80 inches or more.

Typically, the surface layer of the Terra Ceia soil is a mixture of black and very dark grayish brown muck to a depth of about 37 inches and black muck to a depth of 80 inches or more.

Some areas of the map unit are made up of Gator and similar soils, some are made up of Terra Ceia and similar soils, and some are made up of both soils. The relative proportion of the combinations of the soils varies. Areas of the individual soils are large enough to map separately, but because of present and predicted use they were mapped as one unit.

On 80 percent of the acreage mapped as Gator and Terra Ceia soils, frequently flooded, Gator, Terra Ceia, and similar soils make up about 76 to 100 percent of the mapped areas. Dissimilar soils make up less than 24 percent. On 20 percent of the acreage, the dissimilar soils make up more than 24 percent of the mapped areas.
Included in mapping are soils that are similar to the Gator soils, but have a sandy layer that is more than 12 inches thick underlying the organic surface layer or have and organic surface layer that is less than 16 inches thick. Also included are soils that are similar to the Gator and Terra Ceia soils but have bedrock below a depth of 40 inches or are extremely acid in the surface layer.

Throughout the year the seasonal high water table is within a depth of 6 inches in the Gator and Terra Ceia soils. Areas of this map unit are flooded by adjacent rivers are creeks for periods of 1 to 6 months during most years. Permeability is moderate in the Gator soil and rapid in the Terra Ceia soil. Available water capacity is very high in both soils.

(37) Myakka mucky sand, occasionally flooded - This poorly drained, very deep nearly level soil is on the flatwoods are adjacent to the tidal marsh or the floodplain of the Suwannee River. Individual areas are generally long and narrow and range from 3 to nearly 500 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is black muck to a depth of about 2 inches and a very dark gray mucky sand to a depth of 10 inches. The subsurface layer is gray sand to a depth of about 21 inches. The subsoil is very dark gray sand to a depth of about 40 inches and very dark grayish brown sand to a depth of 80 inches or more.

On most of the acreage mapped as Myakka mucky sand, occasionally flooded, Myakka and similar soils make up more than 85 percent of the mapped areas. Dissimilar soils make up less than 15 percent.

Included in mapping are soils that are similar to the Myakka soils but have a surface layer of fine sand or sand that is more than 3 inches thick; have an organic layer at the surface that is more than 3 inches thick; do not have a dark, organically coated subsoil; have a loamy subsoil at a depth of 40 to 80 inches; have a dark organically coated subsoil that is within a depth of 20 inches or at a

depth of 30 to 80 inches; or have a dark surface layer that is more than 8 inches thick.

The seasonal high water table is within a depth of 12 inches in the Myakka soil for more than 6 months during most years. Areas of this map unit are flooded by storm-driven tides or by the Suwannee River for periods of 2 to 7 days during some years. Permeability is moderate or moderately rapid. Available water capacity is moderate.

(38) Myakka sand – This poorly drained, very deep, nearly level soil is on flatwoods. Individual areas are generally irregular in shape and range from 4 to nearly 2, 100 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray sand about 5 inches thick. The subsurface layer is grayish brown sand to a depth of about 18 inches and light gray sand to a depth of 26 inches. The subsoil is organically coated sand. It is black to a depth of about 40 inches and very dark gray to a depth of 58 inches. The underlying material is pale brown sand to a depth of 80 inches or more.

On 90 percent of the acreage mapped as Myakka sand, Myakka and similar soils make up about 76 to 100 percent of the mapped areas. Dissimilar soils make up less than 24 percent. On 10 percent of the acreage, the dissimilar soils make up more than 24 percent of the mapped areas.

Included in mapping are soils that are similar to the Myakka soil but have an organically coated subsoil within a depth of 20 inches or at a depth of 30 to 80 inches, do not have an organically coated subsoil, have a loamy subsoil at a depth of 40 to 80 inches, have bedrock at a depth of 60 to 80 inches, have a surface layer of fine sand, or have a dark surface layer that is more than 8 inches thick.

In most years the seasonal high water table is at a depth of 6 to 18 inches in the Myakka soil for 1 to 4 months, but it can recede to a depth of about 60 inches during draughty periods. Permeability is moderate or moderately rapid. Available water capacity is moderate.

(39) Waccasassa-Demory complex, flooded – These poorly drained, shallow or very shallow, nearly level soils are on low ridges. They are rarely flooded and occasionally flooded. Individual areas are generally irregular in shape and range from 2 to more than 10,000 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer of the Waccasassa soil is very dark grayish brown sandy clay loam about 2 inches thick. The subsoil is dark yellowish brown sandy clay loam to a depth of about 12 inches. Limestone bedrock is at a depth of about 12 inches.

Typically, the surface layer of the Demory soil is very dark brown sandy clay loam to a depth of about 6 inches. The underlying material is dark yellowish brown sandy clay loam, and extends to a depth of about 11 inches. Limestone bedrock is at a depth of about 11 inches.

Generally, the mapped areas average about 53 percent Waccasassa and similar soils and 37 percent Demory and similar soils. The components of this map unit are so intermingled that it is not practical to map them separately at the scale used in mapping. However, the proportions of the Waccasassa and Demory soils and of the similar soils are fairly consistent in most mapped areas.

On 95 percent of the acreage mapped as Waccasassa-Demory complex, flooded, Waccasassa, Demory, and similar soils make up about 81 to 99 percent of the mapped areas. Dissimilar soils make up about 1 to 19 percent. ON 5 percent of the acreage, the dissimilar soils make up more than 19 percent of the mapped areas.

Included in mapping are soils that are similar to the Waccasassa and Demory soils but have a surface layer of fine sand, loamy fine sand, fine sandy loam, or muck that is more than 3 inches thick; have more than 5 percent gravel in the surface layer; are sandy throughout; or have bedrock within a depth of 4 inches.

The seasonal high water table is within a depth of 12 inches in the Waccasassa and Demory soils for 2 to 6 months in most years. During dry periods it is within crevices and solution holes in the bedrock. Areas of this map unit are flooded by adjacent creeks for periods of 2 to 7 days during some years. Permeability is moderately slow in both soils. Available water capacity is very slow in both soils.

(40) Pineda fine sand - This poorly drained, very deep nearly level soil is on sloughs on flatwoods. Individual areas are generally irregular in shape and range from 3 to nearly 350 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer is dark gray fine sand to a depth of about 18 inches. The subsoil is brown fine sand to a depth of about 32 inches, dark grayish brown fine sandy loam to a depth of 55 inches, and greenish gray sandy clay loam to a depth of 80 inches or more.

On 80 percent of the acreage mapped as Pineda fine sand, Pineda and similar soils make up about 76 to 86 percent of the mapped areas. Dissimilar soils make up about 14 to 24 percent. On 20 percent of the acreage, the dissimilar soils make up more than 24 percent of the mapped areas.

Included in mapping are soils that are similar to the Pineda soils but have and organically coated subsoil more than 2 inches thick that overlies the loamy subsoil, do not have a sandy subsoil, have bedrock at a depth of 60 to 80 inches, do not have sandy intrusions in the upper 2 to 10 inches of the loamy subsoil, or have a dark surface layer that is more than 10 inches thick.

In most years the seasonal high water table is within a depth of 12 inches in the Pineda soil for 2 to 6 months, but it can be above the surface for 1 to 2 weeks following heavy rains or can recede to a depth of about 60 inches during droughty periods. Permeability is slow or very slow. Available water capacity is low.

(41) Demory sandy clay loam, occasionally flooded - This poorly drained, nearly level, shallow to very shallow is on low ridges adjacent to or surrounded by areas of tidal marsh. Individual areas are generally irregular in shape and range from 2 to nearly 3,000 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface is covered with several inches of undecomposed leaf litter. The surface layer is black muck about 3 inches thick. Below this is very dark grayish brown sandy clay loam about 4 inches thick. The underlying material is dark grayish brown sandy clay loam about 2 inches thick. Limestone bedrock is at a depth of 9 inches.

On 95 percent of the acreage mapped as Demory sandy clay loam, occasionally flooded, Demory and similar soils make up about 78 to96 percent of the mapped areas. Dissimilar soils make up about 4 to 22 percent. On 5 percent of the acreage, the dissimilar soils make up more than22 percent of the mapped areas.

Included in mapping are soils that are similar to the Demory soil but do not have a dark surface layer; have a surface layer of fine sand, loamy fine sand, fine sandy loam, or muck that is more than 3 inches thick; have more than 5 percent gravel in the surface layer; have bedrock within a depth of 4 inches; or are sandy throughout.

The seasonal high water table is within a depth of 12 inches for 2 to 6 months in most years. During dry periods it is within crevices and solution holes in the bedrock. Areas of this map unit are flooded by adjacent creeks or by storm-driven tides for periods of 2 to 7 days during some years. Permeability is moderately slow. Available water capacity is very low.

(43) Tidewater mucky clay, frequently flooded - This very poorly drained, deep and very deep, nearly level soil is in tidal marsh. Individual areas are generally irregular in shape and range from 4 to nearly 6,700 acres in size. Slopes are 0 to 1 percent.

Typically, the surface layer is very dark brown mucky clay to a depth of about 10 inches, black silty clay to a depth of about 24 inches, and black sandy clay loam to a depth of 40 inches. The underlying material is a mixture of black and very dark grayish brown loamy fine sand to a depth of about 76 inches. Limestone bedrock is at a depth of 76 inches.

On 95 percent of the acreage mapped as Tidewater mucky clay, frequently flooded, Tidewater and similar soils make up about 91 to 100 percent of the mapped areas. Dissimilar soils make up less than 9 percent.

The seasonal high water table is within a depth of 12 inches in the Tidewater soil throughout the year. Areas of this map unit are flooded daily by high tides. Permeability is moderately slow. Available water capacity is low.

(45) Cracker mucky clay, frequently flooded - This very poorly drained, shallow or very shallow, nearly level soil is in areas of tidal marsh. Individual areas are generally irregular in shape and range from 9 to nearly 5,900 acres in size. Slopes are 0 to 1 percent.

Typically, the surface layer is black mucky clay to a depth of about 4 inches and very dark gray sandy clay loam to a depth of 12 inches. Limestone bedrock is at a depth of about 12 inches.

On 90 percent of the acreage mapped as Cracker mucky clay, frequently flooded, Cracker and similar soils make up about 76 to92 percent of the mapped areas. Dissimilar soils make up about 8 to 24 percent. On 10 percent of the acreage, the dissimilar soils make up more than 24 percent of the mapped areas.

Included in mapping are soils that are similar to the Cracker soil but have a surface layer of muck, fine sandy loam, sandy clay loam, or sandy clay that is more than 3 inches thick; are sandy throughout; or have bedrock at a depth of 20 to 30 inches or within a depth of 6 inches.
The seasonal high water table is within a depth of 12 inches in the Cracker soil throughout the year. Areas of this map unit are flooded daily by high tides. Permeability is moderate. Available water capacity is very low.

(46) Chobee fine sandy loam, limestone substratum, frequently flooded - This very poorly drained, deep or very deep, nearly level soil is on flood plains. Individual areas are generally irregular in shape and range from 3 to nearly 3,500 acres in size.

Typically, the surface layer is very dark brown muck to depth of about 3 inches and very dark brown fine sandy loam to a depth of 11 inches. The subsoil is very dark grayish brown sandy clay loam to a depth of about 21 inches, light brownish gray sandy clay loam to a depth of 28 inches, dark greenish gray sandy clay

loam to a depth of 54 inches, and a mixture of greenish gray and light greenish gray sandy clay loam to a depth of 68 inches. Limestone bedrock is at a depth of about 68 inches.

On most of the acreage mapped as Chobee fine sandy loam, limestone substratum, frequently flooded, Chobee and similar soils make up more than 85 percent of the mapped areas. Dissimilar soils make up less than 15 percent.

Included in mapping are soils that are similar to the Chobee soil but do not have bedrock within a depth of 80 inches, have bedrock at a depth of 20 to 40 inches, do not have a dark surface layer as much as 10 inches in thickness, have an organic surface layer that is 4 to 16 inches thick, have and average content of clay in the upper 20 inches of the subsoil that is more than 35 percent, or have a surface layer of fine sand, loamy fine sand, or sandy clay loam that is 4 to 20 inches thick.

The seasonal high water table is at or above the surface in the Chobee soil for more than 6 months during most years. Areas of this map unit are flooded by adjacent rivers or creeks for periods of more than 6 months during most years. Permeability is slow. Available water capacity is moderate.

(58) Boca-Holopaw, limestone substratum, complex - This map unit consists of moderately deep Boca soil, and a deep or very deep Holopaw soil. These poorly drained, nearly level soils are on low ridges and flatwoods. Individual areas are generally irregular in shape and range from 3 to nearly 1,000 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer of the Boca soil is black fine sand about 5 inches thick. The subsurface layer is light gray fine sand to a depth of about 15 inches, light brownish gray fine sand to a depth of 25 inches, and brown fine sand to a depth of 29 inches. The subsoil is olive brown sandy clay loam to a depth of about 37 inches. Limestone bedrock is at a depth of about 37 inches.

Typically, the surface layer of the Holopaw soil is black fine sand about 5 inches thick. The subsurface layer is a mixture of gray and dark grayish brown fine sand to a depth of about 20 inches, light brownish gray fine sand to a depth of 35 inches, pale brown fine sand to a depth of 41 inches, and a mixture of grayish brown and very dark grayish brown fine sand to a depth of 43 inches. The subsoil is dark gray sandy clay loam to a depth of about 48 inches and gray fine sandy loam to a depth of 65 inches. Limestone bedrock is at a depth of about 65 inches.

On 95 percent of the acreage mapped as Boca-Holopaw, limestone substratum, complex, Boca, Holopaw, and similar soils make up about 83 to 98 percent of the mapped areas. Dissimilar soils make up about 2 to 17 percent. On 5 percent of

the acreage, the dissimilar soils make up more than 17 percent of the mapped areas.

Included in mapping are soils that are similar to the Coca soils but do not have bedrock within a depth of 40 inches, have and organically stained layer that over lies the subsoil or the bedrock, have a loamy subsoil within a depth of 20 inches, do not have a loamy subsoil, or have a surface layer that is more than 9 inches thick. Also included are soils that are similar to the Holopaw soil but do not have bedrock within a depth of 80 inches; have a dark, organically stained layer that is more than 2 inches thick overlying the loamy subsoil; do not have a loamy subsoil; or have a dark surface layer that is more than 7 inches thick.

In most years the seasonal high water table is within a depth of 12 inches in the Boca and Holopaw soils for 2 to 6 months, but it can be above the surface for 1 to 2 weeks following heavy rains or can recede to a depth of about 60 inches during droughty periods. Permeability is moderate in the Boca soil and moderately slow or moderate in the Holopaw soil. Available water capacity is very low in the Boca soil and moderate in the Holopaw soil.

(69) Broward-Lutterloh, limestone substratum, complex - This map unit consists of a moderately deep Broward soil and a very deep Lutterloh soil. These somewhat poorly drained nearly level soils are on low ridges. Individual areas are generally irregular in shape and range from 2 to nearly 2,000 acres in size. Slopes range from 0 to 2 percent.

Typically, the surface layer of the Broward soil is dark gray fine sand about 6 inches thick. The underlying material is a mixture of light yellowish brown and brownish yellow fine sand to a depth of 10 inches and yellowish brown fine sand to a depth of 25 inches. Limestone bedrock is at a depth of about 25 inches.

Typically, the surface layer of the Lutterloh soil is dark gray fine sand about 9 inches thick. The subsurface layer is light gray fine sand to a depth of about 35 inches and brown fine sand to a depth of 53 inches. The subsoil layer is light brownish gray fine sandy loam and extends to a depth 61 inches. Limestone bedrock is at a depth of about 61 inches.

Generally, the mapped areas average about 57 percent Broward and similar soils and 35 percent Lutterloh and similar soils. The components of this map unit are so intermingled that it is not practical to map them separately at the scale used in mapping. However, the proportions of the Broward and Lutterloh soils and of similar soils are fairly consistent in most mapped areas.

