

# **Cayo Costa State Park**

## **Advisory Group Draft Unit Management Plan**

**STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**Division of Recreation and Parks  
March 2018**





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## INTRODUCTION

Cayo Costa State Park is located in Lee County (see Vicinity Map). Access to Cayo Costa is by boat, traveling south either from Boca Grande or west from Pine Island. (see Reference Map). The Vicinity Map also reflects significant land and water resources existing near the park.

Cayo Costa State Park was initially acquired by the State of Florida on September 7, 1976 with funds from Environmentally Endangered Lands Bonds Proceeds. Subsequent acquisitions have been funded through Preservation 2000 and Florida Forever programs. Currently, the park comprises 2,567 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) holds fee simple title to the park and on February 25, 1986, the Trustees leased (Lease Number 3426) the property to DRP under a 50-year lease. The current lease will expire on February 24, 20136.

Cayo Costa 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 Cayo Costa State Park is to protect, maintain, and preserve the unique subtropical island of Cayo Costa acquired through the environmentally Endangered Lands and Save our Coast programs, which were established to protect Florida's unique and irreplaceable lands for conservation purposes.

#### **Park Significance**

- The park protects and provides public recreational access to the largest undisturbed barrier island in southwest Florida, with over nine miles of coastline providing for ample resource-based activities within the state park, such as swimming, snorkeling, boating, fishing, as well as hiking.
- Situated along a chain of two distinct barrier islands between Boca Grande, Captiva, and Redfish passes, the park protects diverse and ecologically significant natural communities, including extensive tracts of marine tidal marsh, beach dune, coastal grassland, and maritime hammock.
- The park protects habitat for a broad range of flora and fauna, including the imperiled piping plover, Wilson's plover, least tern, gopher tortoise, American loggerhead, West coast beach sunflower, and shell mound prickly-pear.
- The park preserves and interprets the island's cultural history at eight prehistoric and six historic sites, including Weeden Island and Caloosahatchee period aboriginal midden sites and an early 20<sup>th</sup> century military Quarantine Station.

Cayo Costa is classified as a state park in the DRP's unit classification system. In the management of a state park, a balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at management of natural systems. Development in the park is directed toward providing public access to and within the park, and to providing recreational facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation on the park's natural, aesthetic and educational attributes.

### **Purpose and Scope of the Plan**

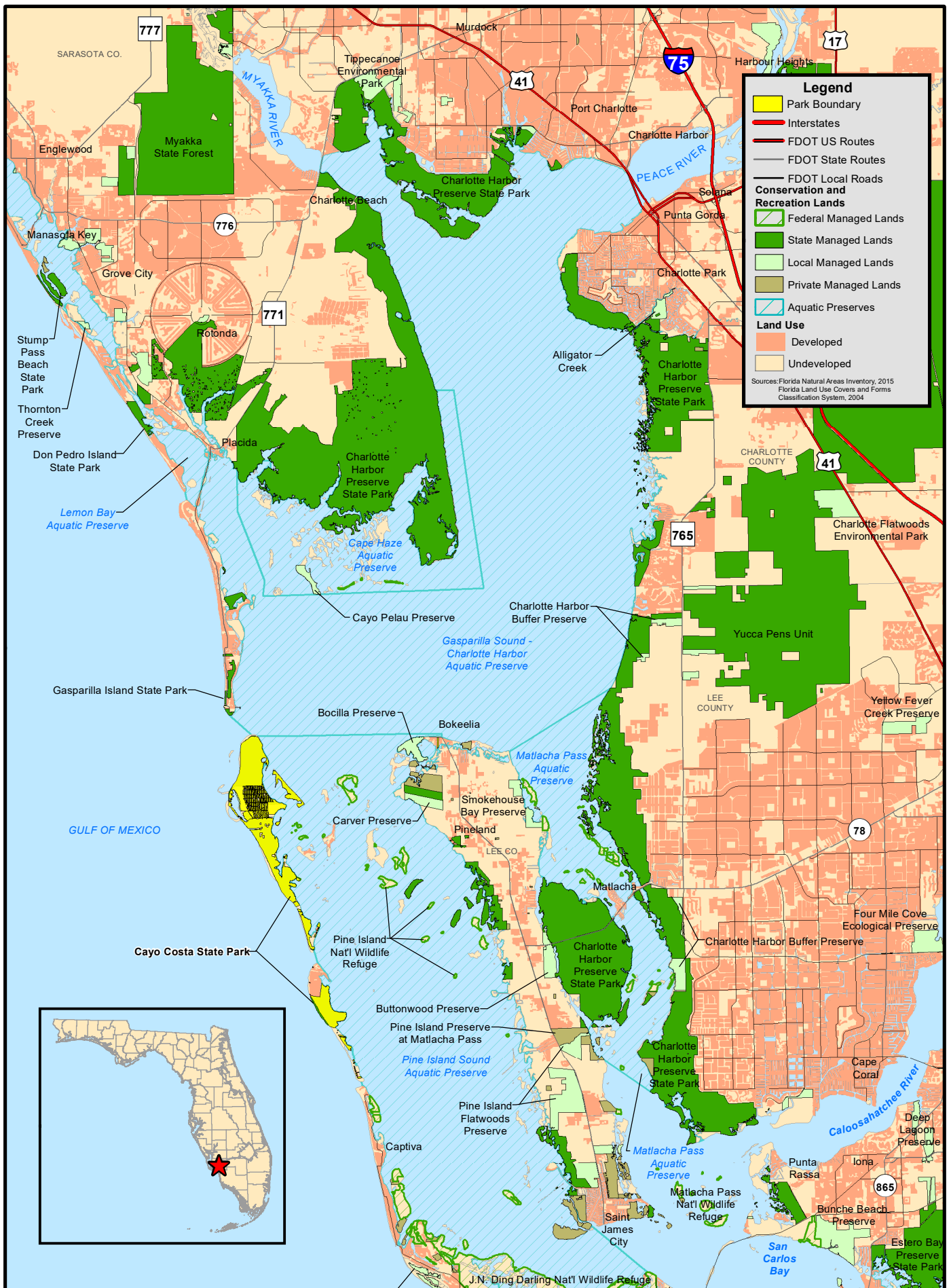
This plan serves as the basic statement of policy and direction for the management of Cayo Costa State Park as a unit of Florida's state park system. It identifies the goals, objectives, actions and criteria or standards that guide each aspect of park administration, and sets forth the specific measures 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: Resource Management Component, Land Use Component and 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.





**Legend**

- Park Boundary
- Interstates
- FDOT US Routes
- FDOT State Routes
- FDOT Local Roads
- Conservation and Recreation Lands**
- Federal Managed Lands
- State Managed Lands
- Local Managed Lands
- Private Managed Lands
- Aquatic Preserves
- Land Use**
- Developed
- Undeveloped

Sources: Florida Natural Areas Inventory, 2015  
Florida Land Use Covers and Forms Classification System, 2004

CAYO COSTA STATE PARK



VICINITY MAP



Pelican Bay  
Dock Area  
Camping Area  
Cabins & Tent Sites

Jug Creek Landbase

Matlacha Pass  
Aquatic Preserve

Bokeelia

Burnt Store Road

Cape Coral

GULF  
OF  
MEXICO

Captiva Pass

Pine Island Road

Pine Island Sound  
Aquatic Preserve

PINE ISLAND

NORTH CAPTIVA ISLAND

**Legend**

-  Park Boundary
-  Conservation Lands
-  Aquatic Preserves
-  Roads



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CAYO COSTA STATE PARK

0 0.5 1 2 Miles

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

REFERENCE MAP



All development and resource alteration proposed in this plan is subject to the 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 Tuesday, March 20 and Wednesday, March 21, 2018, respectively. Meeting notices were published in the Florida Administrative Register, March 9, 2018, Volume 44, Issue 48, 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**

Cayo Costa State Park is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and it (is/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 III waters by the Department. This primary portion of the unit is adjacent to the Pine Island Sound Aquatic Preserve and Gasparilla Sound-Charlotte Harbor Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes). Matlacha Pass Aquatic Preserve is located on the east side of Pine Island and borders the park's Landbase at Jug Creek.



## 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.

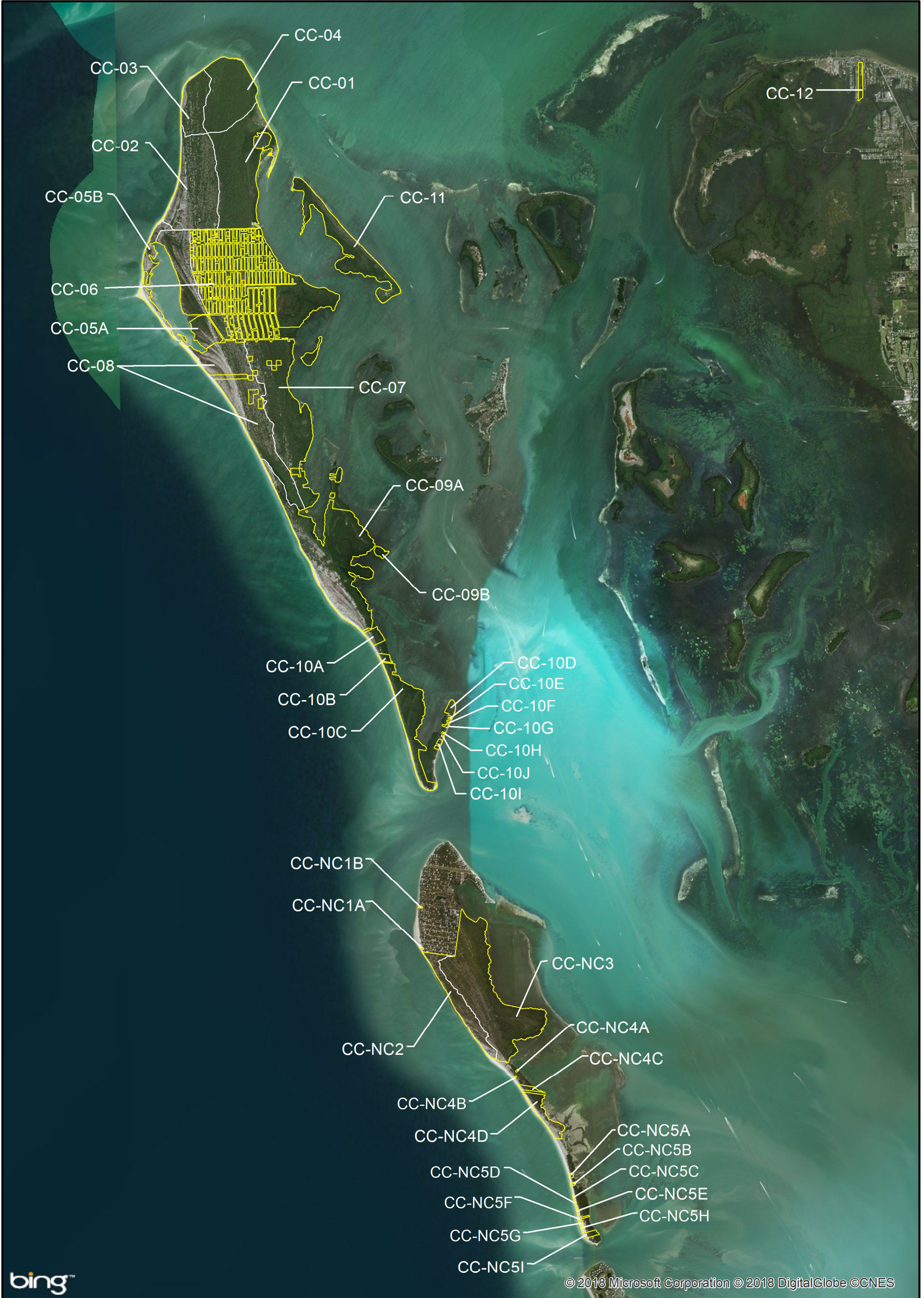
The DRP's management goal for cultural resources is to preserve sites and objects that represent Florida's cultural periods, significant historic events or persons. This goal often entails active measures to stabilize, reconstruct or restore resources, or to rehabilitate them for appropriate public use.

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 locations 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 acreage of each zone.

**Table 1. Cayo Costa State Park Management Zones**

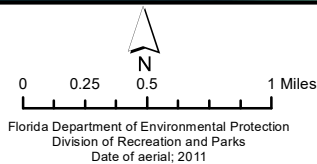
<b>Management Zone</b>	<b>Acreage</b>	<b>Managed with Prescribed Fire</b>	<b>Contains Known Cultural Resources</b>
CC-01	236.67	Y	Y
CC-02	186.20	N	Y
CC-03	68.04	N	N
CC-04	150.14	N	Y
CC-05A	32.87	N	N
CC-05B	41.98	N	N
CC-06	296.10	N	N
CC-07	254.96	N	Y
CC-08	226.36	N	Y
CC-09A	292.98	N	N
CC-09B	5.07	N	N
CC-10A	10.38	N	N
CC-10B	3.81	N	N
CC-10C	90.30	N	Y
CC-10D	5.28	N	N
CC-10E	0.33	N	N
CC-10F	0.33	N	N
CC-10G	0.82	N	N
CC-10H	0.34	N	N
CC-10I	1.11	N	N
CC-10J	0.26	N	N
CC-11	126.38	N	Y
CC-12	7.80	N	Y
CC-NC1A	0.20	N	N
CC-NC1B	0.43	N	N
CC-NC2	92.62	N	N
CC-NC3	283.95	N	Y
CC-NC4A	0.24	N	Y
CC-NC4B	0.22	N	N
CC-NC4C	3.83	N	Y
CC-NC4D	24.43	N	Y
CC-NC5A	0.96	N	N
CC-NC5B	0.82	N	N
CC-NC5C	0.76	N	N
CC-NC5D	0.23	N	N
CC-NC5E	1.23	N	N
CC-NC5F	0.94	N	N
CC-NC5G	0.86	N	N
CC-NC5H	0.29	N	N



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CAYO COSTA STATE PARK



MANAGEMENT ZONES MAP



## RESOURCE DESCRIPTION AND ASSESSMENT

### Natural Resources

#### Topography

##### Cayo Costa

Naturally occurring fluctuations in elevation on Cayo Costa Island vary from mean sea level (msl) to 10 feet above msl. One pre-Columbian mound, Old Ware Mound, represents the highest elevation on the island at about 16 feet above msl.

Topographic relief on the island was created by wind and waves depositing sediment in ridges along the seaward face of the island. These ridges which extend parallel along the west side of the island are tallest and most pronounced directly adjacent to the Gulf of Mexico. As the ridges are replaced, and weathered over time, they become shorter and leveled off. This creates a gently undulating ridge-swale topography found only on the west side of the island. On the east side of the island, fluctuations in topography were created by either sedimentation from the bay or over wash events that occurred during large storms. Recently, the loss of shoreline vegetation and over wash events caused by hurricanes and tropical storms has eroded the northeastern corner of the island, which resulted in accretion at the park's docking facility. Changes in shoreline topography on these barrier islands occur sporadically and are exacerbated by large storm events, long open fetches, and consistent boat wakes.

##### North Captiva

Topography at North Captiva Island is extremely similar to Cayo Costa. The same forces that shaped Cayo Costa also shaped North Captiva. Smaller and narrower than Cayo Costa, most of the park portion of North Captiva is less than 6 feet above msl, with the maximum elevation reaching only 10 feet above msl. The northern extent of the island on the Gulf side closely matches the undulating ridges found on Cayo Costa. The Gulf side of the narrower south end of the island is known as Redfish Shores. This area experiences frequent erosion and has sections where mangroves are exposed to the high wave energies of the Gulf. In 2004, Hurricane Charley washed out the middle of the island creating "Charley's Pass", separating the south from the north end of the island for five years until sand filled it in. South of Redfish Shores is Redfish Pass, which formed during a hurricane in 1921 and separates North Captiva from Captiva Island.

##### Punta Blanca

The topography of Punta Blanca, a small island east of Cayo Costa, is mostly low-level ridges reaching 3 feet above msl. An area on the southern spit of the island reaches 8 feet above msl, and was historically used as a family house site as early as 1935. The island was originally formed as a part of Cayo Costa as recently as 1868. Since this time, the inlet known as Pelican Pass that separates Punta Blanca and Cayo Costa has increased in width separating the two islands from each other with Pelican Bay.

### Jug Creek

The Jug Creek parcel is located on the north end of Pine Island, with a topography that is generally flat and low-lying reaching 3 feet above msl. This thin strip of property has been dredged to 6 feet below msl in the past for boat access to Pelican Sound, and as a result, there is a slightly raised spoil pile directly west running parallel to the canal which supports a variety of mangrove and fern species.

### **Geology**

Cayo Costa, North Captiva, and Punta Blanca rest on a foundation of limestone. The upper layer of this limestone originates from a Pleistocene series of sedimentary deposits called the Anastasia formation. This formation is mainly composed of conquinoid limestone, sand and clay. These islands are part of a barrier island chain which includes Gasparilla Island to the north, and Captiva and Sanibel to the south. Collectively, these land masses form a buffer that protects the Charlotte Harbor estuarine system, isolating it from some of the effects of storm-generated waves in the Gulf of Mexico.

The islands of Cayo Costa and North Captiva are both approximately 3,100 years old (Stapor et al. 1991). Radiocarbon dating of shells from sediment cores has aged all of the ridges in both islands, and explains how the topography was formed. The beach ridge sets at Cayo Costa and North Captiva indicate a history of alternating deposition and erosion of sediment, plausibly the result of three major fluctuations in sea level: (1) sea level rise until about 2000 years ago, (2) sea level fall between 1,700 and 1,100 years ago, and (3) rise in sea level from 1,100 years ago to present day. The ridges were formed from a change in the level of surrounding waters, with a constant amount of wave energy. This theory contradicts the original hypothesis developed by Stanley Herwitz in his book, *The Natural History of Cayo Costa* (1977). Herwitz' theory suggests that there was one single fall of sea levels from the late Pleistocene. He also notes that the land form known as Johnson Shoals located on the Gulf side of the island was created by a hurricane in 1930. Recent technology has now shown that this prominent shoal existed throughout the entire 3000 years of the island's history (Stapor et al. 1991).

Major geomorphic changes have occurred on Cayo Costa and associated parcels in the last 150 years. The size and location of Johnson Shoals located just off the coast of the widest section of Cayo Costa drives the accretion and erosion on the island. With increased shoaling, the southern section of the island is starved of sediment. This widens the north section of the island and diminishes the southern section. The occurrence of inland water bodies is attributed to historical coastline locations, which were driven by sea levels and the occurrence of large storm events. As barrier islands, constant shifts in shoreline locations and overall morphology are expected.

## **Soils**

The soils found on Cayo Costa consist of undifferentiated sand with a varying mixture of shell fragments. Some areas also contain marl and peat properties, especially on the east side of the islands. The 1984 Soil Survey of Lee County, Florida (Henderson 1984) describes seven soil types within Cayo Costa and associated parcels (see Addendum 4). The main sandy soils include Canaveral fine sand, beaches, and Captiva fine sand. All of these soil types are found on the western side and central areas of Cayo Costa and North Captiva.

On the eastern shore of Cayo Costa, North Captiva, and throughout Punta Blanca, Wulfert muck and Kesson fine sand are the dominant soil types. These soil types are poor-draining and frequently yield mangrove swamps. The surface of the soil is a dark organic muck with underlying sand and shell.

Jug Creek and the southern tip of Punta Blanca show evidence of massive soil disruption in the form of earth movement. This disturbed soil is likely from nearby dredging projects and early attempts to raise the existing topography for coastal development. Since this soil movement, native vegetation has returned, though sparse, within these areas due to the loss of the native seed bank and high compaction.

There are no unique erosion problems except those associated with the dynamics of a sandy coastline. Accretion has occurred previously within the canal at Jug Creek, and the service boat dock at Cayo Costa impairing boat access and fuel transportation to the island. Coastal Engineers reported in 2004 that Hurricane Charley caused vegetative loss on the northeastern tip of the island, thereby freeing large amounts of sandy soil to flow south, eventually filling in the staff's access point. In 2007 and 2016, both locations were dredged to 5 feet below msl to improve park staff access. To maintain normal park operations, both of these access canals will require maintenance dredging as sediment accretes in the future.

Currently, no beach nourishment or other erosion mitigation projects are proposed for Cayo Costa or associated parcels. If extensive erosion occurs, park and district staff will coordinate with Lee County to ameliorate the loss of soil. Beach nourishment would be preferred over any type of hard stabilization (seawall, jetties, breakwaters, etc.). Also, park and district staff will coordinate with the aquatic preserve to potentially add living shorelines on the northeastern coastline to slow down the net flow of sand into the service boat canal.

## **Minerals**

There is no information available on minerals at Cayo Costa State Park. No mineral deposits of commercial value are known to exist within the park boundaries.

## **Hydrology**

Cayo Costa and North Captiva both have a shallow freshwater lens with potable groundwater. The capacity for this source to supply water to the park, and existing private residences over a long term is unknown. Currently, the park extracts on average 828 gallons of water per day, with a maximum extraction of 1,880 gallons per single day. Drawing freshwater from a shallow lens directly adjacent to open ocean will eventually lead to salinization of all shallow wells. The effect of groundwater withdrawal on surface water quality is not known.

Due to a shallow water table and the lack of any moving sheet flow over the island, the drainage of surface water is slow. Precipitation is readily absorbed into the sandy soils, but once the sediment is saturated, surface water accumulates. Slow underground seepage mixed with high humidity and a slow evaporation rate leaves standing surface water throughout the park. Park trails and campground areas will accumulate water after heavy rainfall events. There are ten areas on Cayo Costa and two areas on North Captiva that perennially hold water.

Of the ten water features located on Cayo Costa, three are not located within the park boundaries, as they are part of the surface tidal inlets that connect them to Pine Island Sound, which is under the management of the Pine Island Sound Aquatic Preserve. This includes Old Place Hole (management zone CC-01), Murdock's Lagoon (management zone CC-08) and the Primo Point tidal pool complex (management zone CC-06). These three water bodies are designated as Class II Waters by DEP, and they have salinities that are indistinguishable from those found throughout Pine Island Sound.

Two water bodies known as the Egret Ponds (management zone CC-01) exchange water with Pine Island Sound through subterranean tidal seepage. This maintains the two ponds at consistent depths and salinities, regardless of seasonal rainfall variations. Due to the lack of surface water exchange with the sound, management remains under the DRP. Both Egret Ponds are designated as Florida Class III Waters.

Another water body known as the Pejuan Tidal Pool found on the southernmost point of Cayo Costa (management zone CC-10C) is salty due to inundation of seawater only during extreme high tides or large storm events. This large pool of water has an elevated salinity from the surrounding seawater (up to 50 parts per thousand) due to its lack of regular tidal flushing. The water exhibits extremely low visibility and a murky brown color due to tannins and suspended particulates.

One body of water remains as a relic of historic geology, known as the inland mangrove pond (management zone CC-06). As Cayo Costa was formed over the past 3000 years, spits of land became connected as global sea levels decreased. These spits of land became connected through sediment movement and sea subsidence. Where salt water became trapped a large volume of salt was deposited as the salt water evaporated. Now, without connection to the surrounding bay or Gulf, the salinity remains around 20 parts per thousand, allowing mangroves to





**Legend**

- 02 - Canaveral fine sand
- 05 - Captiva fine sand
- 22 - Beaches
- 23 - Wulfert muck
- 24 - Kesson fine sand
- 25 - St. Augustine, organic substratum-Urban land complex
- 48 - St. Augustine sand
- 99 - Water

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persist over freshwater species. This inland pocket of mangroves will continue to persist until all of the existing salt is leached out by rainwater.

Fresh bodies of water are also found at Cayo Costa, including Alligator Marsh (management zone CC-06), Sellar's Marsh (management zone CC-07) and Hogs Pond (management zone CC-05A). Alligator Marsh is the most extensive, covering approximately 18 acres during the summer months. Water levels of all three are closely correlated to rainfall on the island. During the driest months of the year, all are reduced to either a surface film of water, or a soggy substrate. Herwitz (1977) observed that these fresh water bodies are simply low-lying zones of saturation in contact with the unconfined aquifer. These fresh bodies of water are also designated as Class III water by DEP.

North Captiva contains two bodies of water located on the island's surface, one in management zone CC-NC3, and one in management zone CC-NC2. Both are saline water that become inundated with salt water during large storm events. The water body located in management zone CC-NC2 is located less than 20 meters from the Gulf of Mexico, and is frequently inundated with seawater. Salinities of these waters fluctuate slightly, but generally remain near 35 parts per thousand. A body of freshwater is located on North Captiva, but it is not within the park boundary.

Jug Creek has significantly altered hydrology due to the dredging of the canal. As the canal was created, a spoil berm was deposited along the west side of the canal, causing major changes in water flow through the mangrove swamp. Extreme high tides and storm events allow salt water to flow over the berm and into the lower mangrove swamp area. As the water subsides, saltwater is trapped along with large amounts of detritus that is carried in with the water. Placing gaps in the spoil berm would alleviate extreme salinities found on the west side of the canal, but might negatively impact the dredged area. Management measures should include research by district staff to determine how partial or complete removal of the berm would impact access to Jug Creek.

### **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 2010). 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 thirteen distinct natural communities as well as altered land cover types (see Natural Communities Map). A list of known plants and animals occurring in the park is contained in Addendum 5.

### **Beach Dune**

*Desired Future Condition:* Beach dune is a coastal mound or ridge of unconsolidated sediments found along shorelines with high energy waves. Vegetation consists of herbaceous dune forming grass species such as sea oats (*Uniola paniculata*) and railroad vine (*Ipomea pes-caprae* spp. *brasiliensis*). Other species include coastal sea rocket (*Cakile lanceolata*), seashore paspalum (*Paspalum vaginatum*), baybean (*Canavalia rosea*), and bitter panicgrass (*Panicum amarum*). Shrubs such as the state threatened inkberry (*Scaevola plumieri*) are scattered within the herbaceous vegetation. This community at Cayo Costa is mainly comprised of wind-deposited foredune and wave-deposited upper beach, with dunes reaching a maximum height of eight feet above mean sea level. This ephemeral community is constantly shifting due to accretion and erosion of the local sediment budget. Vegetation found here is halophytic and can withstand recurrent changes associated with occasional burial and exposure.