On 95 percent of the acreage mapped as Broward-Lutterloh, limestone substratum, complex, Broward, Lutterloh, and similar soils make up about 87 to 98 percent of the mapped areas. Dissimilar soils make up about 2 to 13 percent.

On 5 percent of the acreage, the dissimilar soils make up more than 13 percent of the mapped areas.

Included in mapping are soils that are similar to the Broward soil but have bedrock at a depth of 12 to 20 inches, have a loamy or organically stained subsoil that over lies the bedrock, or have bedrock at a depth of 40 to 60 inches. Also included are soils that are similar to the Lutterloh soils but are sandy to a depth of 80 inches or more, have a dark surface layer that is more than 9 inches thick, or have bedrock at a depth of 40 to 60 inches.

The seasonal high water table is at a depth of 18 to 30 inches in the Broward and Lutterloh soils for 2 to 6 months during most years. Permeability is rapid in the Broward soil and moderate in the Lutterloh soil. Available water capacity is very low in both soils.

(70) Hallandale-Boca-Holopaw complex - This map unit consists shallow or very shallow Hallandale soil, a moderately deep Boca soil, and a very deep Holopaw soils. These poorly drained, nearly level soils are on low ridges and flatwoods.

Typically, the surface layer of the Hallandale soil is light gray fine sand about 4 inches thick. The subsurface layer is white fine sand to a depth of about 12 inches. The subsoil is very pale brown fine sand to a depth of 19 inches. Limestone bedrock is at a depth of about 19 inches.

Typically, the surface layer of the Boca soil is dark gray fine sand about 4 inches thick. The subsurface layer is white fine sand to a depth of about 10 inches and very pale brown fine sand to a depth of 21 inches. The subsoil is light brownish gray sandy clay loam to a depth of about 25 inches. Limestone bedrock is at a depth of 25 inches.

Typically, the surface layer of the Holopaw soil is very dark gray fine sand about 4 inches thick. The subsurface layer is light gray fine sand to a depth of about 28 inches and very pale brown fine sand to a depth of 52 inches. The subsoil layer is gray sandy clay loam to a depth of 80 inches or more.

Generally, the mapped areas average about 35 percent Hallandale and similar soils, 28 percent Boca and similar soils, and 27 percent Holopaw and similar soils. The components of this map unit are so intermingled that it is not practical to map them separately at the scale used in mapping. However, the proportions of the Hallandale, Boca, and Holopaw soils and the similar soils are fairly consistent in most mapped areas.

On 80 percent of the acreages mapped as Hallandale-Boca-Holopaw complex, Hallandale, Boca, Holopaw and similar soils make up about 75 to 100percent of

the mapped areas. Dissimilar soils make up less than 25 percent. On 20 percent of the acreage, the dissimilar soils make up more than 25 percent of the mapped areas.

Included in mapping areas soils that are similar to the Hallandale soils but have a continuous, loamy subsoil that overlies the bedrock; have a dark surface layer that is more than 7 inches thick; or have bedrock within a depth of 4 inches. Also included are soils that area similar to the Boca soil but do not have a loamy subsoil at least 4 inches thick, have a loamy subsoil within a depth of 20 inches; or have bedrock at a depth of 40 to 80 inches. Also included are soils that are similar to the Holopaw soil but have bedrock at a depth of 40 to 80 inches, have a dark surface layer that is more than 7 inches thick, or do not have a loamy subsoil within a depth of 80 inches. Also included are soils that are similar to the Hallandale, Boca, and Holopaw soils but have a dark, organically stained subsoil that is more than 2 inches thick.

In most years the seasonal high water table is within a depth of 12 inches in the Hallandale, Boca, and Holopaw soils for 2 to 6 months, but it can be above the surface for 1 to 2 weeks following heavy rains of can recede to a depth of about 60 inches during droughty periods. Permeability is rapid in the Hallandale soil, moderate in the Boca soil, and moderately slow or moderate in the Holopaw soil. Available water capacity is very low in the Hallandale and Boca soils and Low in the Holopaw soil.

Addendum 5—Plant and Animal List

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)

MOSSES

.....	*Amblystegium varuim*
.....	*Anomodon attenuatus*
.....	*Anomodon rostratus*
.....	*Barbula agraria*
.....	*Barbula cancellata*
.....	*Bryohaplocladium microphyllum*
.....	*Bryum pseudocapillare*
.....	*Cryphaea glomerata*
.....	*Cyrto-hypnum minutulum*
.....	*Ditrichum pallidum*
.....	*Entodon macropodus*
.....	*Entodon seductrix*
.....	*Fissidens cristatus*
.....	*Fissidens taxifolius*
.....	*Forsstroemia trichomitria*
.....	*Homolotheciella subcapillata*
.....	*Isopterygium tenerum*
.....	*Leucobryum albidum*
.....	*Leucodon julaceus*
.....	*Octoblepharum albidum*
.....	*Papillaria nigrescens*
.....	*Rhynchostegium serrulatum*
.....	*Schlothemia rugifolia*
.....	*Schwetshkeopsis fabronia*
Meadow spikemoss.....	*Selaginella apoda*
.....	*Sematophyllum adnatum*
.....	*Syrrhopodon incompletus*
.....	*Syrrhopodon texanus*
.....	*Thelia hirtella*
.....	*Thuidium delicatulum*

LICHENS

.....	*Bulbothrix isidiza*
.....	*Canoparmelia cryptochlorophaea*
.....	*Cladina subtenuis*
.....	*Cladonia grayi*
.....	*Cladonia leporina*
.....	*Cladonia peziziformis*
.....	*Cladonia ramulosa*
.....	*Cladonia ravenelii*
.....	*Dirinaria applanata*
.....	*Heterodermia speciosa*
.....	*Hyperphyscia syncolla*
.....	*Leptogium austroamericanum*

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
.....	*Leptogium azureum*	
.....	*Leptogiumchloromelum*	
.....	*Leptogium cyanescens*	
.....	*Leptogium marginellum*	
.....	*Leptogium phyllocarpum*	
.....	*Leptogium stipitatum*	
.....	*Lobaria ravenelii*	
.....	*Parmotrema hypoleucinum*	
.....	*Parmotrema perforatum*	
.....	*Parmotrema rigidum*	
.....	*Parmotrematinctorum*	
.....	*Parmotrema ultralucens*	
.....	*Physcia atrostriata*	
.....	*Physcia neogaea*	
.....	*Pseudoparmelia sphaerospora*	
.....	*Puntelia rudecta*	
.....	*Pyxine caesiopruinosa*	
.....	*Ramalina complanata*	
.....	*Ramalina fastigiata*	
.....	*Ramalina usnea*	
.....	*Ramalina willeyi*	
.....	*Rimelia reticulata*	
.....	*Rimelia subisidiosa*	
.....	*Usnea baileyi*	
.....	*Usnea mutabilis*	
.....	*Usnea perplectata*	
.....	*Usnea rubicunda*	
.....	*Usnea strigosa*	
.....	*Usnea trichodea*	

LIVERWORTS

.....	*Aneura pinguis*	
.....	*Ceratolejeunea laetefusca*	
.....	*Cheilolejeunea clausa*	
.....	*Cheilolejeunea rigidula*	
.....	*Cololejeunea cardiocarpa*	
.....	*Frullania cobrensis*	
.....	*Frullania eboracensis*	
.....	*Frullania kunzei*	
.....	*Frullania obcordata*	
.....	*Frullania squarrosa*	
.....	*Lejeunea cladogyna*	
.....	*Lejeunea flava*	
.....	*Lejeunea laetivirens*	
.....	*Leucolejeunea unciloba*	
.....	*Marchantia domingensis*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
	Mastigolejeunea auriculata	
	Microlejeunea ulicina spp. *bullata*	
	Odontoschisma prostratum	
	Pallavicinia lyellii	
	Plagiochila dubia	
	Radula australis	
	Riccia fluitans	
	Riccardia latifrons	
	Riccardia multifida	
	Ricciocarpus natans	
	Sphaercarpos sp.	
CHAROPHYTES		
	Chara zeylanica	
	Nitella capillata	
PTERIDOPHYTES		
Giant leather fern	*Acrostichum danaeifolium*	
Ebony spleenwort	*Asplenium platyneuron*	
Southern grape-fern	*Botrychium biternatum*	
Southern wood fern	*Dryopteris ludoviciana*	
Japanese climbing fern	*Lygodium japonicum* *	
Cinnamon fern	*Osmunda cinnamomea*	
Golden polypody	*Phlebodium aureum*	
Resurrection fern	*Pleopeltis polypodioides* var. *michauxiana*	
Tailed bracken	*Pteridium aquilinum* var. *pseudocaudatum*	
Chinese ladder brake	*Pteris vittata* *	
Hairy maiden fern	*Thelypteris hispidula* var. *versicolor*	
Widespread maiden fern	*Thelypteris kunthii*	
Ovate marsh fern	*Thelypteris ovata*	
Marsh fern	*Thelypteris palustris* var. *pubescens*	
Shoestring fern	*Vittaria lineata*	
Virginia chain fern	*Woodwardia virginica*	
GYMNOSPERMS		
Red cedar	*Juniperus virginiana*	
Slash pine	*Pinus elliottii*	
Loblolly pine	*Pinus taeda*	
Bald cypress	*Taxodium distichum*	
Coontie	*Zamia pumila*	
ANGIOSPERMS		
Monocots		
Purple bluestem	*Andropogon glomeratus* var. *glaucopsis*	
Bushy bluestem	*Andropogon glomeratus* var. *pumilus*	
Elliott's bluestem	*Andropogon gyrans* var. *stenophyllus*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Hairy bluestem	*Andropogon longiberbis*	
Broomsedge bluestem	*Andropogon virginicus*	
Nodding nixie	*Apteria aphylla*	
Jack-in-the-pulpit	*Arisaema triphyllum*	
Tall threeawn	*Aristida patula*	
Arrowfeather threeawn	*Aristida purpurascens*	
Bottlebrush threeawn	*Aristida spiciformis*	
Wiregrass	*Aristida stricta* var. *beyrichiana*	
Switchcane	*Arundinaria gigantea*	
Common carpetgrass	*Axonopus fissifolius*	
Big carpetgrass	*Axonopus furcatus*	
King ranch bluestem	*Bothriochloa ischaenum* var. *songarica*	
Sandyfield hairsedge	*Bulbostylis stenophylla*	
Bandanna-of-the-Everglades	*Canna flaccida*	
Broadwing sedge	*Carex alata*	
Eastern woodland sedge	*Carex blanda*	
Chapman's sedge	*Carex chapmannii*	HH
Cherokee sedge	*Carex cherokeensis*	
Longhair sedge	*Carex comosa*	
Hammock sedge	*Carex fissa* var. *aristata*	
Gholson's sedge	*Carex gholsonii*	
Godfrey's sedge	*Carex godfreyi*	
Shoreline sedge	*Carex hylaninolepis*	
False hop sedge	*Carex lupuliformis*	
Peninsula sedge	*Carex paeninsulae*	
Florida hammock sedge	*Carex vexans*	
Southern sandbur	*Cenchrus echinatus*	
Big sandbur	*Cenchrus myosuroides*	
Coastal sandbur	*Cenchrus spinifex*	
Slender woodoats	*Chasmanthium laxum*	
Longleaf woodoats	*Chasmanthium laxum var. sessiliflorum*	
Shiny woodoats	*Chasmanthium nitidum*	
Jamaica swamp sawgrass	*Cladium jamaicense*	
Common dayflower	*Commelina diffusa* *	
Whitemouth dayflower	*Commelina erecta*	
Seven-sisters; string-lily	*Crinum americanum*	
Bermudagrass	*Cynodon dactylon* *	
Poorland flatsedge	*Cyperus compressus*	
Baldwin's flatsedge	*Cyperus croceus*	
Swamp flatsedge	*Cyperus distinctus*	
Yellow nutgrass	*Cyperus esculentus* *	
Yellow flatsedge	*Cyperus flavescens*	
Haspan flatsedge	*Cyperus haspan*	
Swamp flatsedge	*Cyperus ligularis*	
Fragrant flatsedge	*Cyperus odoratus*	
Pinebarren flatsedge	*Cyperus ovatus*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Flatleaf flatsedge	*Cyperus planifolius*	
Manyspike flatsedge	*Cyperus polystachyos*	
Nutgrass	*Cyperus rotundus* *	
Strawcolored flatsedge	*Cyperus strigosus*	
Tropical flatsedge	*Cyperus surinamensis*	
Fourangle flatsedge	*Cyperus tetragonus*	
Green flatsedge	*Cyperus virens*	
Needleleaf witchgrass	*Dichanthelium aciculare*	
Deertongue panicum	*Dichanthelium clandestinum*	
Variable witchgrass	*Dichanthelium commutatum*	
Cypress witchgrass	*Dichanthelium dichotomum*	
Cypress witchgrass	*Dicanthelium ensifolium*	
Erectleaf witchgrass	*Dichanthelium erectifolium*	
Openflower witchgrass	*Dicanthelium laxiflorum*	
Hemlock witchgrass	*Dicanthelium portoricense*	
Southern crabgrass	*Digitaria ciliaris*	
Slender crabgrass	*Digitaria filiformis*	
Saltgrass	*Distichlis spicata*	
Jungle rice	*Echinochloa colona* *	
Barnyardgrass	*Echinochloa crus-galli* *	
Coast cockspur	*Echinochloa walteri*	
Upright burrhead	*Echinodorus berteroi*	
White spikerush	*Eleocharis albida*	
Purple spikerush	*Eleocharis atropurpurea*	
Baldwin's spikerush	*Eleocharis baldwinii*	
Gulf coast spikerush	*Eleocharis cellulosa*	
Yellow spikerush	*Eleocharis flavescens*	
Canada spikerush	*Eleocharis geniculata*	
Sand spikerush	*Eleocharis montevidensis*	
Indian goosegrass	*Eleusine indica* *	
Virginia wildrye	*Elymus virginicus*	
Green-fly orchid	*Epidendrum conopseum*	
Elliot's lovegrass	*Eragrostis elliottii*	
Bigtop lovegrass	*Eragrostis hirsuta*	
Coastal lovegrass	*Eragrostis virginica*	
Centipedegrass	*Eremochloa ophiuroides* *	
Michaux's cupgrass	*Eriochloa michauxii*	
Saltmarsh fingergrass	*Eustachys glauca*	
Pinewoods fingergrass	*Eustachys petraea*	
Slender fimbry	*Fimbristylis autumnalis*	
Carolina fimbry	*Fimbristylis caroliniana*	
Forked fimbry	*Fimbristylis dichotoma*	
Hairy fimbry	*Fimbristylis puberula*	
Marsh fimbry	*Fimbristylis spadicea*	
Saltmarsh umbrellasedge	*Fuirena breviseta*	
Southern umbrellasedge	*Fuirena scirpoidea*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Toothpetal false reinorchid	*Habenaria floribunda*	
Spiked crested coralroot	*Hexalectris spicata*	HH
Hydrilla; Waterthyme	*Hydrilla verticillata* *	
Common yellow stargrass	*Hypoxis curtissii*	
Fringed yellow stargrass	*Hypoxis juncea*	
Cogongrass	*Imperata cylindrica* *	
Dixie iris; Prairie iris	*Iris hexagona*	
Leathery rush	*Juncus coriaceus*	
Forked rush	*Juncus dichotomus*	
Shorerush	*Juncus marginatus*	
Bighead rush	*Juncus megacephalus*	
Manyhead rush	*Juncus polycephalos*	
Needlegrass rush	*Juncus roemerianus*	
Needlepod rush	*Juncus scirpoides*	
Path rush	*Juncus tenuis*	
Shortleaf spikesedge	*Kyllinga brevifolia*	
Low spikesedge	*Kyllinga pumila* *	
Southern cutgrass	*Leersia hexandra*	
Whitegrass	*Leersia virginica*	
Little duckweed	*Lemna obscura*	
Bearded sprangletop	*Leptochloa fusca* subsp. *fascicularis*	
Florida addersmouth orchid	*Malaxis spicata*	
Twoflower melicgrass	*Melica mutica*	
Shoregrass	*Monanthochloe littoralis*	
Hairawn muhly	*Muhlenbergia capillaris*	
Nakedstem dewflower	*Murdannia nudiflora* *	
Spiny waternymph	*Najas marina*	
Crowpoison	*Nothoscordum bivalve*	
Woodsgrass	*Oplismenus hirtellus*	
Beaked panicum	*Panicum anceps*	
Fall panicgrass	*Panicum dichotomiflorum*	
Torpedograss	*Panicum repens* *	
Redtop panicum	*Panicum rigidulum*	
Switchgrass	*Panicum virgatum*	
Rustyseed paspalum	*Paspalum botterii*	
Blue crowngrass	*Paspalum caespitosum*	
Dallisgrass *	*Paspalum dilatatum*	
Florida paspalum	*Paspalum floridanum*	
Bahiagrass	*Paspalum notatum* var. *saurae* *	
Water paspalum	*Paspalum repens*	
Thin paspalum	*Paspalum setaceum*	
Vaseygrass	*Paspalum urvillei* *	
Seashore paspalum	*Paspalum vaginatum*	
Green arrow arum	*Peltandra virginica*	
Savannah panicum	*Phanopyrum gymnocarpon*	
Annual bluegrass	*Poa annua* *	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Rabbitsfootgrass	*Polypogon monspeliensis* *	
Hairy shadow witch	*Ponthieva racemosa*	
Needle palm	*Rhapidophyllum hystrix*	
Anglestem beaksedge	*Rhynchospora caduca*	
Starrush whitetop	*Rhynchospora colorata*	
Shortbristle horned beakrush	*Rhynchospora corniculata*	
Fascicled beaksedge	*Rhynchospora fascicularis*	
Sandyfield beaksedge	*Rhynchospora megalocarpa*	
Southern beaksedge	*Rhynchospora microcarpa*	
Millet beaksedge	*Rhynchospora miliacea*	
Mingled beaksedge	*Rhynchospora mixta*	
Widgeongrass	*Ruppia maritima*	
Dwarf palmetto	*Sabal minor*	
Cabbage palm	*Sabal palmetto*	
Sugarcane plumegrass	*Saccharum giganteum*	
Grassy arrowhead	*Sagittaria graminea*	
Bulltongue arrowhead	*Sagittaria lancifolia*	
Awl-leaf arrowhead	*Sagittaria subulata*	
Little bluestem	*Schizachyrium scoparium*	
Giant bulrush	*Schoenoplectus californicus*	
Saltmarsh bulrush	*Schoenoplectus robustus*	
Softstem bulrush	*Schoenoplectus tabernaemontani*	
Drooping bulrush	*Scirpus lineatus*	
Littlehead nutrush	*Scleria oligantha*	
Tall nutgrass	*Scleria triglomerata*	
Low nutrush	*Scleria verticillata*	
Cultivated rye	*Secale cereale* *	
Saw palmetto	*Serenoa repens*	
Coral foxtail	*Setaria macrosperma*	
Yellow bristlegrass	*Setaria parviflora*	
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*	
Annual blue-eyed grass	*Sisyrinchium rosulatum* *	
Earleaf greenbrier	*Smilax auriculata*	
Saw greenbrier	*Smilax bona-nox*	
Cat greenbrier	*Smilax glauca*	
Laurel greenbrier	*Smilax laurifolia*	
Sarsaparilla vine	*Smilax pumila*	
Jackson vine	*Smilax smallii*	
Bristly greenbrier	*Smilax tamnoides*	
Slender Indiangrass	*Sorghastrum elliotti*	
Saltmarsh cordgrass	*Spartina alterniflora*	
Sand cordgrass	*Spartina bakeri*	
Marshhay cordgrass	*Spartina patens*	
Gulf cordgrass	*Spartina spartinae*	
Prairie wedgescale	*Sphenopholis obtusata*	
Smutgrass	*Sporobolus indicus* *	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Seashore dropseed	*Sporobolus virginicus*	
St. Augustinegrass	*Stenotaphrum secundatum*	
Sago pondweed	*Stuckenia pectinata*	
Alligator flag	*Thalia geniculata*	
Bartram's airplant	*Tillandsia bartramii*	
Ballmoss	*Tillandsia recurvata*	
Southern needleleaf	*Tillandsia setacea*	
Spanish moss	*Tillandsia usneoides*	
Tall redtop	*Tridens flavus*	
Arrowgrass	*Triglochin striata*	
Eastern gamagrass	*Tripsacum dactyloides*	
Southern cattail	*Typha domingensis*	
Shortleaf yelloweyed grass	*Xyris brevifolia*	
Carolina yelloweyed grass	*Xyris caroliniana*	
Spanish bayonet	*Yucca aloifolia*	
Redmargin zephyrlily	*Zephyranthes simpsonii*	HH