*Description and assessment:* Beach dune at Cayo Costa is located mostly along the west coast of the island, creating an almost continuous line along the Gulf's edge. A small patch of mangrove swamp divides the beach dune near the southern tip of the island. There is also a disconnected section of beach dune on the east side of the island facing Pine Island Sound. On North Captiva, beach dune is found along the west coast of the island facing the Gulf of Mexico in patches. Coastal erosion has fragmented this community by exposing areas of coastal strand to the high wave energies of the Gulf. It is expected that more areas of beach dune communities will develop as vegetation from coastal strand declines from salt and wave exposure.



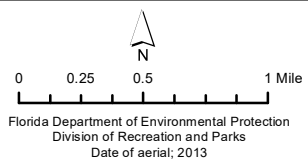
**Legend**

**Natural Communities**

- BD - Beach Dune 167.75 ac.
- CB - Coastal Berm 80.08 ac.
- CG - Coastal Grassland 476.74 ac.
- CIS - Coastal Interdunal Swale 41.68 ac.
- CS - Coastal Strand 415.68 ac.
- DM - Depression Marsh 28.00 ac.
- MAH - Maritime Hammock 571.78 ac.
- MF - Mesic Flatwoods 62.76 ac.
- MS - Mangrove Swamp 685.45 ac.
- MUS - Marine Unconsolidated Substrate 85.88 ac.
- SHM - Shell Mound 9.56 ac.
- CD - Canal/Ditch 1.44 ac.
- DV - Developed 16.91 ac.



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The beach dune community type found at Cayo Costa and North Captiva closely matches the FNAI description and is identified as an exemplary site in the FNAI "Guide to the Natural Communities of Florida" (2010). The community variation listed for tropical regions of the western peninsula include species such as the baybean, inkberry, bay cedar (*Suriana maritima*), and west coast dune sunflower (*Helianthus debilis* ssp. *vestitus*). Each of these plants are commonly found within the beach dune community on both Cayo Costa and North Captiva. Some of the animals that utilize the beach dune community at Cayo Costa and North Captiva include coachwhips (*Masticophis flagellum*), nesting shorebirds, and sea turtles, including the state threatened loggerhead sea turtle (*Caretta caretta*) and federally threatened green sea turtle (*Chelonia mydas*), which deposit eggs within the beach dune community each year between May and October.

The areas of beach dune community at Cayo Costa and North Captiva are in excellent condition. Low amounts of exotic plants matched with limited beach driving help maintain this community in its natural state. The natural coastal erosion process will constantly alter the beach dune resulting in fluctuations in acreage over time; however, more beach dune will form as the communities shift with the changing sea levels and increased erosion.

*General Management Measures:* General management of beach dune at Cayo Costa and North Captiva includes monitoring for exotic invasive plant species and removing them as necessary. In the past, a huge effort to remove Australian pine (*Casuarina equisetifolia*) was successful in nearly exterminating the population. As saplings begin to grow, park staff should make every effort to pull the trees while small to avoid another future large removal event. Additionally, beach naupaka (*Scaevola taccada*) is another exotic invasive plant that can out compete its native relative the state threatened inkberry. Every effort should be made to continue to monitor and remove these exotics before they become established.

Proposed walkways that would intersect the beach dune community should be constructed as either elevated boardwalks or switchback paths to avoid sand from blowing out past the foredunes. As vegetation in the back dune cannot withstand the salt spray and sand burial, perpendicular walkways can indirectly result in damages to plants on the back sides of dunes.

### **Coastal Berm**

*Desired Future Condition:* Coastal berm habitat on Cayo Costa is found along the seaward and landward edges of the mangroves. Coastal berm here consists of a mixture of tropical herbs, shrubs and trees and is defined by its substrate of coarse, calcareous, storm-deposited sediment forming long narrow ridges that parallel the shore. Tree species include cabbage palm (*Sabal palmetto*), gumbo limbo (*Bursera simaruba*), and seagrape (*Coccoloba uvifera*). Characteristic tall shrub and short tree species may include Spanish stopper (*Eugenia foetida*) and white indigoberry (*Randia aculeata*), while short shrubs and herbs may include broad-leaf spiderlily (*Hymenocallis latifolia*), buttonsage (*Lantana involucrata*), and rougeplant (*Rivina humilis*). More seaward berms or those more recently affected by storm deposition support a suite of plants similar to beaches, including shoreline sea purslane

(*Sesuvium portulacastrum*), saltgrass (*Distichlis spicata*), and seashore dropseed (*Sporobolus virginicus*), along with dense shrub thickets with buttonwood (*Conocarpus erectus*), black mangrove (*Avicennia germinans*), red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), joewood (*Jacquinia keyensis*), and bushy seaside oxeye (*Borrichia frutescens*). While this natural community is similar to coastal strand in appearance, the main difference is held with the substrate.

*Description and assessment:* Coastal berm can be found in patches on Cayo Costa, North Captiva and Punta Blanca. Locations where wind and waves have deposited coastal berms show evidence of historical storms, and seem to exist along the east side of the island and in 45-degree north-facing strips along the southern half of the island. This is due to the creation and constant movement and shifting that occurs along barrier islands. Coastal berm on North Captiva is distributed in patches within the mangrove swamp along the east side of the island. These berm areas have a slightly higher elevation compared to the surrounding mangrove swamp, which allows for diverse vegetation types other than mangroves.

Characteristic plant species found within the coastal berm on Cayo Costa and North Captiva includes gumbo limbo, seagrape, white indigoberry, bay cedar, and buttonsage. Rare plant species found within the coastal berm community on Cayo Costa include the state threatened joewood.

The areas of coastal berm at Cayo Costa and associated islands are in good condition. Feral hogs (*Sus scrofa*) periodically root within the coastal berm at Cayo Costa, causing soil disturbance. Some exotic plants including beach naupaka, Australian pine, Brazilian pepper (*Schinus terebinthifolius*), coconut palm (*Cocos nucifera*), and Senegal date palm (*Phoenix reclinata*) have invaded this natural community. With continued removal of these plants, the condition of the coastal berm will improve. Surrounding land use on Pine Island consists of landscaping plants and trees production. Therefore, it is expected that due to proximity, these types of exotic plants will continue to occur on these islands.

*General Management Measures:* Management activities routinely occurring within the coastal berm communities on Cayo Costa and associated islands include invasive exotic plant and animal control. All areas of coastal berm should be surveyed annually to identify areas containing Brazilian pepper and Australian pine while they are small enough to be uprooted. Every effort should be made to continue to monitor and remove exotic vegetation. In addition, these areas should be surveyed annually and monitored for rare plant species.

### **Coastal Grassland**

*Desired Future Condition:* Coastal grassland is predominantly an herbaceous community, occupying the flatter and drier portions of the transition zone between the primary beach dunes and the natural communities dominated by woody species (such as coastal strand or maritime hammock). With the exception of over wash from severe storms, it will be a relatively stable community compared to the dynamic primary dunes. Characteristic plant species include bluestem grasses



(*Andropogon* spp. and *Schizachyrium* spp.), camphorweed (*Heterotheca subaxillaris*) and ear-leaf greenbriar (*Smilax auriculata*). Other common species include sea oats, bitter panicgrass and saltmeadow cordgrass (*Spartina patens*). In older, more stable barrier islands fronting the Pine Island Sound, such as Cayo Costa and North Captiva, coastal grassland includes a unique species known as hairy gramma grass (*Bouteloua hirsuta*), which is typically found in Texas and on the western high plains (Küchler 1964).

*Description and assessment:* The coastal grassland community at Cayo Costa and North Captiva includes a mixture of species such as sea oats, bluestem grasses, and saltmeadow cordgrass that transition further from the beach into open areas where hairy gramma grass persists as a dominant ground cover. Areas of coastal strand are interspersed among the grasslands, containing cabbage palms, cocoa plum (*Chrysobalanus icaco*), snowberry (*Chiococca alba*), saw palmetto (*Serenoa repens*), and the state threatened joewood. This mosaic of grassland and coastal strand also contains open bare patches of sand frequently inhabited by gopher tortoises (*Gopherus polyphemus*) and coachwhip snakes. Rare animal species found in this community include Eastern indigo snakes (*Drymarchon couperi*).

The coastal grassland communities at Cayo Costa and North Captiva are typically located behind the primary dune in the over wash plain parallel to the beach and longitudinally over half the length of the island. This community is bisected by six park trails/roads that pass through the grassland, and two staff residences. Currently, the coastal grassland is in excellent condition at Cayo Costa and some portions are gradually succeeding to coastal strand and maritime hammock. Periodic disturbances to the coastal grassland communities at Cayo Costa and North Captiva include large storm events. As storms pass through, they remove large vegetation and deposit saline water, negatively impacting normal coastal strand and hammock species. This allows the salt-tolerant grasses to bounce back and dominate the landscape, rebuilding the coastal grassland community.

On North Captiva, much of the previously mapped grassland areas at the northeast end of the park have now succeeded to coastal strand. Despite decrease in acreage of grassland patches that still exist within the park boundary, the remaining coastal grassland is in excellent condition with minimal exotic plant coverage.

*General Management Measures:* Management activities that routinely occur within coastal grassland includes invasive exotic plant and animal control. All areas of coastal grassland should be surveyed yearly to identify areas with Brazilian pepper and Australian pine while they are small enough to be hand pulled out of the ground. Every effort should be made to continue to monitor and remove exotic vegetation. In addition, these areas should be surveyed annually and monitored for rare plant species.

If new roads or developments are proposed for either Cayo Costa or North Captiva, the coastal grassland should be avoided. The grassland community found on these islands is identified as an exemplary site in the FNAI "Guide to the Natural

Communities of Florida" (2010) with minimal disturbance, and every effort should be made to maintain this status.

### **Coastal Interdunal Swale**

*Desired Future Condition:* Coastal interdunal swale is a variable community which occurs as marshes, moist grasslands, dense shrublands, or damp flats which occur in strips between successive dune ridges that develop as beach building occurs seaward (accretion). Dominant plant species may be quite variable and a function of local hydrology, salt water occurrence, and the age of the swale. On Cayo Costa, the interdunal swale occurs as moist grasslands with shallow wet areas including a diverse mixture of herbs, including southern umbrellasedge (*Fuirena scirpoidea*), *Cyperus sp.*, seashore paspalum, bluestem grasses, and cordgrass (*Spartina sp.*). Shrubby areas may contain wax myrtle (*Myrica cerifera*) and buttonwood. Hurricanes and tropical storms can flood the swales with salt water after which are recolonized with salt-tolerant species like saltgrass.

*Description and assessment:* Coastal interdunal swale exists on both Cayo Costa and North Captiva as marshes and moist grasslands in linear depressions that parallel the beach within the coastal grassland communities behind the primary beach dune. These areas are differentiated from the beach dune and coastal grassland communities in that they lack species such as sea oats, and tend to be wetter, holding water longer than surrounding areas. Dominant plant species include broomsedges, wax myrtle, seashore paspalum, cordgrasses, and buttonwood. Older coastal interdunal swales along the middle and east sides of the island have long since succeeded to coastal grassland, coastal strand, maritime hammock, and linear depression marshes as accretion continues to build the west side of the island.

The coastal interdunal swale community type found at Cayo Costa and North Captiva closely matches the FNAI description and is identified as an exemplary site in the FNAI "Guide to the Natural Communities of Florida" (2010). The coastal interdunal swale communities at Cayo Costa and North Captiva are in excellent condition with minimal exotic plant coverage.

*General Management Measures:* Management activities that routinely occur within the coastal interdunal swale community includes exotic plant and animal control. Every effort should be made to continue to monitor and remove exotic vegetation.

### **Coastal Strand**

*Desired Future Condition:* Coastal strand can be characterized as a community of stabilized, wind-deposited coastal dunes that are thickly vegetated with evergreen salt-tolerant shrubs. It is an eco-tonal community that will generally lie between the beach dune and maritime hammock or tidal swamp. Coastal strand dunes will contain deep, well-drained sands that are generally quite stable but become susceptible to severe damage if the vegetation is significantly disturbed. Tropical coastal strand species prevalent on Cayo Costa and North Captiva include sea grape, myrsine (*Myrsine cubana*), buttonsage, yellow necklace pod (*Sophora tomentosa var. truncata*), cocoa plum, white indigoberry, snowberry, and numerous

others. Smooth domed canopies will develop as the taller vegetation is “pruned” by the windblown salt spray that kills the outer buds.

*Description and assessment:* Large acreage of coastal strand is located on both Cayo Costa and North Captiva behind the primary beach dune, interspersed within the coastal grasslands, and positioned between the coastal grassland and maritime hammock. Coastal strand normally acts as an ecotone from beach dune to maritime hammock, but the geological formation of these islands has created coastal grassland more inland from the existing strand. Within the coastal strand are pockets and small strips of grassland understory, creating a fluctuating mosaic of strand and grassland throughout both of the islands.

The coastal strand community type found at Cayo Costa and North Captiva closely matches the FNAI description and is identified as an exemplary site in the FNAI “Guide to the Natural Communities of Florida” (2010). Coastal strand found on Cayo Costa and North Captiva is characterized by the prevalence of tropical species, with sea grapes and cabbage palms dominating the vegetative cover, and other tropical shrubs, such as myrsine and buttonsage, flanking in areas with enough sun exposure. Even though cabbage palms and wax myrtle are common throughout this community, the pyric nature and natural fire frequency of tropical coastal strand is still unresolved (FNAI 2010).

The coastal strand at both islands is currently in excellent condition. Very few exotics are present in this community, and imperiled plants and animals thrive in these areas. High amounts of active gopher tortoise burrows can be found within this community, along with large populations of the state threatened joewood. Eastern indigo snakes are also known to utilize the coastal strand habitat on Cayo Costa and North Captiva. As recently as 2005, a federally endangered west coast prickly apple cactus (*Harrisia aboriginum*) was documented within the coastal strand on Cayo Costa. Following tropical storms and hurricanes later that same year, the cacti has not been documented on Cayo Costa or North Captiva; however, all coastal strand and maritime hammock communities on Cayo Costa and North Captiva are considered potential habitat for this endangered cactus.

*General Management Measures:* While the reduction of dangerous wildfire fuel is vital, the ecological value of burning coastal strand at North Captiva and Cayo Costa is not supported. For this particular plan, coastal strand will not be identified as a pyric community unless other evidence is presented that justifies the need for ecological burning. Prescribed burns with the intent of reducing fuels should be considered in coastal strand at both Cayo Costa and North Captiva when fuel levels are deemed high.

Management activities that routinely occur within coastal strand on Cayo Costa and North Captiva include invasive exotic plant and animal control. All areas of coastal strand should be surveyed yearly to identify areas with Brazilian pepper and Australian pine while small enough to be hand pulled out of the ground. Every effort should be made to continue to monitor and remove exotic vegetation. In addition, these areas should be surveyed annually and monitored for rare plant species.

## Maritime Hammock

*Desired Future Condition:* Maritime hammock is a coastal evergreen hardwood forest occurring on stabilized coastal dunes at varying distances from the shore. On Cayo Costa and North Captiva, canopy species typically consist of live oak (*Quercus virginiana*), seagrape, gumbo limbo, strangler fig (*Ficus aurea*), and cabbage palm. For maritime hammock communities, the canopy will typically be a dense, closed canopy with a distinct understory. The understory species may consist of saw palmetto, wax myrtle, myrsine, wild coffee (*Psychotria nervosa*), snowberry, coralbean (*Erythrina herbacea*), and marlberry (*Ardisia escallonioides*). Herbaceous groundcover is typically very sparse or absent. Many vine species persist in this community, including poison ivy (*Toxicodendron radicans*), ear-leaf greenbriar, and Virginia creeper (*Parthenocissus quinquefolia*).

*Description and assessment:* Maritime hammock is the most extensive community on Cayo Costa, covering most of the island's east side. North Captiva contains this community in patches on the west side of the island, and in a continuous strip on the east side adjacent to the mangrove swamp. Open sandy spaces are rare when this habitat is undisturbed, and organic material consisting of leaf litter dominates the groundcover. Buildup of organic material contributes to moisture retention. A nearly complete canopy cover of cabbage palms and live oak reduces the range of temperature fluctuations during the day and night in this community.

The maritime hammock at Cayo Costa closely matches the FNAI description and is identified as an exemplary site in the FNAI "Guide to the Natural Communities of Florida" (2010). Aside from the characteristic live oak and cabbage palm, additional plant species found in this community on Cayo Costa and North Captiva include gumbo limbo, strangler fig, myrsine, white stopper (*Eugenia axillaris*), wild coffee, wild lime (*Zanthoxylum fagara*), and coralbean. A large variety of ferns are supported in the maritime hammock, including whisk fern (*Psilotum nudum*), marsh fern (*Thelypteris palustris* var. *pubescens*), and resurrection fern (*Pleopeltis polypodioides*). Aerial bromeliads are prevalent in this community, including the imperiled banded airplant (*Tillandsia flexuosa*) and giant airplant (*Tillandsia utriculata*). The maritime hammock at Cayo Costa and North Captiva is also considered habitat for several other rare plant species including the state endangered West Indian cock's comb (*Celosia nitida*) and the federally endangered west coast prickly apple cactus.

The maritime hammock at Cayo Costa is in good condition. Extensive rooting from feral hogs has disrupted large sections of hammock, especially adjacent to park trails. Rooting destroys the native vegetation, and allows exotic plants an opening to become established. Also, the communities of fungi and insects are displaced by this physical manipulation of the soil. Exotic plants are present in this community, namely Brazilian pepper, carrotwood (*Cupaniopsis anacardioides*), and mother-in-law's tongue (*Sansevieria hyacinthoides*). Focused efforts in exotic removal have taken place, including the work of two AmeriCorps in 2014, and the continued assistance from other park volunteers whose primary responsibilities include the chemical treatment of Brazilian pepper infestations within the maritime hammock.

*General Management Measures:* Management activities that routinely occur within maritime hammock at Cayo Costa and North Captiva include invasive exotic plant and animal control. All areas of maritime hammock should be surveyed yearly to identify areas with Brazilian pepper and Australian pine while they are small enough to be hand pulled out of the ground. Every effort should be made to continue to monitor and remove exotic vegetation. In addition, these areas should be surveyed annually and monitored for rare plant species.

The maritime hammock on Cayo Costa has been subject to occasional fire, either through intended prescribed fires, by accidents from park visitors and residents, or naturally by lightning. FNAI describes maritime hammock as a non-pyric community that rarely experiences fire (FNAI 2010). With the exception of management zone CC-01, which contains mesic flatwoods surrounded by areas of maritime hammock, the maritime hammock for this plan will remain non-pyric with no prescribed fires for ecological reasons proposed. Areas that are ignited naturally or by human interaction should be extinguished as quickly as possible to prevent the fire from spreading to other areas and to avoid the destruction of private property.

### **Mesic Flatwoods**

*Desired Future Condition:* Mesic flatwoods community is characterized by an open canopy of tall south Florida slash pines (*Pinus elliotii*) and a dense, ground layer of low shrubs, grasses and forbes. Saw palmetto will generally be present but not overly dominant. Other shrub species include cocoa plum and bluestem grasses. This community has minimal topographic relief, and the soils contain a hardpan layer within a few feet of the surface which impedes percolation. Due to these factors, water can saturate the sandy surface soils for extended periods during the wet season but lengthy droughts also commonly occur during the dry season. The Optimal Fire Return Interval for this community is 2-4 years.

*Description and assessment:* The mesic flatwoods community found on Cayo Costa is very different than what is observed on the mainland. This natural community is in discontinuous patches within the interior northern half of the island. The flatwoods occur locally within the maritime hammock, typically near a site of historical human disturbance, giving the appearance that the community is more related to human activity than to the island's physiography or successional pattern. The formation of these flatwoods correlates to the passage of major hurricanes, with these large storms opening up attractive areas for human development within the hammock.

The main difference between the mesic flatwoods and maritime hammock is the lack of woody species and reduced herbaceous groundcover due to pine needle droppings. The flatwoods have minimal snowberry, indigoberry, coral bean and myrsine understory when compared to those typically found in the hammock. Common ground cover in the mesic flatwoods includes saw palmetto, coastal ground cherry (*Physalis angustifolia*), shell mound prickly pear (*Opuntia stricta*), and flat leaf flatsedge (*Cyperus planifolius*). Exotic plants are not commonly found within this community on Cayo Costa.

The mesic flatwoods at Cayo Costa are in good condition, but are not contiguous. Only a portion of the mesic flatwoods is currently managed with prescribed fire as several patches of flatwoods are surrounded by non-pyric community types and others are located near outparcels containing private homes. Managing such small areas of this pyric community embedded in a non-pyric area makes prescribed burning extremely difficult. The lack of regular fire also brings down the quality of this particular community. Lightning strike fires occur, but with less frequency than the mainland.

*General Management Measures:* Management activities that routinely occur within the mesic flatwoods on Cayo Costa include monitoring for invasive exotic plants and animal control. Every effort should be made to continue to monitor and remove exotic vegetation. On the mainland, mesic flatwoods are a pyric community that burns frequently. The largest pocket of flatwoods north of the main road will continue to be ecologically maintained with prescribed fire; however, it should also be monitored for pine mortality and groundcover response.

Due to the location of mesic flatwoods and association with historical resources, future trails and developments should be avoided in this community.

### **Shell Mound**

*Desired Future Condition:* Shell mounds are characterized as small hills in coastal areas composed entirely of shells (clams, oysters, whelks) that were discarded by generations of Native Americans. This aggregation of shells created a habitat that was attractive to calciphilic plants. These hills of shell are often surrounded by mangrove swamp, indicating that sea levels were much lower at the time these mounds were created. Undisturbed mounds support diverse hardwood forests with tropical vegetation including white stopper, Florida swamp privet (*Forestiera segregata*), strangler fig, and gumbo limbo. Mangroves are also present around the base of the mound, along with herbaceous species including sea purslane and saltwort (*Batis maritima*). A few imperiled species are only found among the shell mound natural community, including West Indian cock's comb (*Celosia nitida*).

*Description and assessment:* The shell mounds at Cayo Costa and North Captiva are in fair condition. The shell mound communities at North Captiva are not entirely contained within park boundaries. Because the mounds offer topographic relief, they were targeted for early private residential construction. Two large mounds on Cayo Costa, Faulkner Mound and Mark Pardo Shellworks, have private homes on their highest points. This makes natural community management very difficult due to the matrix of park and non-park property. Due to the construction of homes, walkways, and fencing, some of the mounds on Cayo Costa are physically disturbed. The associated vegetation still persists, but only in small patches away from public use areas.

The shell mounds on both Cayo Costa and North Captiva harbor tropical hardwood species including gumbo limbo, strangler fig, and Florida swamp privet. Red, black, and white mangroves, along with buttonwood fringe the mounds with patches of herbaceous ground cover. Imperiled species found among the shell mound

communities at Cayo Costa include the state threatened shell mound prickly pear, state threatened triangle cactus (*Acanthocereus tetragonus*), state endangered West Indian cock's comb, and federally endangered west coast prickly apple cactus.

*General Management Measures:* Management activities that routinely occur on the shell mounds on Cayo Costa and North Captiva include monitoring for invasive exotic plants and removing them as necessary. The West Indian cock's comb is found among this community, and every effort should be made to leave these plants undisturbed. Exotic plant removal should be conducted with minimal impact to the subsurface. In addition, these areas should be surveyed annually and monitored for rare plant species.

Looting of the shell mounds for artifacts has occurred in the past, causing disturbances to both the mound and associated vegetation. Shell mounds should be visited as frequently as possible by park staff to deter visitors from physically manipulating these sites.

### **Depression Marsh**

*Desired Future Condition:* Depression marsh is characterized as containing low emergent herbaceous and shrub species which will be dominant over most of the area. Trees will be few and will occur primarily in the interior portions of the community. There will be little accumulation of grassy fuels due to frequent burning; one can often see the soil surface through the vegetation when the community is not inundated. Dominant vegetation in basin marsh and depression marsh at Cayo Costa includes panic grasses (*Panicum* spp.), Jamaica swamp sawgrass (*Cladium jamaicense*), *Cyperus* sp., and coastalplain willow (*Salix caroliniana*). The Optimal Fire Return Interval for this community is 2-10 years depending on fire frequency of adjacent communities.

*Description and assessment:* The depression marshes found on Cayo Costa do not match the FNAI description as some are linear rather than circular and originated from saline remnants of old coastal interdunal swale systems. The continued leaching of salts from the substrate as the island grew in width created more hydric conditions which transitioned the vegetative community to be more favorable for freshwater species. The dominant defining species present include the coastal plain willow and panic grasses.

Currently, the depression marshes on Cayo Costa are in good condition. Exotic plants such as Brazilian pepper and mother-in-law's tongue are present in and around the marsh boundaries. Also, there is hog damage in and around all of the depression marshes.

*General Management Measures:* Management activities that occur in the depression marsh communities on Cayo Costa include monitoring for invasive exotic plant species and removing them as necessary. Every effort should be made to maintain control of Brazilian Pepper and mother-in-law's tongue.

The depression marshes at Cayo Costa will be maintained as a non-pyric because they are surrounded by other non-pyric communities, such as maritime hammock and mangrove swamp, and some are located near outparcels that contain private homes.