Dicots

Mauve	*Abutilon hulseanum*	
Slender threeseed mercury	*Acalypha gracilens*	
Red maple	*Acer rubrum*	
Florida maple	*Acer saccharum* var. *floridanum*	
Oppositeleaf spotflower	*Acmella oppositifolia* var. *repens*	
Red buckeye	*Aesculus pavia*	
Saltmarsh false foxglove	*Agalinis maritima*	
Slenderleaf false foxglove	*Agalinis tenuifolia*	
Hammock snakeroot	*Ageratina jucunda*	
Mimosa	*Albizia julibrissin* *	
Southern amaranth	*Amaranthus australis*	
Spiny amaranth	*Amaranthus spinosus* *	
Common ragweed	*Ambrosia artemisiifolia*	
Pink redstem	*Ammannia latifolia*	
Bastard false indigo	*Amorpha fruticosa*	
Peppervine	*Ampelopsis arborea*	
Eastern bluestar	*Amsonia tabernaemontana*	
Chaffweed	*Anagallis minima*	
Devil's walkingstick	*Aralia spinosa*	
Spreading sandwort	*Arenaria lanuginosa*	
Thymeleaf sandwort	*Arenaria serpyllifolia* *	
Swamp milkweed	*Asclepias incarnata*	
Fewflower milkweed	*Asclepias lanceolata*	
Milkweed	*Asclepias perennis*	
Showy milkwort	*Asemeia violacea*	
Slimleaf pawpaw	*Asimina angustifolia*	
Crested saltbush	*Atriplex pentandra*	
Black mangrove	*Avicennia germinans*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Saltwater falsewillow	*Baccharis angustifolia*	
Silverling	*Baccharis glomeruliflora*	
Groundsel tree; sea-myrtle	*Baccharis halimifolia*	
Herb-of-grace	*Bacopa monnieri*	
Saltwort	*Batis maritima*	
Tarflower	*Bejaria racemosa*	
Rattan vine	*Berchemia scandens*	
Florida greeneyes	*Berlandiera subacaulis*	
Beggarticks	*Bidens alba*	
Spanish needles	*Bidens bipinnata*	
Spanish needles	*Bidens mitis*	
Crossvine	*Bignonia capreolata*	
Samphire	*Blutaparon vermiculare*	
Red spiderling	*Boerhavia diffusa*	
False nettle	*Boehmeria cylindrica*	
Smallhead doll's daisy	*Boltonia diffusa*	
Bushy seaside oxeye	*Borrichia frutescens*	
American bluehearts	*Buchnera americana*	
Coastal searocket	*Cakile lanceolata*	
American beautyberry	*Callicarpa americana*	
Florida bellflower	*Campanula floridana*	
Trumpet creeper	*Campsis radicans*	
Tropical bushmint	*Cantinoa mutabilis* *	
Bulbous bittercress	*Cardamine bulbosa*	
Pennsylvania bittercress	*Cardamine pensylvanica*	
Vanillaleaf	*Carphephorus odoratissimus*	
American hornbeam	*Carpinus caroliniana*	
Wild olive	*Cartrema americana*	
Water hickory	*Carya aquatica*	
Pignut hickory	*Carya glabra*	
Sugarberry; hackberry	*Celtis laevigata*	
Spadeleaf	*Centella asiatica*	
Spurred butterfly pea	*Centrosema virginianum*	
Common buttonbush	*Cephalanthus occidentalis*	
Mouse-ear chickweed	*Cerastium glomeratum* *	
Spiny hornwort	*Ceratophyllum echinatum*	
Redbud	*Cercis canadensis*	
Partridge pea	*Chamaecrista fasciculata*	
Sensitive pea	*Chamaecrista nictitans*	
Limestone sandmat	*Chamaesyce blodgettii*	
Hyssopleaf sandmat	*Chamaesyce hyssopifolia*	
Spotted sandmat	*Chamaesyce maculata*	
Coastal beach sandmat	*Chamaesyce mesembrianthemifolia*	
Pitseed goosefoot	*Chenopodium berlandieri*	
Snowberry; milkberry	*Chiococca alba*	
Spotted water hemlock	*Cicuta maculata*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Purple thistle	*Cirsium horridulum*	
Nuttall's thistle	*Cirsium nuttallii*	
Sweet orange	*Citrus x aurantium* *	
Satincurls	*Clematis catesbyana*	
Swamp leather-flower	*Clematis crispa*	
Carolina coralbead	*Cocculus carolinus*	
Blue mistflower	*Conoclinium coelestinum*	
Asthmaweed	*Conyza bonariensis* *	
Canadian horseweed	*Conyza canadensis*	
Leavenworth's tickseed	*Coreopsis leavenworthii*	
Roughleaf dogwood	*Cornus asperifolia*	
Swamp dogwood	*Cornus foemina*	
Smallflower fumewort	*Corydalis micrantha* subsp. *australis*	
May haw	*Crataegus aestivalis*	
Rabbitbells	*Crotalaria rotundifolia*	
Showy rattlebox	*Crotalaria spectabilis* *	
Colombian waxweed	*Cuphea carthagenensis*	
Little ironweed	*Cyanthillium cinereum* *	
Marsh parsley	*Cyclospermum leptophyllum* *	
Whitetassels	*Dalea carnea*	
Swamp loosestrife	*Decodon verticillatus*	
Climbing hydrangea	*Decumaria barbara*	
Western tansymustard	*Descurainia pinnata*	
Wild tantan	*Desmanthus virgatus* *	
Dillenius' ticktrefoil	*Desmodium glabellum*	
Zarzabacoa comun	*Desmodium incanum* *	
Smooth ticktrefoil	*Desmodium marilandicum*	
Panicledleaf ticktrefoil	*Desmodium paniculatum*	
Dixie ticktrefoil	*Desmodium tortuosum* *	
Threeflower ticktrefoil	*Desmodium triflorum* *	
Carolina ponysfoot	*Dichondra carolinensis*	
Branched foldwing	*Dicliptera brachiata*	
Virginia buttonweed	*Diodia virginiana*	
Florida yam	*Dioscorea floridana*	
Common persimmon	*Diospyros virginiana*	
Swamp twinflower	*Dyschoriste humistrata*	
Oblongleaf twinflower	*Dyschoriste oblongifolia*	
False daisy	*Eclipta prostrata*	
Carolina elephantsfoot	*Elephantopus carolinianus*	
Tall elephantsfoot	*Elephantopus elatus*	
Smooth elephantsfoot	*Elephantopus nudatus*	
Carolina scalystem	*Elytraria caroliniensis*	
American burnweed	*Erechtites hieraciifolius*	
Oakleaf fleabane	*Erigeron quercifolius*	
Prairie fleabane	*Erigeron strigosus*	
Early whitetop fleabane	*Erigeron vernus*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Baldwin's eryngo	*Eryngium baldwinii*	
Coralbean; Cherokee bean	*Erythrina herbacea*	
White stopper	*Eugenia axillaris*	
American strawberrybush	*Euonymus americanus*	
White thoroughwort	*Eupatorium album*	
Dogfennel	*Eupatorium capillifolium*	
Semaphore thoroughwort	*Eupatorium mikanioides*	
Mohr's thoroughwort	*Eupatorium mohrii*	
Common boneset	*Eupatorium perfoliatum*	
False horehound	*Eupatorium rotundifolium*	
Lateflowering boneset	*Eupatorium serotinum*	
Wood spurge	*Euphorbia commutata*	HH
Marsh gentian	*Eustoma exaltatum*	
Slender flattop goldenrod	*Euthamia caroliniana*	
Silver dwarf morning-glory	*Evolvulus sericeus*	
Narrowleaf yellowtops	*Flaveria linearis*	
Pink thoroughwort	*Fleischmannia incarnata*	
Upland swampprivet	*Forestiera ligustrina*	
Florida swampprivet	*Forestiera segregata*	
White ash	*Fraxinus americana*	
Carolina ash	*Fraxinus caroliniana*	
Green ash; pumpkin ash	*Fraxinus pennsylvanica*	
Elliott's milkpea	*Galactia elliottii*	
Eastern milkpea	*Galactia volubilis*	
Coastal bedstraw	*Galium hispidulum*	
Hairy bedstraw	*Galium pilosum*	
Stiff marsh bedstraw	*Galium tinctorium*	
Pennsylvania everlasting	*Gamochaeta pensylvanica*	
Blue huckleberry	*Gaylussacia frondosa* var. *tomentosa*	
Yellow jessamine	*Gelsemium sempervirens*	
Carolina cranesbill	*Geranium carolinianum*	
Water locust	*Gleditsia aquatica*	
Honey locust	*Gleditsia triacanthos*	
Angularfruit milkvine	*Gonolobus suberosus*	HH
Rough hedgehyssop	*Gratiola hispida*	
Narrowleaf sunflower	*Helianthus angustifolius*	
East coast dune sunflower	*Helianthus debilis*	
Stiff sunflower	*Helianthus radula*	
Seaside heliotrope	*Heliotropium curassavicum*	
Camphorweed	*Heterotheca subaxillaris*	
Scarlet rosemallow	*Hibiscus coccineus*	
Swamp rosemallow	*Hibiscus grandiflorus*	
Innocence	*Houstonia procumbens*	
Manyflower marshpennywort	*Hydrocotyle umbellata*	
Whorled marshpennywort	*Hydrocotyle verticillata*	
Roundpod St. John's-wort	*Hypericum cistifolium*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
St. Andrew's-cross	*Hypericum hypericoides*	
Fourpetal St. John's-wort	*Hypericum tetrapetalum*	
Clustered bushmint	*Hyptis alata*	
Dahoon	*Ilex cassine*	
Gallberry	*Ilex glabra*	
Yaupon	*Ilex vomitoria*	
Tievine	*Ipomoea cordatotriloba*	
Ivyleaf morning-glory	*Ipomoea hederacea* *	
Whitestar	*Ipomoea lacunosa*	
Largeroot morningglory	*Ipomoea macrorhiza* *	
Man-of-the-earth	*Ipomoea pandurata*	
Railroad vine	*Ipomoea pes-caprae* subsp. *brasiliensis*	
Saltmarsh morning-glory	*Ipomoea sagittata*	
Juba's bush	*Iresine diffusa*	
Bigleaf sumpweed	*Iva frutescens*	
Piedmont marshelder	*Iva microcephala*	
Virginia saltmarsh mallow	*Kosteletzkya pentacarpos*	
Japanese clover	*Kummerowia striata* *	
Canada lettuce	*Lactuca canadensis*	
Woodland lettuce	*Lactuca floridana*	
Henbit deadnettle	*Lamium amplexicaule* *	
Lantana; shrubverbena	*Lantana camara* *	
Corkwood	*Leitneria floridana*	HH
Lesser swinecress	*Lepidium didymum* *	
Virginia pepperweed	*Lepidium virginicum*	
Narrowleaf lespedeza	*Lespedeza angustifolia*	
Hairy lespedeza	*Lespedeza hirta*	
Narrowleaf paleseed	*Leucospora multifida* *	
Grassleaf gayfeather	*Liatris elegantula*	
Slender gayfeather	*Liatris gracilis*	
Shortleaf gayfeather	*Liatris tenuifolia*	
Carolina sealavender	*Limonium carolinianum*	
Canadian toadflax	*Linaria canadensis*	
Malaysian false pimpernel	*Lindernia crustacea* *	
Stiff yellow flax	*Linum medium* var. *texanum*	
Sweetgum	*Liquidambar styraciflua*	
Tuberous gromwell	*Lithospermum tuberosum*	
Cardinalflower	*Lobelia cardinalis*	BS
Bay lobelia	*Lobelia feayana*	
Glade lobelia	*Lobelia glandulosa*	
Coral honeysuckle	*Lonicera sempervirens*	
Seaside primrosewillow	*Ludwigia maritima*	
Smallfruit primrosewillow	*Ludwigia microcarpa*	
Creeping primrosewillow	*Ludwigia repens*	
Christmasberry	*Lycium carolinianum*	
Rose-rush	*Lygodesmia aphylla*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Rusty staggerbush	*Lyonia ferruginea*	
Coastalplain staggerbush	*Lyonia fruticosa*	
Fetterbush	*Lyonia lucida*	
Winged loosestrife	*Lythrum alatum*	
Wand loosestrife	*Lythrum lineare*	
Southern magnolia	*Magnolia grandiflora*	
Sweetbay	*Magnolia virginiana*	
Florida mayten	*Maytenus phyllanthoides*	HH
Axilflower	*Mecardonia acuminata* ssp. *peninsularis*	
Black medick	*Medicago lupulina* *	
Snow squarestem	*Melanthera nivea*	
White sweetclover	*Melilotus albus*	
Indian sweetclover	*Melilotus indicus* *	
Chocolateweed	*Melochia corchorifolia* *	
Creeping cucumber	*Melothria pendula*	
Florida Keys hempvine	*Mikania cordifolia*	
Climbing hempvine	*Mikania scandens*	
Partridgeberry	*Mitchella repens*	
Tropical girdlepod	*Mitracarpus hirtus* *	