### **Mangrove Swamp**

*Desired Future Condition:* Mangrove swamp is typically characterized as a dense forest occurring along relatively flat, low wave energy, marine and estuarine shorelines. The dominant overstory will include red mangrove, black mangrove, white mangrove, and buttonwood. These four species may occur either in mixed stands or often in differentiated, 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 mangrove in the intermediate zone, and white mangroves and buttonwood in the highest, least tidally influenced 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. When present on Cayo Costa and associated islands, shrub species include seaside oxeye, and vines including gray nicker (*Caesalpinia bonduc*), coinvine (*Dalbergia ecastaphyllum*), and herbaceous species such as saltwort, perennial glasswort (*Sarcocornia perennis*), and giant leather fern (*Acrostichum danaeifolium*). Soils will generally be anaerobic and are saturated with brackish water at all times, becoming inundated at high tides. Mangrove swamps will occur on a wide variety of soils, ranging from sands and mud to solid limestone rock. In older mangrove swamps containing red mangroves, a layer of peat may build up over the soil from decaying plant material (primarily red and black mangrove roots).

*Description and assessment:* The mangrove swamp found at Cayo Costa, North Captiva, Punta Blanca, and Jug Creek are in excellent condition. Occasional exotic plants can be found interspersed among the mangrove swamp, but no areas are monocultures of invasive species. Carrotwood and Brazilian pepper are the typical exotic species found in this natural community. Mangrove swamp is expanding on the east sides of both Cayo Costa and North Captiva as more mangroves recruit adjacent to the existing swamp.

*General Management Measures:* Management activities that routinely occur in the mangrove swamp communities include monitoring and removal of invasive exotic plant species. Exotic removal should be a continuous process to maintain this natural community. Also, park management should discourage boats tying lines to mangrove branches.

Illegal trimming of mangroves on state park property has previously been documented and brought to the attention of the Pine Island Sound Aquatic Preserve. Quarterly surveys by boat should be conducted along the east side of the islands to monitor mangrove health on state park property.



## **Marine Unconsolidated Substrate**

*Desired Future Condition:* Marine unconsolidated substrate consists of expansive unvegetated, open areas of mineral based substrate composed of shell, coral, and sand (sand beaches). The presence of natural marine debris, or wrack, is considered desirable as it greatly enhances nutrient cycling and the food web. Desired conditions include preventing soil compaction, dredging activities, and disturbances such as the accumulation of pollutants.

*Description and assessment:* The marine unconsolidated substrate at Cayo Costa and North Captiva is in excellent condition. Natural beach erosion and accretion occurs constantly within this community. The acreage and shape of the substrate changes daily based on the speed and location of the long shore current. On the west side of the islands, this community consists mainly of open sandy beaches seaward of the beach dune. Along the east side of the islands, this community includes sandy shorelines flanking the mangroves and mud flats exposed at low tides. At the widest point of the island along the west side, an inland saltwater lagoon occasionally overflows its banks creating a channel through the marine unconsolidated substrate to the Gulf of Mexico. Significant erosion and storm events as recently as 2015 resulted in the opening of the lagoon to the Gulf of Mexico. Beach raking does not occur on these islands; therefore, the beach wrack community is kept natural. This community provides important nesting habitat for imperiled species, including imperiled green and loggerhead sea turtles, and migrating shorebirds. All-terrain vehicles (ATVs) are used on the beaches for sea turtle nesting surveys, with driving limited to those lower beach areas near or below the high-tide line not utilized by shorebirds and sea turtles in accordance with FWC best management practices.

*General Management Measures:* Management activities that routinely occur in the marine unconsolidated substrate on Cayo Costa and North Captiva include monitoring for invasive exotics and animal control. The beach community should be monitored annually for erosion and accretion to better assess habitat loss/gain for shorebirds and sea turtles, and to limit the amount of human interference in the form of beach nourishment or hard stabilizations. Beach raking should not be conducted on Cayo Costa or North Captiva to preserve the wrack line and minimize impacts to nesting shorebirds and sea turtles. Natural resource protection should be balanced with recreational use by including signage around sea turtle nests, signage prohibiting pets on the beach, and posting barriers to prevent trespassing within shorebird nesting areas.

Driving on this natural community should be limited to necessary management activities and in accordance with FWC best management practices to avoid conflicts between beach nesting species.

## **Developed**

*Desired Future Condition:* The developed areas within the park will be managed to minimize the effect of the developed areas on adjacent natural areas. Priority invasive plant species (FLEPPC Category I and II species) will be removed from all developed areas. Other management measures include proper stormwater

management and development guidelines that are compatible with prescribed fire management in adjacent natural areas.

*Description and assessment:* The developed areas of Cayo Costa and Jug Creek are in good condition. The developed areas at Cayo Costa include tent campsites, small primitive cabins, restroom facilities, ranger station, maintenance shop, three staff residences, and water treatment tank. Multiple areas are regularly mowed to reduce the encroachment of grasses and vegetation.

Jug Creek contains an infestation of exotic plants within the cottage area that require herbicidal and mechanical treatment. No other developed areas of the park have issues with exotic plants.

*General Management Measures:* Management activities for developed areas in the park routinely include monitoring for invasive exotic plant species and removing them as necessary. Developed areas should be maintained such that the vegetative cover contains 5% or less exotic plant species. Exotic animals such as armadillos (*Dasypus novemcinctus*) and wild hogs should also be removed to prevent rooting in public use areas.

Proposed landscaping for developed areas of the park should include only native plants found within their proper ranges. No new native plants should be introduced to the park if there is no historical record of that plant inhabiting the park in the past. Ornamental landscapes statewide often install the east coast variety (*Helianthus debilis*) for landscaping, but it is important to ensure that only the native west coast variety is planted in the park.

## **Canal**

*Desired Future Condition:* The canal area within the park will be managed to minimize the effect of the canal on adjacent natural areas. The depth will be maintained at 5 feet to allow for the passage of the crew boat.

*Description and assessment:* The canal area is located at Jug Creek, and is in good condition. The dredged canal at Jug Creek is the only access to the mainland for the island parks. Over the years, the canal has been filling in and becoming too shallow for the park boats to enter. In 2016, the canal was dredged to maintain boat access for park staff. Without canal access, the island parks will not be able to transport staff, fuel, and other resources to Cayo Costa.

*General Management Measures:* The canal depth at Jug Creek is monitored weekly to ensure access for the crew boat and the canal is dredged as allowed by permit. The canal should be maintenance dredged to keep the depth at or below 5 feet deep for boat access.

## **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.

The DRP strives to maintain healthy 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.

Cayo Costa is vital to the existence and reproduction of many imperiled species. Much of Florida's coastal habitats have been lost to human development. Cayo Costa and its associated islands provide undisturbed beach communities that act as breeding, nesting, resting, and feeding grounds for many protected plants and animals.

Imperiled sea turtles frequently nest on the beaches of Cayo Costa and North Captiva. The state -threatened loggerhead sea turtle is the most common nesting sea turtle, with over 300 nests laid in 2013, 2014, and 2016. Federally threatened green sea turtles lay an average of two to five nests on Cayo Costa per year. Other sea turtles that have been observed within park property include the federally endangered Kemp's ridley (*Lepidochelys kempi*). In accordance with FWC protocol, park staff and volunteers survey the full length of the beach daily, identifying new nests, locating eggs, and erecting boundary postings with signage. Nests are excavated three days after hatching occurs or 70 days from the date when eggs were first deposited. All nests are documented and recorded, including those lost to tidal inundation, erosion, or depredation. Depredation by nuisance animals such as raccoons, armadillos, and coyotes is currently a significant issue for nesting sea turtles at these islands. Morning surveyors locate the clutch and place a three-foot by three-foot screen over the nest to deter depredation. This screen is held in place with four tent stakes, and is buried 2-3 inches beneath the sand surface. The

screen and stakes are removed three days after the initial hatchling emergence is documented or 70 days after the nest was first deposited.

There is currently no lighting at the only developed site (campground) along the Gulf of Mexico on Cayo Costa. If development were slated to occur along any of the nesting beaches, all lights would conform to standards preventing adult and hatchling disorientation. All exterior lighting would incorporate "turtle friendly" lighting and conform to the FWC Marine Turtle Lighting Guidelines. Disorientation events attributed to artificial light sources and area sky-glow adjacent to the park are reported to FWC and Lee County.

Nesting seabirds and shorebirds are also monitored at Cayo Costa and North Captiva in accordance with FWC and DEP Shorebird and Seabird Management standards. Bird species historically known to nest on Cayo Costa include snowy plovers (*Charadrius nivosus*), least terns (*Sternula antillarum*), Wilson's plovers (*Charadrius wilsonia*), black skimmers (*Rynchops niger*), and American oystercatchers (*Haematopus palliatus*). Areas throughout the park are to be posted for nesting and resting birds, regardless of visitor use. Timing, size, and enforcement of the closed areas for beach nesting and resting shorebirds and sea turtles are critical to their effectiveness. Posting of significant wildlife habitat in advance of seasonal occupation (pre-posting) can make the difference between occupied and unused nesting sites. Providing a sufficient buffer to ensure that disturbances do not result in abandonment is critical. In areas of intense recreational pressure, outreach and enforcement need to accompany any posting effort. The DRP will continue to coordinate with FWC on enforcement and protection measures for critical shorebird and sea turtle nesting and resting areas.

The DRP will seek a balanced approach to minimize visitor impacts to shorebirds and the park's sensitive coastal habitats, while managing resource-based recreational activities. In collaboration with FWC, other government agencies, local non-governmental organizations, park staff will identify and delineate habitats and educate the public about shorebird protection. Management decisions will be informed by analysis of data on habitat use in the park during prior nesting seasons. This analysis will suggest areas of importance where focused management actions are needed. These actions will typically include:

- Demarcating potential shorebird habitat by enclosing the perimeter of the habitat and buffer area with appropriate fencing and signage.
- Encouraging and focusing visitor activities into areas less suitable for shorebird nesting habitat.
- Monitoring during the nesting season to identify and protect new breeding sites.
- Providing interpretive and educational outreach to the public prior to and during the nesting season to encourage visitor use that protects shorebirds and their habitat.
- When the same breeding sites are used year after year, posting the protected area will occur prior to the season (pre-posting).

- When new breeding sites are indicated, appropriate measures will be implemented, including demarcating new protected areas and expanding or initiating interpretive programs.
- Coordinating with FWC and local law enforcement agencies to ensure compliance with park rules and shorebird protection, as needed. This includes coordination with FWC law enforcement to enforce existing rules about dogs not being allowed on the beach.

As needed, park staff or volunteers will provide onsite interpretation to educate visitors about the management of imperiled shorebird habitat and identify suitable recreational areas. These outreach programs will commence prior to nesting seasons and prior to placing limits on access to recreational areas. Pre-posting the identified habitat areas combined with early public notification regarding the park's shorebird protection program will improve visitor compliance with park rules and promote broad-based public stewardship of shorebird nesting, resting, and foraging habitats in the park. For more information and details of monitoring protocols, please visit DRP's shorebird and seabird management plan.

Cayo Costa and North Captiva are important resting and feeding areas for migrating and wintering shorebirds. Species currently experiencing population declines such as the red knot (*Calidris canutus rufa*) and piping plover (*Charadrius melodus*) will be monitored within the state park. All parks, including Cayo Costa and North Captiva, will participate in FWC's winter shorebird survey to accurately capture how many birds are using Florida beaches for wintering and resting. When important resting and feeding areas are identified at these parks, proper signage and protection will be erected.

Though no longer listed as imperiled, southern bald eagles are noted here because of the FWC guidelines for activities near eagle nests during the October 1 through May 15 nesting season (FWC 2008). Special precautions are taken near active bald eagle nests, including buffers, to prevent disturbance. Precautions are also taken to protect osprey nests that can be found in pine snags at the park.

Eastern indigo snakes are currently being researched on both North Captiva and Cayo Costa by the Sanibel Captive Conservation Foundation (SCCF). This ongoing research involves a population study of the genetic differences between mainland indigo snakes and the Pine Island barrier island populations. Snakes that are captured by SCCF biologists are measured and marked using a scale clip technique and PIT tag to identify individuals from the population. Despite optimal habitat in both locations, indigo snakes have not been captured to date on Cayo Costa and have rarely been captured within the park boundaries on North Captiva (pers. comm. with Chris Lechowicz, Director SCCF). One management concern for these imperiled snakes on Cayo Costa is the feral hog presence throughout the island. These imperiled snakes are normally found in developed areas, on park trails, around resident houses and the shop area. Annual reports on these research findings are submitted to the DRP.

Lee County is among the most important counties for manatees on the west coast of Florida. Although a majority of manatee use occurs in the southern half of Pine Island Sound, manatees frequently move north along the outskirts of North Captiva and Cayo Costa. Manatee “hotspots” include Pelican Bay adjacent to Cayo Costa, and Safety Harbor within North Captiva. These animals also frequently visit Hook’s canal which is just outside of the park boundary in management zone CC-06. Manatees are so frequent in both Pelican Bay and Safety Harbor that a comprehensive Manatee Protection Plan has been completed for the area. From April 1<sup>st</sup> through November 15<sup>th</sup>, both water bodies have slow speed zones to protect these animals from boats in the warmer months. Also, a manatee awareness sign has been placed at the park’s boat ramp to inform visitors of manatees in the surrounding waters.

Both Cayo Costa and North Captiva have dense populations of gopher tortoises within their coastal strand and coastal grassland natural communities. In 2015, Cayo Costa State Park was identified as one of 35 priority Florida state conservation lands to be included in a gopher tortoise population assessment. This study completed by staff from the Joseph W. Jones Ecological Research Center determined the density, age class, and over health of the tortoises, providing rankings for survey sites based upon population evaluation and habitat suitability sites (Smith 2016). The density of tortoises per hectare surveyed on Cayo Costa was calculated as being 2.095 with an abundance of 343 gopher tortoises for the 163.5 hectares surveyed on the island (Smith 2016). The habitat at Cayo Costa was determined to be high quality with a likelihood of a viable population of gopher tortoises (Smith 2016). The study also found that gopher tortoise population manipulation/augmentation is not necessary on Cayo Costa, but the sites requires continued management to maintain the existing population and habitat (Smith 2016).

Punta Blanca also protects gopher tortoises located on the southern end of the island, where the topography allows coastal berm to persist. Due to the short stature of the dominant grass species on Cayo Costa and North Captiva, hairy gramma grass, burning is not needed to allow for gopher tortoise use. The coastal strand and coastal grassland consistently remain open and low enough for movement and foraging. Park staff will monitor for decreases in the population size of gopher tortoises, and consult with FWC to protect this imperiled species.

Imperiled plant species are managed through the upkeep of the park’s natural communities. Twelve imperiled plant species are currently found at Cayo Costa and North Captiva. Additionally, the west coast prickly apple was historically found on Cayo Costa. Several imperiled plant species listed in the park’s previously approved Unit Management Plan (December 9, 2005) have been removed from this list as they have not been observed or vouchered in the park. All imperiled plant species are monitored once every three years for population health, and yearly visits document continued persistence of species on both Cayo Costa and North Captiva.

On January 21, 2015, the U.S. Fish and Wildlife Service announced a proposal to designate critical habitat for the federally protected west coast prickly-apple cactus.

This document outlines potential habitat for this endangered cactus, along with areas to be surveyed, and potential areas for relocation. All upland natural communities at Cayo Costa and North Captiva are designated as potential critical habitat to protect the west coast prickly apple cactus. District and park staff will work with USFWS to identify potential habitat and survey for the presence of cacti, and determine if the state park would be suitable as a recipient site for augmentation, introduction, or reintroduction as a protected population for this species.

Joewood is an imperiled plant species that is abundant within both Cayo Costa and North Captiva. Cayo Costa is near the northernmost limit for joewood, with most of the state's joewood existing in the Florida Keys. This species is within the coastal grassland and coastal strand at North Captiva and Cayo Costa, along with shell mound prickly-pear (*Opuntia stricta*). Other species, including west coast dune sunflower and inkberry, are found within the beach dune community throughout the park.

Some imperiled plant species are associated specifically with the Indian shell mounds and middens found on Cayo Costa and North Captiva. Plants such as West Indian cock's-comb (*Celosia nitida*) prefer this calcium enriched natural community. Also, due to the higher topography and location adjacent to mangrove swamps, Florida mayten (*Maytenus phyllanthoides*) can also be found around the shell middens and mounds.

The bromeliads listed in Table 2 can be found throughout the mangrove swamps and maritime hammock at Cayo Costa. The major threat to these imperiled species is change in sea level. As water levels rise and stronger storms become more frequent, the host trees for these plants found in the maritime hammock may become inundated with saltwater, thereby slowly killing them over time. Park staff will monitor the overall impacts of sea level rise to these imperiled plant species, and coordinate with FDACS and local botanical gardens to preserve genetic material if needed.

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		
<b>PLANTS</b>						
Triangle Cactus <i>Acanthocereus tetragonus</i>			LT		2	Tier 1
West Indian cock's-comb <i>Celosia nitida</i>			LE		2,10	Tier 2
West coast prickly apple cactus <i>Harrisia aboriginum</i>		LE	LE	G1,S1	2,3,10	Tier 2
Spiked crested coralroot <i>Hexalectris spicata</i>			LE		2, 10	Tier 1
West coast dune sunflower <i>Helianthus debilis</i> subsp <i>vestitus</i>				G5T2,S2	2	Tier 1
Joewood <i>Jacquinia keyensis</i>			LT	G4,S3	2	Tier 2
Florida mayten <i>Maytenus phyllanthoides</i>			LT		2	Tier 2
Shell mound prickly-pear <i>Opuntia stricta</i>			LT		2	Tier 1
Inkberry <i>Scaevola plumieri</i>			LT		2	Tier 1
Northern needleleaf <i>Tillandsia balbisiiana</i>			LT		2	Tier 1



Table 2. Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
Cardinal airplant; Common wild-pine <i>Tillandsia fasciculata</i>			LE		2	Tier 1
Twisted airplant; Banded airplant <i>Tillandsia flexuosa</i>			LT	G5,S3	2	Tier 1
Giant airplant; Giant wild-pine <i>Tillandsia utriculata</i>			LE		2	Tier 1
<b>REPTILES</b>						
American alligator <i>Alligator mississippiensis</i>	SSC	LT(S/A)		G5,S4	13	Tier1
Atlantic loggerhead <i>Caretta</i>	FT	LT		G3,S3	2,8,10,13	Tier 3
Green turtle <i>Chelonia mydas</i>	FT	LT		G3,S2	2,8,10,13	Tier 3
Eastern indigo snake <i>Drymarchon couperi</i>	FT	LT		G3,S3	2,10,13	Tier 1
Gopher tortoise <i>Gopherus polyphemus</i>	ST	C		G3,S3	2,8,10,13	Tier 2
Kemp's ridley <i>Lepidochelys kempii</i>	FE	LE		G1,S1	2,8,10,13	Tier 3

Table 2. Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
<b>BIRDS</b>						
Short-Tailed hawk <i>Buteo brachyurus</i>				G4G5, S1	2,13	Tier 1
Red Knot <i>Calidris canutus rufa</i>	FT	LT		G4T2, S2N	2,8,10,13	Tier 2
Piping plover <i>Charadrius melodus</i>	FT	LT		G3, S2	2,8,10,13	Tier 2
Snowy plover <i>Charadrius nivosus</i>	ST			G3,S1	2,8,10,13	Tier 3
Wilson's plover <i>Charadrius wilsonia</i>				G5,S2	2,8,10,13	Tier 3
Little blue heron <i>Egretta caerulea</i>	ST			G5,S4	2,8,10,13	Tier 1
Reddish egret <i>Egretta rufescens</i>	ST			G4, S2	2,8,10,13	Tier 1
Tri-colored heron <i>Egretta tricolor</i>	ST			G5,S4	2,8,10,13	Tier 1
Swallow-tailed kite <i>Elanoides forficatus</i>				G5,S2	2,13	Tier 1
Merlin <i>Falco columbaris</i>				G5, S2	2,13	Tier 1
Peregrine falcon <i>Falco peregrinus</i>				G4, S2	2,13	Tier 1

Table 2. Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
Magnificent frigatebird <i>Fregata magnificens</i>				G5, S1	13	Tier 1
Gull-billed tern <i>Gelochelidon nilotica</i>				G5, S2	13	Tier 2
American oystercatcher <i>Haematopus palliatus</i>	ST			G5, S2	2,8,10,13	Tier 3
Worm-eating warbler <i>Helmitheros vermivorum</i>				G5, S1	2,8,10,13	Tier 1
Caspian tern <i>Hydroprogne caspia</i>				G5, S2	2,8,10,13	Tier 2
Wood stork <i>Mycteria americana</i>	FT	LT		G4, S2	2,8,10,13	Tier 1
Roseate spoonbill <i>Platalea ajaja</i>	ST			G5, S2	2,8,10,13	Tier 1
American avocet <i>Recurvirostra americana</i>				G5, S2	10,13	Tier 1
Black skimmer <i>Rynchops niger</i>	ST			G5, S3	2,8,10,11, 13	Tier 3
Least tern <i>Sternula antillarum</i>	ST			G4, S3	2,8,10,11, 13	Tier 3
Sandwich tern <i>Thalasseus sandvicensis</i>				G5, S2	2,8,10,13	Tier 2

Table 2. Imperiled Species Inventory						
Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
<b>MAMMALS</b>						
Florida manatee <i>Trichechus manatus latirostris</i>	FT	LT		G2, S2	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 venomous snakes or 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.

A significant amount of exotic plant control work has been conducted by park staff and volunteers on Cayo Costa, North Captiva, Punta Blanc and Jug Creek. The most visible exotic tree, the Australian pine, has a long history on these islands. As of 2014, almost all of the adult Australian pine trees have been killed on Cayo Costa and North Captiva, with the exception of trees found on out-parcels and private properties outside of the park's boundary. There is an extensive seedbank that still exists within the park. Over the past 20 years, park staff has made strides in eliminating the majority of the Australian pines found at all of the island parks.

Brazilian pepper is currently the most prevalent exotic plant found on all of the island parks. The displacement of native vegetation by Brazilian pepper has been extensive in the past, but mechanical treatment along with herbicide has reduced the coverage of this plant. Locating and treating Brazilian pepper is often difficult due to the inaccessibility of its infestations. Surveying and treatment of Brazilian pepper has been conducted by multiple park staff and volunteers that reside at the park during winter months.

While AmeriCorps members had previously worked with Brazilian pepper, their main focus in 2014 was on mother-in-law's tongue (*Sansevieria hyacinthoides*). This herbaceous exotic has infested areas on the maritime hammock in

management zone CC-01. AmeriCorps members studied effective mixtures of herbicides to remove this species as regrowth from roots may occur.

Small areas of lantana or shrub verbena (*Lantana camara*) and beach naupaka are also present in the park. These exotic plants closely resemble their native counterparts, buttonsage and state-threatened inkberry. The native lantana is differentiated from the exotic by slight differences in the flowers of the two species. The native imperiled inkberry is easily differentiated from the exotic beach naupaka by the black-colored fruit produced in late summer and fall. To avoid confusion with native lantana and native inkberry in the park, staff typically work with biologists to confirm identification of non-native species.

The other exotics found on Cayo Costa and associated islands are thinly dispersed. Plants such as carrotwood, rosary pea (*Abrus precatorius*), and balsampear (*Momordica charantia*) are occasionally located and treated. Of greater concern to park and district staff is the arrival of new exotic plant species to the islands. While birds, mammals, and the wind can bring seeds of exotics to the islands, humans can also act as vessels for plant dispersal. To avoid the dispersal of exotics, park personnel does not allow for firewood, or any potted plants to be brought to the island. Also, trash collected from visiting boats is not allowed in park trash cans, as raccoons frequently raid these cans, and could potentially spread exotic plant seeds all over the island. This also limits potential pests and pathogens that could be introduced to the islands from the mainland and other outside areas.

Early Detection and Rapid Response (EDRR) programs are being developed on the federal and state levels. A Weed Risk Assessment is now available through the USDA Animal and Plant Health Inspection Service (APHIS) and the University of Florida's Institute of Food and Agricultural Sciences (IFAS); this tool is used to predict the invasiveness potential of an exotic species before it becomes the management problem that make it a FLEPPC Category I or II species. FNAI is now working with FWC and all of Florida's Cooperative Invasive Species Management Areas (CISMA) to determine the species that are local threats, and to provide identification information and treatment assistance. Good management practice would include staying current with the local CISMA's EDRR list, in this case the Suncoast CISMA. By working with this CISMA, park staff can obtain information on invasive species currently threatening their area to assist with identification and quick removal upon detection in the park (e.g. ground orchid (*Eulophia graminea*)).

Exotic plants are accompanied on these islands by exotic or nuisance animals, such as feral hogs, coyotes, raccoons, and armadillos. Hogs are the most significant exotic animal presence in the park. Feral hogs were reportedly originally released on Cayo Costa in the 1800s by resident fisherman, who used them as a food source. Since then, the hogs have been increasing in population, destroying native vegetation, and causing physical damage to multiple historic and cultural sites located in the park. Contracted trappers have been used in the past to remove hogs from Cayo Costa, and park staff have previously been hired to focus on this effort. Even with this consistent trapping, hog populations remain high. In 2015, Cayo

Costa State Park was selected by FPS, USFWS, and USDA to be the focus of a feral hog eradication effort scheduled for 2018.

The black spinytail iguana (*Ctenosaura similis*) commonly found on nearby Boca Grande, has been observed with increased frequency on Cayo Costa, usually near gopher tortoise burrows. Park staff are coordinating with FWC on a removal strategy while the population levels are low.

Raccoons and coyotes have become nuisance species on Cayo Costa and North Captiva, depredating shorebird and sea turtle nests. Coyotes have been observed swimming from Gasparilla Island to Cayo Costa, and from Cayo Costa to North Captiva. Both raccoons and coyotes can destroy multiple turtle nests in one night, and have impacted the overall hatching success on Cayo Costa and North Captiva in recent years. To combat depredation of sea turtle eggs, park staff and volunteers place an FWC-approved self-releasing metal screen over the clutch of eggs to prevent the predators from reaching the egg clutch. With assistance from the Sea Turtle Conservancy, trapping efforts have taken place in the past on Cayo Costa for coyotes and raccoons to reduce nest depredation and boost sea turtle hatching success. In 2015, this effort also included the removal of several feral hogs, as the hogs had also begun depredating sea turtle nests. In 2017, trapping was not conducted prior to turtle nesting season, resulting in a high rate of nest predation. A multi-year predator removal strategy needs to be developed with a dedicated funding source to improve sea turtle and shorebird nesting success on Cayo Costa.