Lax hornpod	*Mitreola petiolata*	
Swamp hornpod	*Mitreola sessilifolia*	
Carolina bristlemallow	*Modiola caroliniana*	
Spotted beebalm	*Monarda punctata*	
Red mulberry	*Morus rubra*	
Wax myrtle	*Myrica cerifera*	
Cutleaf watermilfoil	*Myriophyllum pinnatum*	
Myrsine	*Myrsine cubana*	
Tropical puff	*Neptunia pubescens*	
Tropical royalblue waterlily	*Nymphaea elegans*	
American white waterlily	*Nymphaea odorata*	
Swamp tupelo	*Nyssa sylvatica* var. *biflora*	
Cutleaf eveningprimrose	*Oenothera laciniata*	
Southern beeblossum	*Oenothera simulans*	
Flattop mille graines	*Oldenlandia corymbosa* *	
Shell-mound pricklypear	*Opuntia stricta*	MF, HH
Leafless swallowwort	*Orthosia scoparia*	
Eastern hophornbeam	*Ostrya virginiana*	
Common yellow woodsorrel	*Oxalis corniculata*	
Butterweed	*Packera glabella*	
Virginia creeper	*Parthenocissus quinquefolia*	
Yellow passionflower	*Passiflora lutea*	
Corkystem passionflower	*Passiflora suberosa*	
Spearleaf swampmallow	*Pavonia hastata* *	
Manyflower beardtongue	*Penstemon multiflorus*	
Red bay	*Persea borbonia*	
Swamp bay	*Persea palustris*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Mild waterpepper	*Persicaria hydropiperoides*	
Dotted smartweed	*Persicaria punctata*	
Thicket bean	*Phaseolus x smilacifolius*	
Oak mistletoe	*Phoradendron leucarpum*	
Red chokeberry	*Photina pyrifolia*	
Turkey tangle fogfruit	*Phyla nodiflora*	
Carolina leafflower	*Phyllanthus caroliniensis*	
Pinewoods dainties	*Phyllanthus liebmannianus* ssp. *platylepis*	HH
Chamber bitter	*Phyllanthus urinaria* *	
Walter's groundcherry	*Physalis walteri*	
American pokeweed	*Phytolacca americana*	
Yellow butterwort	*Pinguicula lutea*	MF
Small butterwort	*Pinguicula pumila*	
Pitted stripeseed	*Piriqueta cistoides* subsp. *caroliniana*	
Common plantain	*Plantago major* *	
Virginia plantain	*Plantago virginica*	
Rosy camphorweed	*Pluchea baccharis*	
Longleaf camphorweed	*Pluchea longifolia*	
Sweetscent	*Pluchea odorata*	
Paintedleaf	*Poinsettia cyathophora*	
Boykin's milkwort	*Polygala boykinii*	
Procession flower	*Polygala incarnata*	
Candyroot	*Polygala nana*	
Rustweed	*Polypremum procumbens*	
Paraguayan purslane	*Portulaca amilis* *	
Marsh mermaidweed	*Proserpinaca palustris*	
Combleaf mermaidweed	*Proserpinaca pectinata*	
American plum	*Prunus americana*	
Black cherry	*Prunus serotina*	
Flatwoods plum	*Prunus umbellata*	
Wild coffee	*Psychotria nervosa*	
Common hoptree	*Ptelea trifoliata*	
Blackroot	*Pterocaulon pycnostachyum*	
Mock bishopsweed	*Ptilimnium capillaceum*	
Carolina desertchicory	*Pyrrhopappus carolinianus*	
Chapman's oak	*Quercus chapmanii*	
Sand live oak	*Quercus geminata*	
Laurel oak; diamond oak	*Quercus laurifolia*	
Swamp chestnut oak	*Quercus michauxii*	
Myrtle oak	*Quercus myrtifolia*	
Water oak	*Quercus nigra*	
Running oak	*Quercus pumila*	
Shumard's oak	*Quercus shumardii*	
Live oak	*Quercus virginiana*	
Wild radish	*Raphanus raphanistrum* *	
Camphor daisy	*Rayjacksonia phyllocephala*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Winged sumac	*Rhus copallinum*	
Michaux's snoutbean	*Rhynchosia michauxii*	
Least snoutbean	*Rhynchosia minima*	
Tropical Mexican clover	*Richardia brasiliensis* *	
Southern marsh yellowcress	*Rorippa teres*	
Swamp rose	*Rosa palustris*	
Sand blackberry	*Rubus cuneifolius*	
Sawtooth blackberry	*Rubus pensilvanicus*	
Southern dewberry	*Rubus trivialis*	
Blackeyed Susan	*Rudbeckia hirta*	
Cutleaf coneflower	*Rudbeckia laciniata*	
Browneyed Susan	*Rudbeckia triloba* var. *pinnatiloba*	HH
Carolina wild petunia	*Ruellia caroliniensis*	
Swamp dock	*Rumex verticillatus*	
Coastal rosegentian	*Sabatia calycina*	
Rose-of-Plymouth	*Sabatia stellaris*	
Smallflower mock buckthorn	*Sageretia minutiflora*	
Annual glasswort	*Salicornia bigelovii*	
Carolina willow	*Salix caroliniana*	
Tropical sage	*Salvia coccinea*	
Lyreleaf sage	*Salvia lyrata*	
American elder; elderberry	*Sambucus nigra* subsp. *canadensis*	
Water pimpernel	*Samolus ebracteatus*	
Pineland pimpernel	*Samolus valerandi* subsp. *parviflorus*	
Canadian blacksnakeroot	*Sanicula canadensis*	
Soapberry	*Sapindus saponaria*	
Perennial glasswort	*Sarcocornia ambigua*	
Lizard's tail	*Saururus cernuus*	
Brazilian pepper	*Schinus terebinthifolia* *	
Sweetbroom	*Scoparia dulcis*	
Carpenter's square	*Scrophularia marilandica*	
Florida scrub skullcap	*Scutellaria arenicola*	
Helmet skullcap	*Scutellaria integrifolia*	
Maryland wild sensitive plant	*Senna marilandica*	
Coffeeweed; sickelpod	*Senna obtusifolia*	
Whitetop aster	*Seriocarpus tortifolius*	
Danglepod	*Sesbania herbacea*	
Bladderpod	*Sesbania vesicaria*	
Shoreline seapurslane	*Sesuvium portulacastrum*	
Gulf coast swallowwort	*Seutera angustifolia*	
Cuban jute	*Sida rhombifolia*	
Prickly fanpetals	*Sida spinosa* *	
Saffron plum	*Sideroxylon celastrinum*	
Gum bully	*Sideroxylon lanuginosum*	
Florida bully	*Sideroxylon reclinatum*	
Tough bully	*Sideroxylon tenax*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Starry rosinweed	*Silphium asteriscus*	
Hairy leafcup	*Smallanthus uvedalia*	
Carolina horsenettle	*Solanum carolinense*	
Black nightshade	*Solanum chenopodioides*	
Pinebarren goldenrod	*Solidago fistulosa*	
Chapman's goldenrod	*Solidago odora* var. *chapmanii*	
Wrinkleleaf goldenrod	*Solidago rugosa* subsp. *aspera*	
Florida horsenettle	*Solanum carolinense* var. *floridanum*	
Chapman's goldenrod	*Solidago odora* var. *chapmanii*	
Seaside goldenrod	*Solidago sempervirens*	
Wand goldenrod	*Solidago stricta*	
Twistedleaf goldenrod	*Solidago tortifolia*	
Spiny sowthistle	*Sonchus asper* *	
Prostrate false buttonweed	*Spermacoce prostrata* *	
Woodland false buttonweed	*Spermacoce remota*	
Creeping oxeye	*Sphagneticola trilobata* *	
Florida pinkroot	*Spigelia loganioides*	HH
Common chickweed	*Stellaria media* *	
American snowbell	*Styrax americanus*	
Sea blite	*Suaeda linearis*	
Coralberry	*Symphoricarpos orbiculatus*	HH
Climbing aster	*Symphyotrichum carolinianum*	
Rice button aster	*Symphyotrichum dumosum*	
Annual saltmarsh aster	*Symphyotrichum subulatum*	
Perennial saltmarsh aster	*Symphyotrichum tenuifolium*	
New Zealand spinach	*Tetragonia tetragonioides* *	
Wood sage	*Teucrium canadense*	
Water cowbane	*Tiedemannia filiformis*	
Carolina basswood	*Tilia americana* var. *caroliniana*	
Eastern poison ivy	*Toxicodendron radicans*	
Whitenymph	*Trepocarpus aethusae*	
Forked bluecurls	*Trichostema dichotomum*	
Field clover	*Trifolium campestre*	
Clasping Venus' looking-glass	*Triodanis perfoliata*	
Winged elm	*Ulmus alata*	
American elm	*Ulmus americana*	
Cedar elm	*Ulmus crassifolia*	
Heartleaf nettle	*Urtica chamaedryoides*	
Leafy bladderwort	*Utricularia foliosa*	
Sparkleberry	*Vaccinium arboreum*	
Darrow's blueberry	*Vaccinium darrowii*	
Shiny blueberry	*Vaccinium myrsinites*	
Deerberry	*Vaccinium stamineum*	
Brazilian vervain	*Verbena brasiliensis* *	
Harsh vervain	*Verbena scabra*	
Shiny blueberry	*Vaccinium myrsinites*	

Common Name	*Scientific Name*	Primary Habitat Codes (for imperiled species)
Deerberry	*Vaccinium stamineum*	
Brazilian vervain	*Verbena brasiliensis* *	
White crownbeard	*Verbesina virginica*	
Giant ironweed	*Vernonia gigantea*	
Corn speedwell	*Veronica arvensis* *	
Neckweed	*Veronica peregrina*	
Southern arrowwood	*Viburnum dentatum*	
Walter's viburnum	*Viburnum obovatum*	
Fourleaf vetch	*Vicia acutifolia*	
Florida vetch	*Vicia floridana*	
Common vetch	*Vicia sativa* *	
Early blue violet	*Viola palmata*	
Common blue violet	*Viola sororia*	
Prostrate blue violet	*Viola walteri*	
Summer grape	*Vitis aestivalis*	
Florida grape	*Vitis cinerea* var. *floridana*	
Muscadine	*Vitis rotundifolia*	
Frost grape	*Vitis vulpina*	
Cockleburr	*Xanthium strumarium*	
Hog plum	*Ximenia americana*	
Oriental false hawksbeard	*Youngia japonica* *	
Hercules-club	*Zanthoxylum clava-herculis*	
Wild lime	*Zanthoxylum fagara*	

Waccasassa Bay Preserve State Park Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
INVERTEBRATES		
Butterflies and Moths		
Zabulon Skipper	*Poanes zabulon*	MF
FISH		
Lined Sole	*Achirus lineatus*	ECPS
Orange Filefish	*Aluterus schoepfi*	ECPS
White Catfish	*Ameiurus catus*	ECPS
Fringed Pipefish	*Anarchopterus criniger*	ECPS
Broad-striped Anchovy	*Anchoa hepsetus*	ECPS
Bay Anchovy	*Anchoa mitchilli*	ECPS
Sheepshead	*Archosargus probatocephalus*	BST, ECPS
Hardhead Catfish	*Arius felis*	BST, ECPS
Southern Stargazer	*Astroscopus y-graecum*	ECPS
Gafftopsail Catfish	*Bagre marinus*	ECPS
Silver Perch	*Bairdiella chrysoura*	ECPS
Frillfin Goby	*Bathygobius soporator*	ECPS
Gulf Menhaden	*Brevoortia patronus*	ECPS
Grass Porgy	*Calamus arctifrons*	ECPS
Crevalle Jack	*Caranx hippos*	ECPS
Blacktip Shark	*Carcharhinus limbatus*	ECPS
Atlantic Spadefish	*Chaetodipterus faber*	ECPS
Florida Blenny	*Chasmodes saburrae*	ECPS
Striped Burrfish	*Chilomycterus schoepfi*	ECPS
Atlantic Bumper	*Chloroscombrus chrysurus*	ECPS
Sand Seatrout	*Cynoscion arenarius*	ECPS
Spotted Seatrout	*Cynoscion nebulosus*	ECPS
Sheepshead Minnow	*Cyprinodon variegatus*	ECPS
Atlantic Stingray	*Dasyatis sabina*	ECPS
Bluntnose Stingray	*Dasyatis say*	ECPS
Round Scad	*Decapterus punctatus*	ECPS
Sand Perch	*Diplectrum formosum*	ECPS
Spottail Pinfish	*Diplodus holbrooki*	ECPS
Gizzard Shad	*Dorosoma cepedianum*	ECPS
Threadfin Shad	*Dorosoma petenense*	ECPS
Sharksucker	*Echeneis naucrates*	ECPS
Ladyfish	*Elops saurus*	ECPS
Redfin Pickerel	*Esox americanus americanus*	ECPS
Chain Pickerel	*Esox niger*	ECPS
Swamp Darter	*Etheostoma fusiforme*	ECPS
Fringed Flounder	*Etropus crossotus*	ECPS
Smallmouth Flounder	*Etropus microstomus*	ECPS
Jenny Mojarra	*Eucinostomus gula*	ECPS
Tidewater Mojarra	*Eucinostomus harengulus*	ECPS
Goldspotted Killifish	*Floridichthys carpio*	ECPS