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, 2011). 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.

<b>Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species</b>			
<b>Common and Scientific Name</b>	<b>FLEPPC Category</b>	<b>Distribution</b>	<b>Management Zone (s)</b>
<b>PLANTS</b>			
Rosary Pea <i>Abrus precatorius</i>	I	1	CC-01, CC-04
Earleaf acacia <i>Acacia auriculiformis</i>	I	1	CC-06
Australian Pine <i>Casuarina equisetifolia</i>	I	1	CC-02, CC-03, CC-10C
		2	CC-05A, CC-11, CC-12, CC-NC2, CC-NC3, CC-NC4C, CC-NC4D, CC-NC5C, CC-NC5F, CC-NC5I
Carrotwood <i>Cupaniopsis anacardioides</i>	I	1	CC-04
Indian laurel <i>Ficus microcarpa</i>	I	1	CC-01, CC-04
Lantana <i>Lantana camara</i>	I	1	CC-02, CC-03, CC-06, CC-08
Melaleuca <i>Melaleuca quinquenervia</i>	I	2	CC-12
Rose natalgrass <i>Melinis repens</i>	I	1	CC-03
Guava <i>Psidium guajava</i>	I	1	CC-06
Beach naupaka <i>Scaevola taccada</i>	I	2	CC-04, CC-05A, CC08, CC-10A, CC-NC2, CC-NC4C, CC-NC4D
		3	C-02, CC-03, CC-09A, CC-10C



<b>Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species</b>			
<b>Common and Scientific Name</b>	<b>FLEPPC Category</b>	<b>Distribution</b>	<b>Management Zone (s)</b>
Brazilian pepper <i>Schinus terebinthifolia</i>	I	2	CC-01, CC-02, CC-03, CC-04, CC-05A, CC-06, CC-07, CC-08, CC-09A, CC-09B, CC-10A, CC-10B, CC-10D, CC-10E, CC-10F, CC-10G, CC-10H, CC-10I, CC-10J, CC-11, CC-12, CC-NC2, CC-NC3, CC-NC4, CC-NC4D, CC-NC5C, CC-NC5F, CC-NC5I,
		4	CC-06, CC-07, CC-08, CC-10C
Creeping Oxeye <i>Sphagneticola trilobata</i>	II	1	CC-01, CC-06, CC-NC4D
West Indian dropseed <i>Sporobolus indicus</i> var. <i>pyramidalis</i>	I	1	CC-01
American evergreen <i>Syngonium podophyllum</i>	I	2	CC-12
Portia tree <i>Thespesia populnea</i>	I	1	CC-4, CC-12
Sisal hemp <i>Agave sisalana</i>	II	2	CC-08, CC-09A
Madagascar rubbervine <i>Cryptostegia madagascariensis</i>	II	1	CC-01
Coconut palm <i>Cocos nucifera</i>	II	1	CC-07, CC-09A

<b>Table 3. Inventory of FLEPPC Category I and II Exotic Plant Species</b>			
<b>Common and Scientific Name</b>	<b>FLEPPC Category</b>	<b>Distribution</b>	<b>Management Zone (s)</b>
Life plant; Cathedral bells <i>Kalanchoe pinnata</i>	II	2	CC-02, CC-04, CC-05A
Lead tree <i>Leucaena leucocephala</i>	II	1	CC-02, CC-03
		2	CC-01, CC-07
Balsampear <i>Momordica charantia</i> balsampear	II	2	CC-05A
		3	CC-06
Senegal date palm <i>Phoenix reclinata</i>	II	1	CC-01, CC-06
African bowstring hemp <i>Sansevieria hyacinthoides</i>	II	2	CC-01, CC-04
Australian Almond <i>Terminalia muelleri</i>	II	1	CC-12
Jamacian feverplant <i>Tribulus cistoides</i>	II	1	CC-12
Washington fan palm <i>Washingtonia robusta</i>	II	1	CC-12

**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**

Cayo Costa is the largest, undisturbed barrier island in southwest 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:* Cayo Costa State Park contains 13 archaeological sites and two historic cemeteries recorded in the Florida Master Site File (FMSF). Fourteen of these recorded sites are on Cayo Costa, and two are on North Captiva. Other sites, including a home site and former boat works site, have been identified on Punta Blanca.

There are six archaeological sites containing prehistoric components found on Cayo Costa and one on North Captiva, including two large shell mounds, one shellworks and four shell middens. One of these sites, Mark Pardo Shellworks (LL01606), was listed on the National Register of Historic Places (NRHP) in 1996. Very little is known about these sites or the prehistoric people that occupied these islands. Six of the seven sites were recorded based on surface inspection alone, with little to no additional investigation. Consequently, the dimensions, composition, cultural affiliation, and date of construction and use for these sites remains largely unknown. The only exception is the Mark Pardo Shellworks, which was investigated more intensely in order to be placed on the NRHP. The investigation of this shellworks has led to the conclusion that this site, along with other prehistoric sites found on Cayo Costa and North Captiva, were built or constructed by the Caloosahatchee.

Cayo Costa's aboriginal cultural resources lie within the Caloosahatchee Region, as described in the Archaeological Resources of Caloosahatchee Region Multiple Properties NRHP registration form. This region, centered on the estuarine systems of Charlotte Harbor, has supported human populations from the Paleo-Indian period (circa 11,500 B.C.E.) to the present. The majority of the region's recorded aboriginal sites are coastal shell middens that have been ascribed to the Caloosahatchee Culture, 500 B.C.E. to 1750 C.E. The Caloosahatchee and the historic period Calusa people are believed to have been large, sedentary coastal-dwelling populations with complex societies. These societies utilized the rich marine and estuarine resources for a diverse and abundant food source. Middens, mounds,

and shellworks on both North Captiva and Cayo Costa fit the site type models for the Caloosahatchee Region.

Foster Bay Midden (LL00733) is a shell midden located on North Captiva. The midden covers an elongated area that stretches over state and private property. Pottery fragment evidence indicates that this midden is associated with the Glades culture, which existed in the area from 1000 B.C.E. to C.E. 1700.

Old Ware Mound (LL00086) is a shell mound located on Cayo. The survey of the mound, which was part of the parks predictive model done by USF, allowed researchers to update the spatial expanse of the site in the FMSF based on elevation measurements and visual ground-truthing. This shell mound and associated borrow pits are of unknown cultural affiliation and temporal period. This site is difficult to access due to extensive vegetation, and is currently not incorporated into the park's trail system.

Faulkner Mound (LL00087) is a shell mound located on Cayo Costa. This prehistoric mound is associated with Weeden Island culture 450-1000 C.E. Historically, the mound covered approximately 1.5 acres, although current reports delineate the mound covering only a third of an acre.

No Name (LL1413) is a site found on Cayo Costa. The cultural affiliation and temporal period of the site is unknown. This site was recorded in association with Faulkner Mound as being a mound.

Clark #1 (LL00702) and Clark #2 (LL00703) are shell middens located on Cayo Costa. These sites were initially assessed and recorded in 1983 and are of unknown cultural affiliation and temporal period.

Clark #3 (LL00704) is a shell midden located on Cayo Costa. This prehistoric site lies underneath two historic town sites, the Padilla Settlement (LL00701) and Burroughs Ranch (LL01494). This site is commonly visited as it exists under a heavily used park trail. This trail was most likely a continuation of the paths used by the Padilla settlement.

Mark Pardo Shellworks (LL1606) is a shellworks location and a shell midden found on Cayo Costa. Currently, it is believed that this site is associated with the Caloosahatchee IIA-IV cultural phases (500-1500 C.E.). The east, west, and south sides of the site are bounded by the high tide line and the north side by a residential development. The site consists of two distinct components; linear shell deposits that parallel the shoreline adjacent to a mangrove swamp, and a black dirt shell midden just inland from the shellworks. The shell deposits, which primarily contain large lightning whelk and horse conchs, range up to 1.5 meters above the ground and cover approximately 30 acres. The midden contains rich black dirt which indicates a living area, and a variety of shells including oyster, clam, conch, and lightning whelk. These two components within the shellworks site may represent two different occupation periods. Current hypotheses include that the shellworks represents a protective seawall, or the remains of a shellfish

harvesting/shell tool production area. A third site component may exist beneath the submerged sediment within the mangrove swamp community. This site would have been occupied when sea levels were historically lower in this area. The Mark Pardo Shellworks was listed on the National Register of Historic Places in 1996 because of its outstanding preservation, abundance of ecofacts (biological artifact not altered by humans, but which may be indicative of human occupation) and artifacts, and potential to yield information about the Paleo-environments and Caloosahatchee habitation sites on southwest Florida's barrier islands.

There are six historic sites recorded on Cayo Costa and one on North Captiva. These include two cemeteries, a homestead, remnants of two fishing villages, and a U.S military and maritime related site.

A number of different historic cultural groups inhabited Charlotte Harbor and its coastal islands. Many of these cultures overlapped in time, attracted to the islands by ancestral ties, rich natural resources, deep water passages, isolation, and proximity to Cuba and the Caribbean. When the Spanish arrived in Charlotte Harbor in the 16<sup>th</sup> century, the area was occupied by the native Calusa people. With Spanish efforts focused on north Florida, Charlotte Harbor was used as a convenient rendezvous and trading point. By the mid-18<sup>th</sup> century, Spaniards began to establish fishing ranchos on the coastal islands, and by the 1830s European-Americans did as well. In 1848, the U.S. military utilized the northern end of Cayo Costa and the southern end of nearby Gasparilla Island as a military reservation. By the early 20<sup>th</sup> century, Cayo Costa hosted a quarantine station/marine hospital, three pilots' houses, a post office, a dock, and at least two fishing villages. As a result of modern developments such as new industries, improved transportation, school redistricting and state acquisition, much of Cayo Costa is now a state park.

Pioneer Cemetery (LL00699) is a historic cemetery on Cayo Costa. This site was created in the early 20<sup>th</sup> century by the residents of the fishing ranchos on the island. Harbor pilot Captain Peter Nelson, who died in 1919, is buried here. He moved to Lee County in 1887 from Denmark when the shipping industry in the area was flourishing due to cattle and phosphate exports. This site includes shell-bordered graves surrounded by a wooden fence with rock tombstones.

Quarantine Station (LL00700A) is a historic military site located on Cayo Costa. This site, created in the early 20<sup>th</sup> century, is the former location of a U.S. military quarantine station and three ship pilohouses. The quarantine station was relocated to Cayo Costa from Gasparilla Island in 1904, and was in operation on the island until 1925. The site consists of masonry building material scattered over approximately two acres. A submerged brick concentration located by DHR archaeologist in 1992 may be remnants of the middle of the three pilohouses. This site is located directly on the shoreline and receives consistent wave action.

Padilla Settlement (LL00701) is a 19<sup>th</sup> and 20<sup>th</sup> century historic American settlement (1821-present). This site is the former location of a Spanish fishing village that was founded by Tariva "Pappy" Padilla before the Civil War. The Padilla family and other Spanish fishermen lived in wood plank and palmetto thatch houses on the northern

end of the island. The U.S. military classified them as squatters and required them to relocate to the middle of the island.

Foster Bay Homestead (LL00734) is a historic house site dating from 1821-present, found on North Captiva. This site consists of the structural remains of an early 20<sup>th</sup> century house and dock. Items such as window frames, glass, and a piston water pump were recorded at this site.

Padilla Cemetery (LL01493) is a late 19<sup>th</sup> century - early 20<sup>th</sup> century cemetery. This cemetery is associated with the Padilla settlement (LL00701) and contains the graves of Tariva "Pappy" Padilla, his wife and at least one child who were buried in the 1930s. An estimated 30 Cuban fisherman who died during a 1910 hurricane may be buried at this site. There are two distinct ledges covered with limestone rock and maritime hammock vegetation. Coquina rocks were used as headstones within the cemetery, which covers approximately 17.5 meters squared. As of 2005, 95% of this cemetery was reported to be eroded into Pelican Bay.

Burroughs Ranch (LL01494) is a historic town site from the mid-19<sup>th</sup> century on Cayo Costa. This site is the former location of a fishing homesite established in 1859. Maps from the mid-19<sup>th</sup> century depict two medium buildings and four smaller buildings within the homesite.

A portion of the Cayo Costa School (LL02647) site is within park boundaries on Cayo Costa. The school was used from 1911 to approximately 1923 when a new school was constructed on Puente Blanca. The site consists of was recorded in 2015 and consists of building and foundation remains and a water well.