* Non-native species ^ Garden species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Golden Topminnow	*Fundulus chrysotus*	ECPS
Marsh Killifish	*Fundulus confluentus*	ECPS
Gulf Killifish	*Fundulus grandis*	ECPS
Striped Killifish	*Fundulus majalis*	ECPS
Seminole Killifish	*Fundulus seminolis*	ECPS
Eastern Mosquitofish	*Gambusia holbrooki*	ECPS
Skilletfish	*Gobiesox strumosus*	ECPS
Darter Goby	*Gobionellus boleosoma*	ECPS
Naked Goby	*Gobiosoma bosc*	ECPS
Twoscale Goby	*Gobiosoma longipala*	ECPS
Code Goby	*Gobiosoma robustum*	ECPS
Smooth Butterfly Ray	*Gymnura micrura*	ECPS
White Grunt	*Haemulon plumieri*	ECPS
Scaled Sardine	*Harengula jaguana*	ECPS
Buntnose Jack	*Hemicaranx amblyrhynchus*	ECPS
Least Killifish	*Heterandria formosa*	ECPS
Lined Seahorse	*Hippocampus erectus*	ECPS
Dwarf Seahorse	*Hippocampus zosterae*	ECPS
Crested Blenny	*Hypleurochilus geminatus*	ECPS
Halfbeak	*Hyporhamphus unifasciatus*	ECPS
Feather Blenny	*Hypsoblennius hentz*	ECPS
Scrawled Cowfish	*Lactophrys quadricornis*	ECPS
Buffalo Trunkfish	*Lactophyrs trigonus*	ECPS
Pinfish	*Lagodon rhomboides*	BST, ECPS
Spot Croaker	*Leiostomus xanthurus*	BST, ECPS
Longnose Gar	*Lepisosteus osseus*	ECPS
Florida Gar	*Lepisosteus platyrhincus*	ECPS
Dollar Sunfish	*Lepomis marginatus*	ECPS
Redear Sunfish	*Lepomis microlophus*	ECPS
Spotted Sunfish	*Lepomis punctatus*	ECPS
Bluefin Killifish	*Lucania goodei*	ECPS
Rainwater Killifish	*Lucania parva*	ECPS
Gray Snapper	*Lutjanus griseus*	ECPS
Lane Snapper	*Lutjanus synagris*	ECPS
Rough Silverside	*Membras martinica*	ECPS
Inland Silverside	*Menidia beryllina*	BST, ECPS
Tidewater Silverside	*Menidia peninsulae*	ECPS
Southern Kingcroaker	*Menticirrhus americanus*	ECPS
Northern Kingcroaker	*Menticirrhus saxatalis*	ECPS
Green Goby	*Microgobius thalassinus*	ECPS
Fringed Filefish	*Monacanthus ciliatus*	ECPS
Planehead Filefish	*Monacanthus hispidus*	ECPS
Striped Mullet	*Mugil cephalus*	ECPS
White Mullet	*Mugil curema*	ECPS
Gag	*Mycteroperca microlepis*	ECPS
Speckled Worm-eel	*Myrophis punctatus*	ECPS

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Golden Shiner	*Notemigonus crysoleucas*	ECPS
Coastal Shiner	*Notropis petersoni*	ECPS
Polka-dot Batfish	*Ogcocephalus radiatus*	ECPS
Leatherjacket	*Oligoplites saurus*	ECPS
Shrimp Eel	*Ophichthus gomesi*	ECPS
Crested Cusk-eel	*Ophidion welshi*	ECPS
Atlantic Thread Herring	*Opisthonema oglinum*	ECPS
Gulf Toadfish	*Opsanus beta*	ECPS
Pigfish	*Orthopristis chrysoptera*	ECPS
Seaweed Blenny	*Parablennius marmoreus*	ECPS
Gulf Flounder	*Paralichthys albigutta*	ECPS
Harvestfish	*Peprilus alepidotus*	ECPS
Poecilia hybrid *	*Poecilia* sp.	ECPS, BST
Black Drum	*Pogonias cromis*	ECPS
Bluefish	*Pomatomus saltatrix*	ECPS
Leopard Searobin	*Prionotus scitulus*	ECPS
Bighead Searobin	*Prionotus tribulus*	ECPS
Cownose Ray	*Rhinoptera bonasus*	ECPS
Round Sardinella	*Sardinella aurita*	ECPS
Red Drum	*Sciaenops ocellatus*	ECPS
Spanish Mackerel	*Scomberomorous maculatus*	ECPS
Barbfish	*Scorpaena brasiliensis*	ECPS
Lookdown	*Selene vomer*	ECPS
Southern Puffer	*Sphoeroides nephelus*	ECPS
Bandtail Puffer	*Sphoeroides spengleri*	ECPS
Northern Sennet	*Sphyraena borealis*	ECPS
Bonnethead Shark	*Sphyrna tiburo*	ECPS
Checkered Blenny	*Starksia ocellata*	ECPS
Atlantic Needlefish	*Strongylura marina*	ECPS
Redfin Needlefish	*Strongylura notata*	ECPS
Blackcheek Tonguefish	*Symphurus plagiusa*	ECPS
Dusky Pipefish	*Syngnathus floridae*	ECPS
Chain Pipefish	*Syngnathus louisianae*	ECPS
Sargassum Pipefish	*Syngnathus pelagicus*	ECPS
Gulf Pipefish	*Syngnathus scovelli*	ECPS
Inshore Lizardfish	*Synodus foetens*	ECPS
Florida Pompano	*Trachinotus carolinus*	ECPS
Permit	*Trachinotus falcatus*	ECPS
Hog Choker	*Trinectes maculatus*	BST, ECPS
Hound Needlefish	*Tylosurus crocodilus*	ECPS

AMPHIBIANS

Frogs and Toads

Southern Toad	*Anaxyrus terrestris*	HH
Cope's Gray Treefrog	*Hyla chrysocelis*	HH
Green Treefrog	*Hyla cinerea*	HH

* Non-native species ^ Garden species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
American Bullfrog	*Lithobates catesbeianus*	BS
Southern Leopard Frog	*Lithobates sphenocephala*	BS
Southern Chorus Frog	*Pseudacris nigrita*	MF
Salamanders		
Two-toed Amphiuma	*Amphiuma means*	BS
Eastern Lesser Siren	*Siren intermedia*	BS
REPTILES		
Crocodilians		
American Alligator	*Alligator mississippiensis*	BST
Turtles		
Loggerhead Sea Turtle	*Caretta caretta*	ECPS
Green Turtle	*Chelonia mydas*	ECPS
Gopher Tortoise	*Gopherus polyphemus*	MF
Striped Mud Turtle	*Kinosternon baurii*	HH
Eastern Mud Turtle	*Kinosternon subrubrum subrubrum*	HH
Kemp's Ridley Turtle	*Lepidochelys kempii*	ECPS
Diamondback Terrapin	*Malaclemys terrapin*	SAM, ECPS
Florida Box Turtle	*Terrapene carolina bauri*	HH
Snakes		
Florida Cottonmouth	*Agkistrodon piscivorus conanti*	HH
Southern Black Racer	*Coluber constrictor priapus*	HH, MF
E. Diamond-backed Rattlesnake	*Crotalus adamanteus*	MF
Eastern Indigo Snake	*Drymarchon couperi*	HH, MF
Mud Snake	*Farancia abacura*	BS, DM
Scarlet Kingsnake	*Lampropeltis elapsoides*	MF, HH
Eastern Kingsnake	*Lampropeltis getula*	HH, MF
Gulf Saltmarsh Snake	*Nerodia clarkii clarkii*	SAM
Florida Watersnake	*Nerodia fasciata pictiventris*	BST, BS, DM
Eastern Ratsnake	*Pantherophis alleghaniensis*	HH, MF
Dusky Pygmy Rattlesnake	*Sistrurus miliarius barbouri*	HH, MF
Blue-striped Ribbonsnake	*Thamnophis sauritus nitae*	HH, MF
Blue-striped Gartersnake	*Thamnophis sirtalis similis*	HH, MF
Lizards		
Green Anole	*Anolis carolinensis*	HH
Eastern Glass Lizard	*Ophisaurus ventralis*	MF, HH
Ground Skink	*Scincella lateralis*	HH
BIRDS		
Waterfowl		
Wood Duck	*Aix sponsa*	SAM, BST, BS, OF

* Non-native species ^ Garden species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
American Wigeon	*Anas americana*	ECPS, ESGB, OF
Mallard	*Anas platyrhynchos*	SAM, ECPS, EUS, OF
Blue-winged Teal	*Anas discors*	SAM, ECPS, EUS, OF
Northern Shoveler	*Anas clypeata*	SAM, ECPS, EUS, OF
Green-winged Teal	*Anas crecca*	SAM, ECPS, EUS, OF
Canvasback	*Aythya valisineria*	ECPS, ESGB, OF
Lesser Scaup	*Aythya affinis*	ECPS, ESGB, OF
Bufflehead	*Bucephala islandica*	SAM, ECPS, ESGB, OF
Hooded Merganser	*Lophodytes cucullatus*	SAM, ECPS, EUS, OF
Red-breasted Merganser	*Mergus serrator*	ECPS, ESGB, OF
Turkeys		
Wild Turkey	*Meleagris gallopavo*	MF, HH
Grebes		
Pied-billed Grebe	*Podilymbus podiceps*	SAM, BST, ECPS
Horned Grebe	*Podiceps auritus*	ECPS, ESGB
Pigeons and Doves		
Mourning Dove	*Zenaida macroura*	MTC
Cuckoos and Anis		
Yellow-billed Cuckoo	*Coccyzus americanus*	HH
Nightjars		
Chuck-will's-widow	*Antrostomus carolinensis*	HH
Hummingbirds		
Ruby-throated Hummingbird	*Archilochus colubris*	MTC
Rails, Gallinules and Coots		
Clapper Rail	*Rallus crepitans*	SAM
Common Gallinule	*Gallinula galeata*	SAM
American Coot	*Fulica americana*	SAM, ECPS, OF
Oystercatchers		
American Oystercatcher	*Haematopus palliatus*	EMR, SAM, EUS
Plovers		
Black-bellied Plover	*Pluvialis squatarola*	SAM, EUS, OF
Semipalmated Plover	*Charadrius semipalmatus*	SAM, EUS, OF
Sandpipers		
Whimbrel	*Numenius phaeopus*	SAM, EUS, OF
Dunlin	*Calidris alpina*	SAM, EUS, OF
Least Sandpiper	*Calidris minutilla*	SAM, EUS, OF

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Semipalmated Sandpiper	*Calidris pusilla*	SAM, EUS, OF
Western Sandpiper	*Calidris mauri*	SAM, EUS, OF
Short-billed Dowitcher	*Limnodromus griseus*	SAM, EUS, OF
Wilson's Snipe	*Gallinago delicata*	SAM, EUS, OF
American Woodcock	*Scolopax minor*	BS, HH
Spotted Sandpiper	*Actitis macularius*	SAM, EUS, OF
Greater Yellowlegs	*Tringa melanoleuca*	SAM, EUS, OF
Willet	*Tringa semipalmata*	SAM, EUS, OF
Lesser Yellowlegs	*Tringa flavipes*	SAM, EUS, OF
Gulls, Terns, and Skimmers		
Bonaparte's Gull	*Chroicocephalus philadelphia*	SAM, EUS, OF
Laughing Gull	*Leucophaeus atricilla*	SAM, EUS, OF
Ring-billed Gull	*Larus delawarensis*	SAM, EUS, OF
Herring Gull	*Larus argentatus*	SAM, EUS, OF
Forster's Tern	*Sterna forsteri*	SAM, EUS, OF
Royal Tern	*Thalasseus maximus*	SAM, EUS, OF
Black Skimmer	*Rynchops niger*	SAM, EUS, OF
Loons		
Common Loon	*Gavia immer*	ECPS, ESGB, OF
Storks		
Wood Stork	*Mycteria americana*	SAM, DM, OF
Cormorants		
Double-crested Cormorant	*Phalocrocorax auritus*	SAM, ECPS, MS, OF
Anhingas		
Anhinga	*Anhinga anhinga*	SAM, BST, OF
Pelicans		
American White Pelican	*Pelecanus erythrorhynchos*	EUS, ECPS, OF
Brown Pelican	*Pelecanus occidentalis*	EUS, ECPS, OF
Herons, Egrets, and Bitterns		
American Bittern	*Botaurus lentiginosus*	SAM, DM
Great Blue Heron	*Ardea herodias*	SAM, BS, BST, DM, OF
Great Egret	*Ardea alba*	SAM, BS, BST, DM, OF
Snowy Egret	*Egretta thula*	SAM, MS, OF
Little Blue Heron	*Egretta caerulea*	SAM, BS, BST, DM, OF
Tricolored Heron	*Egretta tricolor*	SAM, BS, OF
Cattle Egret	*Bubulcus ibis*	OF
Green Heron	*Butorides virescens*	SAM, BS, DM, OF
Black-crowned Night-Heron	*Nycticorax nycticorax*	SAM, BST, MS, OF
Yellow-crowned Night-Heron	*Nyctanassa violacea*	SAM, BST, MS, OF

Waccasassa Bay Preserve State Park Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Ibises and Spoonbills		
White Ibis	*Eudocimus albus*	SAM, OF
New World Vultures		
Black Vulture	*Coragyps atratus*	MF, OF
Turkey Vulture	*Cathartes aura*	MF, OF
Kites, Eagles, and Hawks		
Osprey	*Pandion haliaetus*	SAM, BST, ECPS, OF
Swallow-tailed Kite	*Elanoides forficatus*	MF, HH, OF
Bald Eagle	*Haliaeetus leucocephalus*	SAM, OF
Northern Harrier	*Circus cyaneus*	SAM, OF
Sharp-shinned Hawk	*Accipiter striatus*	HH, MF, OF
Cooper's Hawk	*Accipiter cooperi*	HH, MF, OF
Red-shouldered Hawk	*Buteo lineatus*	HH, BS, MF, OF
Red-tailed Hawk	*Buteo jamaicensis*	SAM, OF
Owls		
Barn Owl	*Tyto alba*	HH, SAM
Eastern Screech-Owl	*Megascops asio*	MTC
Barred Owl	*Strix varia*	HH, BS
Kingfishers		
Belted Kingfisher	*Megaceryle alcyon*	SAM, BST, OF
Woodpeckers		
Red-bellied Woodpecker	*Melanerpes carolinus*	MTC
Yellow-bellied Sapsucker	*Sphyrapicus varius*	HH
Downy Woodpecker	*Picoides pubescens*	MTC
Northern Flicker	*Colaptes auratus*	MF
Pileated Woodpecker	*Dryocopus pileatus*	HH
Falcons and Caracaras		
American Kestrel	*Falco sparverius*	MF, OF
Tyrant Flycatchers		
Eastern Phoebe	*Sayornis phoebe*	MTC
Shrikes		
Loggerhead Shrike	*Lanius ludovicianus*	MF
Vireos and Allies		
White-eyed Vireo	*Vireo griseus*	MTC
Blue-headed Vireo	*Vireo solitarius*	HH, BS
Red-eyed Vireo	*Vireo olivaceus*	HH, BS

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Crows and Jays		
Blue Jay	*Cyanocitta cristata*	MTC
Florida Scrub-jay	*Aphelocoma coerulescens*	MF
American Crow	*Corvus brachyrhynchos*	MTC, OF
Fish Crow	*Corvus ossifragus*	SAM, OF
Swallows		
Tree Swallow	*Tachycineta bicolor*	SAM, OF
Barn Swallow	*Hirundo rustica*	SAM, OF
Tits and Allies		
Tufted Titmouse	*Baeolophus bicolor*	MTC
Wrens		
Marian's Marsh Wren	*Cistothorus palustris marianae*	SAM
Carolina Wren	*Thryothorus ludovicianus*	MTC
Kinglets		
Ruby-crowned Kinglet	*Regulus calendula*	MTC
Old World Warblers		
Blue-gray Gnatcatcher	*Polioptila caerulea*	HH, MF
Thrushes		
American Robin	*Turdus migratorius*	MTC
Mockingbirds and Thrashers		
Gray Catbird	*Dumetella carolinensis*	MTC
Brown Thrasher	*Toxostoma rufum*	MTC
Northern Mockingbird	*Mimus polyglottos*	MTC
New World Warblers		
Northern Waterthrush	*Parkesia noveboracensis*	HH, BS
Black-and-white Warbler	*Mniotilta varia*	MTC
Common Yellowthroat	*Geothlypis trichas*	SAM, DM, MF
Northern Parula	*Setophaga americana*	MTC
Magnolia Warbler	*Setophaga magnolia*	HH
Yellow Warbler	*Setophaga petechia*	BS, SAM
Palm Warbler	*Setophaga palmarum*	MTC
Pine Warbler	*Setophaga pinus*	MF
Yellow-rumped Warbler	*Setophaga coronata*	MTC
Yellow-throated Warbler	*Setophaga dominica*	HH
Sparrows and Allies		
Seaside Sparrow	*Ammodramus maritimus*	SAM

* Non-native species ^ Garden species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Cardinals, Grosbeaks, and Allies		
Northern Cardinal	*Cardinalis cardinalis*	MTC
Blackbirds and Allies		
Red-winged Blackbird	*Agelaius phoeniceus*	MTC, OF
Common Grackle	*Quiscalus quiscula*	MTC, OF
Brown-headed Cowbird	*Molothrus ater*	MTC
MAMMALS		
Didelphids		
Virginia Opossum	*Didelphis virginiana*	MTC
Insectivores		
Least Shrew	*Cryptotis parva*	HH
Eastern Mole	*Scalopus aquaticus*	HH
Bats		
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	HH, OF
Seminole Bat	*Lasiurus seminolus*	HH, OF
Southeastern Myotis	*Myotis austroriparius*	MTC, OF
Edentates		
Nine-banded Armadillo	*Dasypus novemcinctus* *	MTC
Lagomorphs		
Eastern Cottontail	*Sylvilagus floridanus*	MTC
Marsh Rabbit	*Sylvilagus palustris*	SAM
Rodents		
Southern Flying Squirrel	*Glaucomys volans*	HH
Florida Salt Marsh Vole	*Microtus pennsylvanicus dukecampbelli*	SAM
Eastern Woodrat	*Neotoma floridana*	HH
Golden Mouse	*Ochrotomys nuttalli*	HH
Marsh Rice Rat	*Oryzomys palustris*	SAM
Cotton Mouse	*Peromyscus gossypinus*	HH, MF
Eastern Gray Squirrel	*Sciurus carolinensis*	MTC
Hispid Cotton Rat	*Sigmodon hispidus*	MF
Carnivores		
River Otter	*Lutra canadensis*	BST, SAM
Bobcat	*Lynx rufus*	HH, MF
Striped Skunk	*Mephitis mephitis*	MF
Southeastern Weasel	*Mustela frenata olivacea*	HH, MF
Salt Marsh Mink	*Mustela vison halilimnetes*	SAM
Raccoon	*Procyon lotor*	MTC

* Non-native species ^ Garden species

Waccasassa Bay Preserve State Park Animals

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Florida Panther	*Puma concolor coryi*	HH, MF
Gray Fox	*Urocyon cinereoargenteus*	MF
Florida Black Bear	*Ursus americanus floridanus*	HH, MF, BS
Artiodactyls		
White-tailed Deer	*Odocoileus virginianus*	MF, HH
Feral Pig	*Sus scrofa* *	MTC
Sirens		
West Indian Manatee	*Trichechus manatus*	ESGB, ECPS, BST

* Non-native species ^ Garden species

TERRESTRIAL

Beach Dune	BD
Coastal Berm	CB
Coastal Grassland	CG
Coastal Strand	CS
Dry Prairie	DP
Keys Cactus Barren	KCB
Limestone Outcrop	LO
Maritime Hammock	MAH
Mesic Flatwoods	MF
Mesic Hammock	MEH
Pine Rockland	PR
Rockland Hammock	RH
Sandhill	SH
Scrub	SC
Scrubby Flatwoods	SCF
Shell Mound	SHM
Sinkhole	SK
Slope Forest	SPF
Upland Glade	UG
Upland Hardwood Forest	UHF
Upland Mixed Woodland	UMW
Upland Pine	UP
Wet Flatwoods	WF
Xeric Hammock	XH

PALUSTRINE

Alluvial Forest	AF
Basin Marsh	BM
Basin Swamp	BS
Baygall	BG
Bottomland Forest	BF
Coastal Interdunal Swale	CIS
Depression Marsh	DM
Dome Swamp	DS
Floodplain Marsh	FM
Floodplain Swamp	FS
Glades Marsh	GM
Hydric Hammock	HH
Keys Tidal Rock Barren	KTRB
Mangrove Swamp	MS
Marl Prairie	MP
Salt Marsh	SAM
Seepage Slope	SSL
Shrub Bog	SHB
Slough	SLO
Slough Marsh	SLM
Strand Swamp	STS

Wet Prairie ..... WP

LACUSTRINE

Clastic Upland Lake ..... CULK
Coastal Dune Lake ..... CDLK
Coastal Rockland Lake ..... CRLK
Flatwoods/Prairie ..... FPLK
Marsh Lake ..... MLK
River Floodplain Lake ..... RFLK
Sandhill Upland Lake ..... SULK
Sinkhole Lake ..... SKLK
Swamp Lake ..... SWLK

RIVERINE

Alluvial Stream ..... AST
Blackwater Stream ..... BST
Seepage Stream ..... SST
Spring-run Stream ..... SRST

SUBTERRANEAN

Aquatic Cave ..... ACV
Terrestrial Cave ..... TCV

ESTUARINE

Algal Bed ..... EAB
Composite Substrate ..... ECPS
Consolidated Substrate ..... ECNS
Coral Reef ..... ECR
Mollusk Reef ..... EMR
Octocoral Bed ..... EOB
Seagrass Bed ..... ESGB
Sponge Bed ..... ESPB
Unconsolidated Substrate ..... EUS
Worm Reef ..... EWR

MARINE

Algal Bed ..... MAB
Composite Substrate ..... MCPS
Consolidated Substrate ..... MCNS
Coral Reef ..... MCR
Mollusk Reef ..... MMR
Octocoral Bed ..... MOB
Seagrass Bed ..... MSGB
Sponge Bed ..... MSPB
Unconsolidated Substrate ..... MUS
Worm Reef ..... MWR

ALTERED LANDCOVER TYPES

Abandoned field/Abandoned pasture ..... AFP
Agriculture ..... AG
Artificial Pond ..... AP
Borrow Area ..... BA
Canal/ditch ..... CD
Clearcut pine plantation ..... CPP
Clearing/Regeneration CL
Developed ..... DV
Impoundment ..... IM
Invasive exotic monoculture ..... IEM
Pasture - improved ..... PI
Pasture - semi-improved ..... PSI
Pine plantation ..... PP
Restoration Natural Community ..... RNC
Road ..... RD
Spoil area ..... SA
Successional hardwood forest ..... SHF
Utility corridor ..... UC

MISCELLANEOUS

Many Types of Communities ..... MTC
Overflying ..... OF

Addendum 6—Imperiled Species Ranking Definitions

The Nature Conservancy and the Natural Heritage Program Network (of which FNAI is a part) define an element as any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave or other ecological feature. An element occurrence (EO) is a single extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

Using a ranking system developed by The Nature Conservancy and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks to each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected EOs, relative threat of destruction, and ecological fragility.

Federal and State status information is from the U.S. Fish and Wildlife Service; and the Florida Fish and Wildlife Conservation Commission (animals), and the Florida Department of Agriculture and Consumer Services (plants), respectively.

FNAI GLOBAL RANK DEFINITIONS

G1 ..... Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or fabricated factor.

G2 ..... Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3 ..... Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.

G4 ..... apparently secure globally (may be rare in parts of range)

G5 ..... demonstrably secure globally

GH ..... of historical occurrence throughout its range may be rediscovered (e.g., ivory-billed woodpecker)

GX ..... believed to be extinct throughout range

GXC ..... extirpated from the wild but still known from captivity or cultivation

G#? ..... Tentative rank (e.g.,G2?)

G#G# ..... range of rank; insufficient data to assign specific global rank (e.g., G2G3)

G#T# ..... rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)

G#Q..... rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)

G#T#Q..... same as above, but validity as subspecies or variety is questioned.

GU ..... due to lack of information, no rank or range can be assigned (e.g., GUT2).

G?..... Not yet ranked (temporary)

S1..... Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

S2..... Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

S3..... Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.

S4..... apparently secure in Florida (may be rare in parts of range)

S5..... demonstrably secure in Florida

SH ..... of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)

SX..... believed to be extinct throughout range

SA..... accidental in Florida, i.e., not part of the established biota

SE..... an exotic species established in Florida may be native elsewhere in North America

SN ..... regularly occurring but widely and unreliably distributed; sites for conservation hard to determine

SU ..... due to lack of information, no rank or range can be assigned (e.g., SUT2).

S?..... Not yet ranked (temporary)

N ..... Not currently listed, nor currently being considered for listing, by state or federal agencies.

LEGAL STATUS

FEDERAL

(Listed by the U. S. Fish and Wildlife Service - USFWS)

LE ..... Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.

PE ..... Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.

LT ..... Listed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.

PT ..... Proposed for listing as Threatened Species.

C ..... Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.

E(S/A) ..... Endangered due to similarity of appearance.

T(S/A) ..... Threatened due to similarity of appearance.

EXPE, XE..... Experimental essential population. A species listed as experimental and essential.

EXPN, XN .... Experimental non-essential population. A species listed as experimental and non-essential. Experimental, nonessential populations of endangered species are treated as threatened species on public land, for consultation purposes.

STATE

ANIMALS .. (Listed by the Florida Fish and Wildlife Conservation Commission - FWC)

FE ..... Federally-designated Endangered

FT ..... Federally-designated Threatened

FXN..... Federally-designated Threatened Nonessential Experimental Population

FT(S/A) ..... Federally-designated Threatened species due to similarity of appearance

ST..... Listed as Threatened Species by the FWC. Defined as a species, subspecies, or isolated population, which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat, is decreasing in area at a rapid rate and therefore is destined or very likely to become an endangered species within the near future.

SSC..... Listed as Species of Special Concern by the FWC. Defined as a population which warrants special protection, recognition or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance or substantial human exploitation that, in the near future, may result in its becoming a threatened species.

PLANTS .... (Listed by the Florida Department of Agriculture and Consumer Services - FDACS)

LE ..... Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973,as amended.

LT ..... Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

Addendum 7—Cultural Information

These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.

A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, '*Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."*

B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e. permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

C. Statutory Authority

Statutory Authority and more in depth information can be found at:
http://www.flheritage.com/preservation/compliance/guidelines.cfm

D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under fifty years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at: http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf .

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Deena S. Woodward
Division of Historical Resources
Bureau of Historic Preservation
Compliance and Review Section
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Phone: (850) 245-6425

Toll Free: (800) 847-7278
Fax: (850) 245-6435

The criteria to be used for evaluating eligibility for listing in the National Register of Historic Places are as follows:

1) Districts, sites, buildings, structures, and objects may be considered to have significance in American history, architecture, archaeology, engineering, and/or culture if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- **a)** are associated with events that have made a significant contribution to the broad patterns of our history; and/or
- **b)** are associated with the lives of persons significant in our past; and/or
- **c)** embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or
- **d)** have yielded, or may be likely to yield, information important in prehistory or history.

2) Ordinarily cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the *National Register*. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- **a)** a religious property deriving its primary significance from architectural or artistic distinction or historical importance; or
- **b)** a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- **c)** a birthplace or grave of an historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or
- **d)** a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, distinctive design features, or association with historic events; ora reconstructed building, when it is accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and no other building or structure with the same association has survived; or a property primarily commemorative in intent, if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- **e)** a property achieving significance within the past 50 years, if it is of exceptional importance.

Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations and additions while preserving those portions or features that convey its historical, cultural or architectural values.

Stabilization is defined as the act or process of applying measures designed to reestablish a weather resistant enclosure and the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Addendum 8—Timber Management Analysis

Addendum 8
Timber Management Analysis

1. *Management Context and Best Management Practices*

Timber management at Waccasassa Bay Preserve State Park (Waccasassa Bay) is based on the desired future condition (DFC) of a management zone or natural community (NatCom) as determined by the DRP Unit Management Plans, along with guidelines developed by the Florida Natural Areas Inventory (FNAI). In most cases, the DFC will be closely related to the historic NatCom. However, it is important to note, that in areas where the historic community has been severely altered by past land use practices, the DFC may not always be the same as the historic NatCom. All timber management activities undertaken will adhere to or exceed the current Florida Silvicultural Best Management Practices (BMPs) and Florida Forestry Wildlife BMPs for State Imperiled Species. DRP shall take all measures necessary to protect water quality and wildlife species of concern while conducting timber management activities. DRP has contracted with a private sector, professional forest management firm to complete this timber assessment: F4 Tech.

2. *Purpose of Timber Management Activities*

Timber management activities may be conducted to help improve or maintain current conditions to achieve the associated DFC. Timber management will primarily be conducted in upland NatCom types. Candidate upland NatCom types may include mesic flatwoods and scrubby flatwoods. There will likely be no scheduled timber management activities in historically hardwood-dominated or wetland natural communities. In some circumstances, timber management may include the harvesting and removal of overstory invasive/exotic trees. Descriptions of community types are detailed in the Resource Management Component.

3. *Potential Silvicultural Treatments*

Several silvicultural treatments may be considered and utilized over the next ten years. The various types of timber harvests may include pine thinning, targeted hardwood overstory removal, and clearcutting. Silvicultural treatments will be selectively implemented to minimize potential impacts to water and soil resources, non-target vegetation, and wildlife (see BMPs). Depending upon the condition and marketability of the timber being manipulated, it is possible to generate revenue from the harvest. It is also possible the timber removal could be a cost to DRP. In all decisions, the mission of preserving and restoring natural communities will be the guiding factor.

Thinning may be conducted to reduce the basal area (BA) or density of trees/stems in a stand to improve forest health and growth conditions for residual trees. Allowing trees more room to grow has the potential to increase tree and forest vigor, which helps mitigate the potential for damaging insect and disease outbreaks. Most tree harvesting/removals also increase sunlight reaching the forest floor and fine fuels that facilitate consistent fire return intervals and responses, which can benefit

groundcover vegetation abundance, species richness, and overall ecological diversity. The disruption of natural fire regimes and fire return intervals can often result in the need to remove undesirable or overstocked hardwood stems that currently occupy growing space in the canopy and sub-canopy. Clearcutting may be used to support restoration goals by removing off-site pine or hardwood species and is a precursor to establishing site-appropriate species. It can also be used to control insect infestations that are damaging or threatening forest resources and ecosystem conditions.

On occasion, salvage cuts may need to be conducted to remove small volumes of wood damaged by fire, wind storm, insect or other natural causes. The decision whether or not to harvest the affected timber will depend on the threat to the surrounding stands, risk of collateral ecological damage, and the volume/value of the trees involved. For example, small, isolated lightning-strike, beetle kills are a natural part of a healthy ecosystem and normally would not be cut. However, if a drought caused the insect infestation to spread, the affected trees and buffer zone might have to be removed to prevent significant damage.

4. *Inventory Data and Potential Actions per Area of Interest or Management Zone*

Waccasassa Bay comprises a total of 34,388 acres in Levy County. A total of 169 acres are associated with two (2) upland NatCom types that are potential candidates for timber management. In July 2017, an inventory based on field plots was conducted across and within a large percentage of these areas to quantify overstory, midstory and understory conditions. Various park-level and NatCom-level summary statistics can be found in the following tables.

This timber assessment was based on management zone and NatCom boundary GIS data provided by DRP in September 2018. It is not intended to be prescriptive. Stakeholders and DRP staff are encouraged to view this timber assessment and inventory data as supplemental information for future consideration. Given the dynamic nature of property ownership and land management activities at Waccasassa Bay, together with the timeframe required to create or update a UMP, it is possible that some tabular data may be dated. Therefore, NatCom acreages and recent treatments that occurred after the September 2018 period may not be reflected in the following tables.

Table 1. General summary statistics for Waccasassa Bay Preserve State Park

Waccasassa Bay Preserve State Park
Timber Management Analyses

Number of Management Zones within the State Park	10
Upland NatCom acres	169

Mesic Flatwoods (168.4 acres)

Longleaf pine (*Pinus palustris*) and slash pine (*Pinus elliottii*) are the preferred overstory pine species in the region. The FNAI reference site in this region for mesic flatwoods contains longleaf and slash pine at a basal area (BA) of 10 to 50 square feet per acre with non-pine at a density of 0 trees per acre (TPA). The following table shows the overstory condition for this natural community at Waccasassa Bay and target overstory condition for mesic flatwoods in this region.

MZ ID	Mesic Flatwoods (Acres)	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
WB-1A	25.8	0.0	0.0	0.0	40.0	114.3	10.0	10.0	10 - 50	0 - 0
WB-1B	69.6	13.3	17.2	10.9	26.7	61.9	9.9	20.8	10 - 50	0 - 0
WB-2	0.5	--	--	--	--	--	--	--	--	--
WB-6A	23.5	22.5	30.1	19.2	7.5	32.4	0.0	19.2	10 - 50	0 - 0
WB-6B	46.7	40.0	59.4	34.0	0.0	0.0	0.0	34.0	10 - 50	0 - 0
WB-6C	2.3	--	--	--	--	--	--	--	--	--
Total	**168.4**									

Scrubby Flatwoods (0.5 acre)

Longleaf (*Pinus palustris*) and slash pine (*Pinus elliottii*) are the preferred overstory pine species in the region. The FNAI reference site in this region for scrubby flatwoods contains longleaf and slash pine at a basal area (BA) of 10 to 60 square feet per acre with non-pine at a density between 0 and 26 trees per acre (TPA). There has been no inventory data collected for this natural community at Waccasassa Bay.

MZ ID	Scrubby Flatwoods (Acres)	Current Average Overstory Conditions							Target Overstory Conditions	
		Pine BA (ft2/ac)	Pine TPA	Pine Volume (tons/ac)	Non-Pine BA (ft2/ac)	Non-Pine TPA	Non-Pine Volume (tons/ac)	Total Pine and Non-Pine Volume (tons/ac)	FNAI Reference Condition Pine BA Range (ft2/ac)	FNAI Reference Condition Non-Pine TPA Range
WB-6B	0.5	--	--	--	--	--	--	--	--	--
Total	**0.5**									

Addendum 9 —Land Management Review

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

MEMORANDUM

TO: Keith Singleton, Program Consultant
Division of State Lands

FROM: Wes Howell, Chief, Bureau of Natural and Cultural Resources
Division of Recreation and Parks

Steve Cutshaw, Chief, Office of Park Planning
Division of Recreation and Parks

SUBJECT: Response to Draft Land Management Review (LMR)
Waccasassa Bay Preserve State Park

The Land Management Review draft report provided to Division of Recreation and Parks (DRP) determined that management of Waccasassa Bay Preserve State Park by the DRP met the two tests prescribed by law. Namely, the review team concluded that the land is being managed for the purposes for which it was acquired and in accordance with the land management plan.

Attached is DRP's Managing Agency Response to the draft LMR report. The responses were prepared via a coordinated effort of the park, district office, and our offices.

Thank you for your attention.

/ca

2018 Land Management Review Team Report for Waccasassa Bay Preserve State Park

Table of Contents

1. Introduction

Section 259.036, F.S. requires a periodic on-site review of conservation and recreation lands titled in the name of the Board of Trustees to determine (1) whether the lands are being managed for the purposes for which they were acquired and (2) whether they are being managed in accordance with their land management plan adopted pursuant to s. 259.032, F.S. In cases where the managed areas exceed 1,000 acres in size, such a review must be scheduled at least every five years. In conducting this review, a statutorily constructed review team "shall evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions or archaeological features. The review shall also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan."

The land management review teams are coordinated by the Division of State Lands and consist of representatives from the Division of Recreation and Parks (DEP), the Florida Forest Service (DACS), the Fish and Wildlife Conservation Commission, the local government in which the property is located, the DEP District in which the parcel is located, the local soil and water conservation district or jurisdictional water management district, a conservation organization member, and a local private land manager.

Each Land Management Review Report is divided into three sections. Section 1 provides the details of the property being reviewed as well as the overall results of the report. Section 2 provides details of the Field Review, in which the Review Team inspects the results of management actions on the site. Section 3 provides details of the Land Management Plan Review, in which the team determines the extent to which the Management Plan provides for and documents adequate natural and recreational resource protection.

Finally, each report may also contain an Appendix that lists individual team member comments. This is a compilation of feedback, concerns or other thoughts raised by individual team members, but not necessarily indicative of the final consensus reached by the Land Management Review Team.

1.1. Property Reviewed in this Report

Name of Site: Waccasassa Bay Preserve State Park
Managed by: Department of Environmental Protection, Florida Park Service
Acres: 30,241 **County:** Levy
Purpose(s) for Acquisition: to protect and restore the natural and cultural values of the property and provide the greatest benefit to the citizens of the state.
Acquisition Program(s): LATF/LWCF/CARL/P2000/Donation **Original Acquisition Date:** 12/10/71
Area Reviewed: Entire Property **Last Management Plan Approval Date:**6/6/05
Review Date: 8/7/18

Agency Manager and Key Staff Present:

- Tommy Pavao, Park Manager
- Christopher Camargo, Park Service Specialist

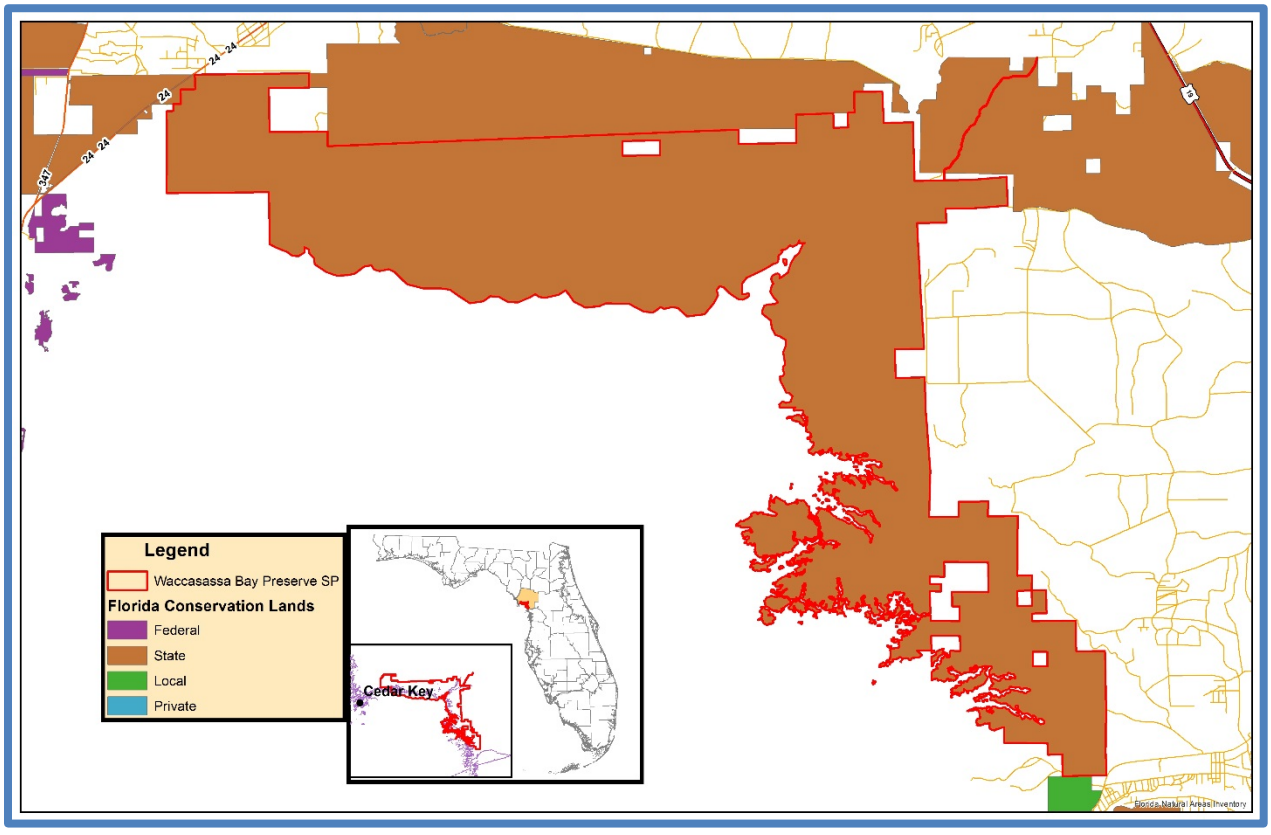
Review Team Members Present (voting)

- Richard Owen, DRP District
- Steven Keith, Local Gov't.
- Blair Hayman, FWC
- Jason Neumann, DEP District
- Michael Edwards, FFS
- Wri Irby, SRWMD
- Jaya Milam, Cons. Organization
- Private Land Manager, None

Other Non-Team Members Present (attending)

- Keith Singleton, DEP/DSL
- Glenda Schrimper, FNPS Florida Native Plant Society

1.2 Property Map



1.3. Overview of Land Management Review Results

Is the property managed for purposes that are compatible with conservation, preservation, or recreation?

Yes = 7, No = 0

Are the management practices, including public access, in compliance with the management plan?

Yes = 7, No = 0

Table 1 shows the average scores received for each applicable category of review. *Field Review* scores refer to the adequacy of management actions in the field, while *Management Plan Review* scores refer to adequacy of discussion of these topics in the management plan. Scores range from 1 to 5 with 5 signifying excellence. For a more detailed key to the scores, please see *Appendix A*.

Table 1: Results at a glance.

Major Land Management Categories	Field Review	Management Plan Review
Natural Communities / Forest Management	4.40	3.89
Prescribed Fire / Habitat Restoration	4.05	4.43
Hydrology	4.33	3.81
Imperiled Species	4.48	4.48
Exotic / Invasive Species	3.96	3.84
Cultural Resources	4.07	4.00
Public Access / Education / Law Enforcement	3.79	3.77
Infrastructure / Equipment / Staffing	2.74	N/A

Color Code (See Appendix A for detail)

Excellent	Above Average	Below Average	Poor

1.3.1 Consensus Commendations for the Managing Agency

The following commendations resulted from discussion and vote of the review team members:

1. The team commends the Florida Park Service (FPS) for becoming airboat qualified and for making efforts to monitor, patrol and work along the coastal boundaries of the park. (7+, 0-)
2. The team commends the FPS for maintaining a large acreage of natural communities with a small number of staff. (7+, 0-)
3. The team commends the FPS for cooperative work to monitor imperiled species. (7+, 0-)

1.3.2. Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The next management plan update should include information about how these recommendations have been addressed:

1. The team recommends that the FPS pursue various alternatives for additional funds to improve working and living areas, also equipment to provide the tools and machinery to manage the property at optimal levels. (7+, 0-)

   Managing Agency Response: *Agree.*

2. The team recommends that the FPS seek out innovative technology to supplement and assist current land management practices. (7+, 0-)

   Managing Agency Response: *Agree.*

3. The team recommends that the FPS work with partners to install an interpretive sign at the public boat ramps. (7+, 0-)

   Managing Agency Response: *Agree. The Division will work with with the appropriate entities on the development of interpretive signage for the Waccasassa River public boat ramp.*

4. The team recommends that the FPS install camping signage to identify designated campsites and replace unofficial structures with new shelters (where applicable). (7+, 0-)

   Managing Agency Response: *Agree. The Division will consider these recommendations during the next unit management plan revision.*

2. Field Review Details

2.1 Field Review Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

1. **Natural communities, specifically scrubby flatwoods, basin swamp, depression marsh, hydric hammock, blackwater stream, estuarine composite substrate, salt marsh, mangrove swamp, and estuarine mollusk reef.**
2. **Listed species, plants and animals in general, and specifally salt marsh vole.**
3. **Natural resource survey/monitoring resources, specifically listed species or their habitat monitoring, fire effects monitoring, other habitat effects monitoring, and invasive species survey and monitoring.**
4. **Cultural resources, specifically protection and preservation.**
5. **Resource management (prescribed fire), specifically area being burned and quality.**
6. **Non-native, invasive, and problem species, specifically prevention and control of plants.**
7. **Ground water and surface water monitoring, specifically quality and quantity.**
8. **Resource protection, specifically signage.**
9. **Adjacent property concerns, specifically surplus lands identified.**
10. **Public access, specifically boat access.**
11. **Environmental education and outreach, specifically wildlife, invasive species, habitat management activities, and recreational opportunities.**
12. **Management resources, specifically waste disposal**.

2.2. Items Requiring Improvement Actions in the Field

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review were not considered sufficient (less than 3.0 score on average). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. **The management plan update should include information on how these items have been addressed**:

1. ***Environmental education and outreach, specifically interpretive facilities and signs, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether interpretive facilities and signs is sufficient.***

Managing Agency Response: *Agree. The Division will consider these recommendations during the next unit management plan revision.*

2. ***Management Resources, specifically buildings, staff and funding, received below average scores. The review team is asked to evaluate, based on information provided by the managing agency, whether management resources are sufficient.***

   Managing Agency Response: *Agree. However, no new staff can be assigned to this or any other park unit unless they are appropriated by the Legislature or reassigned from other units. Funding is determined annually by the Florida Legislature. The Division will consider the recommendations for new development during the next unit management plan revision.*

2.3. Field Review Checklist and Scores

Field Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Mesic Flatwoods	I.A.1	3	3	3	3	3	3	3		3.00
Scrubby Flatwoods	I.A.2	4	5	4	4	4	4	4		4.14
Basin Swamp	I.A.3	5	5	5	4	4	5	4		4.57
Depression Marsh	I.A.4	5	5	4	3	4	5	4		4.29
Hydric Hammock	I.A.5	5	5	5	4	5	5	4		4.71
Blackwater Stream	I.A.6	5	5	5	5	4	4	4		4.57
Estuarine Composite Substrate	I.A.7	5	5	5	5	5	5	5		5.00
Salt Marsh	I.A.8	5	5	5	5	5	5	5		5.00
Mangrove Swamp	I.A.9	5	5	5	5	5	5	5		5.00
Estuarine Mollusk Reef	I.A.10	5	5	5	5	4	5	5		4.86
									Natural Communities Average Score	4.51
Listed species:Protection & Preservation (I.B)										
Animals	I.B.1	5	3	5	4	4	5	5		4.43
Salt Marsh Vole	I.B.1.a	5	3	5	5	4	5	5		4.57
Plants	I.B.2	5	3	5	4	4	5	5		4.43
									Listed Species Average Score	4.48
Natural Resources Survey/Monitoring Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	4	5	4	3	5	5		4.43
Fire effects monitoring	I.C.4	5	4	5	5	4	5	4		4.57
Other habitat management effects monitoring	I.C.5	5	4	5	4	4	5	4		4.43
Invasive species survey / monitoring	I.C.6	3	5	4	4	4	5	4		4.14
Cultural Resources (Archeological & Historic sites) (II.A, II.B)										
Cultural Res. Survey	II.A	5	4	3	3	4	6	4		4.14
Protection and preservation	II.B	5	4	4	3	4	4	4		4.00
									Cultural Resources Average Score	4.07

Resource Management, Prescribed Fire (III.A)										
Area Being Burned (no. acres)	III.A1	3	4	4	4	4	5	5		4.14
Frequency	III.A.2	3	4	4	4	4	5	3		3.86
Quality	III.A.3	3	4	4	4	4	5	5		4.14
									Resource Management, Prescribed Fire Average Score	4.05
Forest Management (III.C)										
Timber Inventory	III.C.1	5	5	5	3	4	5	4		4.43
Timber Harvesting	III.C.2	4	5	4	3	4	5	4		4.14
									Forest Management Average Score	4.29
Non-Native, Invasive & Problem Species (III.D)										
Prevention										
prevention - plants	III.D.1.a	4	4	4	5	4	5	4		4.29
prevention - animals	III.D.1.b	4	4	3	4	3	5	4		3.86
prevention - pests/pathogens	III.D.1.c		3	4	3	4		4		3.60
Control										
control - plants	III.D.2.a	4	4	5	5	4	5	4		4.43
control - animals	III.D.2.b	4	3	3	4	3	5	4		3.71
control - pest/pathogens	III.D.2.c	4	3	4	3	4	5	4		3.86
									Non-Native, Invasive & Problem Species Average Score	3.96
Hydrologic/Geologic function Hydro-Alteration (III.E.1)										
Roads/culverts	III.E.1.a	5	3	4	3	3	4	3		3.57
									Hydrologic/Geologic function, Hydro-Alteration Average Score	3.57
Ground Water Monitoring (III.E.2)										
Ground water quality	III.E.2.a	5	5	5	5	4	5	4		4.71
Ground water quantity	III.E.2.b	5	5	5	5	4	5	4		4.71
									Ground Water Monitoring Average Score	4.71
Surface Water Monitoring (III.E.3)										
Surface water quality	III.E.3.a	5	5	5	5	4	5	4		4.71
Surface water quantity	III.F.3.b	5	5	5	5	4	5	4		4.71
									Surface Water Monitoring Average Score	4.71
Resource Protection (III.F)										
Boundary survey	III.F.1	3	2	3	4	3	5	4		3.43
Gates & fencing	III.F.2	3	2	4	3	3	5	4		3.43
Signage	III.F.3	4	4	4	4	3	5	4		4.00
Law enforcement presence	III.F.4	3	3	4	3	3	5	3		3.43
									Resource Protection Average Score	3.57
Adjacent Property Concerns (III.G)										
Land Use										
Lime Rock Mine	III.G.1.b	5	5	5	3	4	5	4		4.43
Inholdings/additions	III.G.2	4	4	4	4	4	5	3		4.00
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										

Boat Access	IV.1.c	5	4	5	5	4	5	4		4.57
Environmental Education & Outreach										
Wildlife	IV.2.a	5	4	5	4	4	5	4		4.43
Invasive Species	IV.2.b	5	4	5	4	4	4	4		4.29
Habitat Management Activities	IV.2.c	5	4	5	4	4	5	4		4.43
Interpretive facilities and signs	IV.3	3	1	2	1	3	4	1		2.14
Recreational Opportunities	IV.4	5	4	5	5	4	5	3		4.43
Management of Visitor Impacts	IV.5	3	4	4	3	3	5	4		3.71
								Public Access & Education Average Score		4.00
Management Resources (V.1, V.2, V.3. V.4)										
Maintenance										
Waste disposal	V.1.a	4	4	4	5	4	5	4		4.29
Sanitary facilities	V.1.b	4	4	3	3	4	5	4		3.86
Infrastructure										
Buildings	V.2.a	2	2	3	1	2	4	2		2.29
Equipment	V.2.b	4	4	4	2	3	3	2		3.14
Staff	V.3	1	1	2	1	1	2	2		1.43
Funding	V.4	3	1	2	1	1	1	1		1.43
								Management Resources Average Score		2.74

Color Code:	Excellent	Above Average	Below Average	Poor	See Appendix A for detail
		Missing Vote	Insufficient Information		

3. Land Management Plan Review Details

3.1 Items Requiring Improvements in the Management Plan

The following items received low scores on the review team checklist, which indicates that the text noted in the Management Plan Review does not sufficiently address this issue (less than 3.0 score on average.). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The next management plan update should address the checklist items identified below:

1. ***Adjacent Property Concerns, specifically lime rock mine, and discussion of potential surplus land determination, received below average scores. This is an indication that the management plan does not sufficiently address adjacent property.***

   Managing Agency Response: *The Division will address adjacent property concerns and the determination of surplus lands in the update of the management plan. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.*

2. ***Managed Area Uses, specifically proposed picnicking/trail, received a below average score. This is an indication that the management plan does not sufficiently address proposed uses.***

Managing Agency Response: : *The Division will consider these recommendations during the next unit management plan revision. However, the current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.*

3.2 Management Plan Review Checklist and Scores

Plan Review Item	Reference #	Anonymous Team Members								Average
		1	2	3	4	5	6	7	8	
Natural Communities (I.A)										
Mesic Flatwoods	I.A.1	5	3	4	4	4	5	3		4.00
Scrubby Flatwoods	I.A.2	5	3	4	4	4	5	4		4.14
Basin Swamp	I.A.3	5	3	4	4	4	5	4		4.14
Depression Marsh	I.A.4	5	3	4	4	4	5	4		4.14
Hydric Hammock	I.A.5	5	3	4	4	4	5	4		4.14
Blackwater Stream	I.A.6	5	3	4	4	4	4	4		4.00
Estuarine Composite Substrate	I.A.7		3	4	4	4	5	5		4.17
Salt Marsh	I.A.8	4	3	4	4	4	5	5		4.14
Mangrove Swamp	I.A.9	3	3	3	3	3	5	5		3.57
Estuarine Mollusk Reef	I.A.10	3	3	3	3	3	5	5		3.57
								Natural Communities Average Score		4.00
Listed species: Protection & Preservation (I.B)										
Animals	I.B.1	5	3	5	4	4	5	5		4.43
Salt Marsh Vole	I.B.1.a	5	4	5	4	4	5	5		4.57
Plants	I.B.2	5	3	5	4	4	5	5		4.43
								Listed Species Average Score		4.48
Natural Resources Survey/Monitoring Resources (I.C)										
Listed species or their habitat monitoring	I.C.2	5	3	4	4	3	5	5		4.14
Fire effects monitoring	I.C.4	3	3	5	4	4	5	4		4.00
Other habitat management effects monitoring	I.C.5	5	3	4	4	4	5	4		4.14
Invasive species survey / monitoring	I.C.6	5	3	4	4	4	5	4		4.14
Cultural Resources (Archeological & Historic sites) (II.A,II.B)										
Cultural Res. Survey	II.A	4	4	3	3	4	5	4		3.86
Protection and preservation	II.B	4	4	5	3	4	5	4		4.14
								Cultural Resources Average Score		4.00
Resource Management, Prescribed Fire (III.A)										
Area Being Burned (no. acres)	III.A.1	5	4	4	4	4	5	5		4.43
Frequency	III.A.2	5	4	4	4	4	5	5		4.43
Quality	III.A.3	5	4	4	4	4	5	5		4.43

								Resource Management, Prescribed Fire Average Score		4.43
Forest Management (III.C)										
Timber Inventory	III.C.1	5	3	3	3	4	5	4		3.86
Timber Harvesting	III.C.2	4	3	3	3	4	5	4		3.71
								Forest Management Average Score		3.79
Non-Native, Invasive & Problem Species (III.D)										
Prevention										
prevention - plants	III.E.1.a	4	3	4	4	4	5	4		4.00
prevention - animals	III.E.1.b	5	3	4	4	4	5	4		4.14
prevention - pests/pathogens	III.E.1.c	3	3	3	3	3		4		3.17
Control										
control - plants	III.E.2.a	5	3	4	4	4	5	4		4.14
control - animals	III.E.2.b	5	3	4	4	4	5	4		4.14
control - pest/pathogens	III.E.2.c	3	3	3	3	3	5	4		3.43
								Non-Native, Invasive & Problem Species Average Score		3.84
Hydrologic/Geologic function, Hydro-Alteration (III.E.1)										
Roads/culverts	III.F.1.a	4	3	3	3	3	5	3		3.43
								Hydrologic/Geologic function, Hydro-Alteration Average Score		3.43
Ground Water Monitoring (III.E.2)										
Ground water quality	III.F.2.a	5	3	3	4	4	5	4		4.00
Ground water quantity	III.F.2.b	5	3	3	4	4	5	4		4.00
								Ground Water Monitoring Average Score		4.00
Surface Water Monitoring (III.E.3)										
Surface water quality	III.F.3.a	5	3	3	4	4	5	4		4.00
Surface water quantity	III.F.3.b	5	3	3	4	4	5	4		4.00
								Surface Water Monitoring Average Score		4.00
Resource Protection (III.F)										
Boundary survey	III.G.1	5	3	3	4	3	5	4		3.86
Gates & fencing	III.G.2	5	3	3	4	3	5	3		3.71
Signage	III.G.3	5	3	3	4	3	5	3		3.71
Law enforcement presence	III.G.4	3	3	3	3	3	5	3		3.29
								Resource Protection Average Score		3.64
Adjacent Property Concerns (III.G)										
Land Use										
Lime Rock Mine	III.H.1.b	3	1	1	3	2	2	1		1.86
Inholdings/additions	III.H.2	5	4	2	4	4	5	3		3.86
Discussion of Potential Surplus Land Determination	III.H.3	4	1	1	3	2	2	1		2.00
Surplus Lands Identified?	III.H.4	5	4	4	3	4	5	4		4.14
Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)										
Public Access										
Boat Access	IV.1.c	4	3	4	5	4	5	4		4.14

Environmental Education & Outreach										
Wildlife	IV.2.a	4	3	4	4	4	5	4		4.00
Invasive Species	IV.2.b	4	3	4	4	4	4	4		3.86
Habitat Management Activities	IV.2.c	4	3	4	4	4	5	4		4.00
Interpretive facilities and signs	IV.3	4	3	3	2	4	4	3		3.29
Recreational Opportunities	IV.4	4	3	4	5	4	5	4		4.14
Management of Visitor Impacts	IV.5	4	3	4	3	4	5	4		3.86
								Public Access & Education Average Score		3.90
Managed Area Uses (VI.A, VI.B)										
Existing Uses										
Boating	VI.A.1	5	5	5	5	5	5	4		4.86
Fishing	VI.A.2	5	5	5	5	5	5	4		4.86
Primitive camping	VI.A.3	5	4	5	2	2	5	4		3.86
Proposed Uses										
Picnicking/Trail	VI.B.2	5	4	5	2	0	0	1		2.43

Color Code:	Excellent	Above Average	Below Average	Poor	See Appendix A for detail
		Missing Vote	Insufficient Information		

Appendix A: Scoring System Detail

Explanation of Consensus Commendations:

Often, the exceptional condition of some of the property's attributes impress review team members. In those instances, team members are encouraged to offer positive feedback to the managing agency in the form of a commendation. The teams develop commendations generally by standard consensus processes or by majority vote if they cannot obtain a true consensus.

Explanation of Consensus Recommendations:

Subsection 259.036(2), F.S., specifically states that the managing entity shall consider the findings and recommendations of the land management review. We ask team members to provide general recommendations for improving the management or public access and use of the property. The teams discuss these recommendations and develop consensus recommendations as described above. We provide these recommendations to the managing agency to consider when finalizing the required ten-year management plan update. We encourage the manager to respond directly to these recommendations and include their responses in the final report when received in a timely manner.

Explanation of Field Review Checklist and Scores, and Management Plan Review Checklist and Scores:

We provide team members with a checklist to fill out during the evaluation workshop phase of the Land Management Review. The checklist is the uniform tool used to evaluate both the management actions and condition of the managed area, and the sufficiency of the management plan elements. During the evaluation workshop, team members individually provide scores on each issue on the checklist, from their individual perspective. Team members also base their evaluations on information provided by the managing agency staff as well as other team member discussions. Staff averages these scores to evaluate the overall conditions on the ground, and how the management plan addresses the issues. Team members must score each management issue 1 to 5: 1 being the management practices are clearly insufficient, and 5 being that the management practices are excellent. Members may choose to abstain if they have inadequate expertise or information to make a cardinal numeric choice, as indicated by an "X" on the checklist scores, or they may not provide a vote for other unknown reasons, as indicated by a blank. If a majority of members failed to vote on any issue, that issue is determined to be irrelevant to management of that property or it was inadequately reviewed by the team to make an intelligent choice. In either case staff eliminated the issue from the report to the manager.

Average scores are interpreted as follows:

Scores 4.0 to 5.0 are *Excellent*

Scores 3.0 to 3.99 are *Above Average*

Scores 2.0 to 2.99 are *Below Average*

Scores 1.0 to 1.99 are considered *Poor*

Addendum 10—Local Government Comprehensive Plan Compliance

From: Baxley, Demi
To: Shenley Neely
Cc: Wilbur Dean; Allbritton, Joel
Subject: RE: Request to Review Florida State Park Unit Management Plan for Compliance w/Local Comprehensive Plans
Date: Thursday, February 21, 2019 8:29:55 AM
Attachments: image001.png

Good Morning Ms. Shenley

Thank you very much for taking the time to review Cedar Key Scrub State Reserve's and Waccasessa Bay Preserve State Park's management plans. I have forwarded your responses to Joel Allbritton, the Planner assigned to handle the management planning for the two parks. Mr. Allbritton may be reaching out to you in the next few business days with possible questions or follow up to the information you provided. For communication purposes, Mr. Allbritton can be reached by email at joel.allbritton@floridadep.gov or by phone at 850.245.3051.

I'm sure we will be in touch again with another request at some point in the future. We greatly appreciate the assistance and look forward to working with you again.

Have a great rest of the day!

Demi P. Baxley
Florida Department of Environmental Protection
Division of Recreation and Parks/Office of Park Planning
Government Operations Consultant and
Park Planning Administrative Assistant
Demi.Baxley@floridadep.gov
Office: 850.245.3051
Direct: 850.245.3052

From: Shenley Neely <neely-shenley@levycounty.org>
Sent: Wednesday, February 20, 2019 2:30 PM
To: Baxley, Demi <Demi.Baxley@dep.state.fl.us>
Cc: Wilbur Dean <dean-wilbur@levycounty.org>
Subject: RE: Request to Review Florida State Park Unit Management Plan for Compliance w/Local Comprehensive Plans

Good Afternoon, Demi-
As requested, staff review of the Waccasassa Bay Preserve State Park, as well as the Cedar Key Scrub State Reserve Plan, both appear to be in compliance with the Levy County Comprehensive Plan. If you need additional information or have questions, please do not hesitate to give us a call. Thank you for the opportunity to review and comment on these two management plans.

Sincerely,
Shenley

Shenley Neely
Planning Director
Levy County Planning Department
352-486-5405

From: Baxley, Demi <Demi.Baxley@dep.state.fl.us>
Sent: Monday, February 04, 2019 3:32 PM
To: Shenley Neely <neely-shenley@levycounty.org>
Cc: Allbritton, Joel <Joel.Allbritton@dep.state.fl.us>
Subject: Request to Review Florida State Park Unit Management Plan for Compliance w/Local Comprehensive Plans

Good Afternoon Ms. Neely,

The Florida Department of Environmental Protection, Division of Recreation and Parks, Office of Park Planning had the pleasure of working with you last year regarding a review of the Manatee Springs State Park Draft Unit Management Plan. We are now asking for a review of two more plans; **Waccasassa Bay Preserve State Park** and **Cedar Key Scrub State Reserve**. As a reminder, we are responsible for the unit management planning of all Florida State Parks. As part of this planning process, prior to the unit management plan being presented to its Acquisition and Restoration Council for consideration, the Office of Park Planning is now required to connect and communicate with the area's agency that is responsible for the local comprehensive plan to determine if the park unit management plan is in compliance with the comprehensive plan. Specifically, we want to make sure we are accurately citing the future land use and zoning designations for the park and would like to confirm that our proposed developments in the conceptual land use section comply with those designations. The existing facilities section will also need to be reviewed. Please note that the Cedar Key Plan is being sent to you in a separate email; files were too large to send together.

Joel Allbritton, who is copied with this communication, is our point of contact regarding management of the parks. If you have any questions or concerns regarding the management plan, please direct them to Mr. Allbritton at Joel.Allbritton@floridadep.gov or 850.245.3051. Of course, as Mr. Maldonado's assistant, I am also available to you if you need any other information or have any questions.

Have a great day!

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