In 2013, the Alliance for Integrated Spatial Technologies (AIST) at the University of South Florida were contracted as part of a DRP Districts 4 and 5 project to perform predictive modeling of cultural resource potential in state parks. During this project, aerial LiDAR data was used to refine maps showing the complex surface elevations of the park (Collins 2013). Fieldwork was also conducted to survey with sub-meter instrumentation and GPS camera equipment to ground truth previously recorded sites, and potential new sites. The analysis of LiDAR and ground truthing assisted in correcting the boundaries for two previously recorded sites, Old Ware Mound and Faulkner Mound.

The archaeological sensitivity model created from this research found that of the 2,392 acres within Cayo Costa State Park, 1,672 acres (70% of the park) is considered highly sensitive for cultural resources. The other 30% is considered to have a low sensitivity for cultural resources. With the corrected locations for Old War Mound and Faulkner Mound, 93% of the recorded sites fall within the high sensitivity area. The researchers predict that the missing 7% are mapped incorrectly in the FMSF, and that ideally 100% of all identified and not identified sites will fall within the areas marked as having high cultural sensitivity.

*Condition Assessment:* Of the 13 archaeological sites and two historical cemeteries identified in this management plan for Cayo Costa, eight are in good condition,

three are in fair condition, two are in poor condition, and three have not been evaluated. The main factors threatening all of the sites on Cayo Costa and associated islands include coastal erosion, damage from exotic invasive species (plant and animal), ground disturbance from visitors, and private development.

A common theme of disturbance on these islands is coastal erosion. All sites located next to either the Gulf of Mexico or Pelican Sound suffer from erosion. These sites are impacted by tidal action, rising sea levels, storm surge and consistent boat wakes. This loss of coastal sediment is undercutting prehistoric shell middens and mounds, stripping stabilizing soil off site surfaces, and exposing artifacts and human remains. Preventing site loss due to erosion is difficult, and sometimes impossible. The addition of hard stabilization materials would only exacerbate erosion around the structure. With increasing sea levels predicted, many of the coastal sites will be submerged.

Two sites experiencing extensive shoreline erosion are the Quarantine Station and the Padilla Cemetery. The locations of these sites directly adjacent to the water make them vulnerable to wind and waves. Almost all of the remnants of the Quarantine Station have been lost due to wave energy breaking away deteriorated wood and concrete. The Padilla cemetery has almost been entirely lost to shoreline retreat. Rocks used as headstones for the cemetery can now be found scattered around the shoreline near the grave sites.

Exotic animals and plants may also deteriorate prehistoric and historic sites within Cayo Costa. Wild hogs root up massive areas foraging for the roots and young shoots of plants, which disturbs the soils associated with the shell mounds and middens, as well as the stratification of artifacts found at all cultural sites. Destruction of artifacts and ecofacts has also been widely documented by hogs during their search for food. While hog removal is ongoing from the islands, they still continue to disturb almost every historical site within the park. Exotic plants, such as Brazilian pepper and mother-in-law's tongue, have also diminished the quality of many cultural sites at the park. When park staff manually remove this vegetation, it causes disturbance to the site beneath the surface due to roots being pulled out. The Clark #3 shell midden is an area with constant mother-in-law's tongue exotic cover, and with some disturbance to the site through manual removal of these plants.

Excessive foot and vehicle traffic, disturbances associated with development, vandalism, and past looting are also sources of cultural site disturbance at Cayo Costa and North Captiva. Designated trails have been established since its induction as a state park. Some of the existing trails were very likely used by early settlers of the island, which predictably intersect many of the prehistoric and historical sites. Disruption from foot traffic and vehicle traffic is kept to a minimum, and only DRP staff are authorized to use motorized vehicles within the park. Additional roads created by private residents within the boundary of the state park have resulted in impacts to cultural sites, including Mark Pardo Shellworks.



Disturbance associated with development can be seen at all sites adjacent to private property on the islands. Faulkner Mound is a shell midden site in fair condition due to alterations made by home construction. Also, Foster Bay Midden is in fair condition due to trenching that occurred for underground utilities. All of the sites sharing property with private landowners will be damaged to some degree by the activities on the private property.

The last significant disturbance at Cayo Costa and associated islands involved vandalism and looting. In the past, looting was a recurrent issue for all sites within Charlotte Harbor. Stories of pirates and renegades inspired searches for buried treasure and sunken gold coins. Many sites were pitted in unsuccessful search efforts. Looting and vandalism are now uncommon as the rumors of treasure were discredited. Past damage at many of the cultural sites has been covered from slumping, weathering, and vegetation growth.

*General Management Measures:* Management measures for the different types of cultural resources at Cayo Costa are relatively similar. The historic sites, along with the shell middens and mounds (earthworks), should be preserved and protected as much as possible. The ultimate goal of cultural site management at Cayo Costa is continuous sustainable vegetative cover that requires minimum maintenance or manipulation. Park staff should maintain sites so that there is no clear evidence of disturbance—environmental or human—that would result in erosion or loss of terrain features. The three fundamentals to preservation include:

1. Establish and/or perpetuate continuous vegetative cover to stabilize and protect the soil from weather and human contact that may cause erosion.
2. Eliminate recreational or maintenance-related interventions that may disrupt the vegetative cover or forest floor.
3. Minimize destructive natural disturbances, such as tree wind throw, burrowing animals, and invasive exotic species.

The current vegetation cover found on all of the sites adequately protects them by creating a thick duff layer, and by deflecting rainfall and wind. This vegetative cover, which often time consist of shell mound, coastal strand, or maritime hammock natural communities, hides the sites from view. This elusive nature protects these sites from the majority of visitor impacts.

Many of the cultural resources on the northern section of Cayo Costa are found adjacent to established trails used by visitors and park staff. No new trails should be established around existing cultural sites, and extensive surveys should be completed if new trails are proposed elsewhere on the islands. Additionally, exotic plants, specifically mother-in-law's tongue and Brazilian pepper, should be treated on the existing sites.

A few large trees are found on historic sites, and shell mounds within the park. As these trees become larger than 12 inches in diameter at breast height, park staff should consider if these trees need to be removed. Large trees can topple during

hurricanes, bringing with them sediment and artifacts that become entangled in the roots. DHR will be consulted prior to any tree removal on any sites at Cayo Costa.

Other cultural sites, including the Pioneer Cemetery, are maintained for interpretive value. This site is kept free from vegetation, and is surrounded by a wooden fence. Shell bordered grave sites and headstones are maintained by park staff and volunteers to maintain an up kept appearance. Staff should maintain this site as it is, and contact DHR if any changes around this site are to take place.

Sites such as the Padilla Cemetery, Quarantine Station, and Captiva Pass are so eroded that little can be done to manage them. Previously, vegetation was placed around the Padilla Cemetery in hopes of stabilizing the area. Without changing the direction and intensity of wave energy in that area, plantings will not be effective at sediment stabilization. With seagrass prominent in all coastal waters surrounding Cayo Costa and North Captiva stabilization or restoration measures are not feasible offshore. DHR should be contacted if substantial artifacts are unearthed at these sites by shoreline erosion.

Park staff should be vigilant of vandalism and looting at cultural sites on Cayo Costa and North Captiva. Monthly visits to all cultural areas should provide enough park presence to ward off looters. If looting or vandalism is witnessed, park staff should inform appropriate law enforcement, and contact DHR for further guidance.

### **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:* Cayo Costa contains 24 historic structures, and Jug Creek contains nine historic structures within the state park boundary. All but one of the structures found on Cayo Costa were constructed in 1965, with one bathhouse being built in 1979. A majority of the structures (12) are cottages found within the campground that are rented out to park visitors and campers. Three other structures are bathrooms located within the campground, and four of the structures are used for storage or housing generators. A water tower was also erected in 1965 for storing pumped ground water. The remaining structures are residences used by park staff. Jug Creek has 9 structures erected between 1940-1950, and one structure built from 1910-1930. All of the structures at Cayo Costa are currently used either by staff or visitors. All of the historic structures found at Cayo Costa and Jug creek are representative of housing used throughout southwest Florida from the 20<sup>th</sup> century.

Shady Nooks (LL00979, LL01852, LL01853, LL01854, LL01855, LL01856, LL01857, LL01858, LL01859) are all considered vernacular type structures built around 1940 at Jug Creek. This type of structure is derived from vernacular housing types of the upland south, which were built with log frames. Many of these buildings have wrap-around porches that are covered by flared continuations of the main roofs. Entry

points are slightly offset, and the kitchens extend from the rear of the buildings. Each of these structures was used in association with rental cottages.

All of the Shady Nook structures are important examples of Florida vernacular architecture, and contribute significantly to the character of Bokeelia and Pine Island. The Shady Nook Cottages are considered contributing structures in the Bookelia Historic District, designated by Lee County on February 5, 1990.

All of the other recorded historic structures were from between 1965-1979, and are utilized for housing resident park employees, holding park equipment such as tools and generators, or for visitor services. Three residence houses are found on the island, two for park rangers and one for the park management. Two structures house the diesel-powered generators that supply all of the electricity to the park. A single structure acts as the shop for the park, which is used for holding tools, signs, and charging equipment for battery operated vehicles. Another structure associated with the shop acts as storage for various fire equipment, proper protection equipment, and chemicals that are used for treating exotic vegetation. Three structures are used as bathhouses for island visitors and campers. Cottages within the campground make up the majority of the historical structures. Twelve cottages, all single room structures, can be found on the western coast of Cayo Costa. These structures are rented to park visitors for overnight stays. The last historic structure is a water tower that was erected in 1965 that was used to hold water that was pumped from the freshwater lens underground. The current system used to pump and hold water for the park no longer requires a tower.

*Condition Assessment:* All historic structures found on Cayo Costa are in good condition. Structures at Jug Creek are currently in poor condition and not considered accessible. Currently, there are no immediate threats to any of the structures. All structures are vulnerable to hurricane damage due to their barrier island location. Park staff should be cautious of large storm events and document any damage sustained to any structures.

Other issues that could be problematic deal with the possibility of wildfires on the island. All of the structures have mineral fire lines around them, but large canopy fires could still cause damage. Also, termites could potentially cause damage to wooden structures on the island. Monitoring and treatment are needed.

The historic water tower (BL 127027) was erected in 1965 by land owners prior to park acquisition. This tower retained pumped groundwater and distributed it to all other facilities. With new technology, this tower is no longer needed. Unused and offering minimal to no historical value, the tower is considered a risk to nearby equipment. Removal of this tower may be advisable.

*General Management Measures:* Management for all historic structures at Cayo Costa include general maintenance. All buildings are inspected for structural damage monthly and painted on an as-needed basis. Buildings utilized by park visitors are cleaned daily, and managed to be accessible to all. Structures that are not enclosed, such as the shops and storage areas, are organized for efficiency.

Management should check annually for damage by termites and other pests that could impact historic wooden structures. Also, after large storm events such as hurricanes and tropical storms, park staff will assess damages to all of the structures, and consult with district staff and DHR.

No rehabilitation, restoration or stabilization is identified for structures on Cayo Costa at this time. All structures are to be preserved in their current conditions and maintained for visitor and staff use. Historic structures at Jug Creek should be evaluated by a preservation architect due to their current condition. Options for future disposition will be considered in consultation with Lee County and other stakeholders.

### **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:* All of Cayo Costa's collections are held on Cayo Costa Island within the ranger station. Almost all of the collections are biological representations of animals that can be found within the state park. This includes loggerhead sea turtle bones and shell, gopher tortoise, box turtle and cooter turtle shells, along with manatee, dolphin, wild hog, alligator, and pelican bones. All of the sea turtle, manatee, dolphin, pelican and alligator collections were found washed up at Cayo Costa on the beaches facing the Gulf of Mexico. Everything else was found within the state park while surveying and treating for exotic plants. No live animals were dispatched by park staff or volunteers to acquire any of these collections.

The only item within the collections at Cayo Costa not representative of the biological components of the park is a women's belt made from sea turtle leather. This belt, which is representative of what a fisherman would've worn while working on the island in the early 1900s, is on loan from FWC.

All specimens within the collections at Cayo Costa are used to interpret the natural resources found on the islands. The imperiled species are used in multiple ranger walks and interpretive tours to explain how the park's natural communities are vital for the continued existence of sea turtles, manatees, and protected birds.

*Condition Assessment:* All specimens found in the collections at Cayo Costa are in good condition. There are currently no threats to the collection, or to the building in which they are housed.

Currently the building in which the collections are kept is in good condition with air conditioning and routine pest control. Even if power were to be interrupted, and air conditioning stopped, all of the collections would remain in good condition. All items

are locked inside glass cases for viewing, and the ranger station is locked when not occupied by staff.

*Level of Significance:* The biological collections, including animal bones, shells, and a turtle skin belt on loan from FWC, are significant to the park because they represent why the land is vital to the existence of multiple imperiled species.

*General Management Measures:* A Scope of Collections Statement should be completed for the park, as well as a collection management assessment. All collections are cataloged in PastPerfect and 10% of the collections should be inventoried annually. All items within the collections should maintain their labels with appropriate item numbers.

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.

<b>Table 4. Cultural Sites Listed in the Florida Master Site File</b>					
<b>Site Name and FMSF #</b>	<b>Culture/Period</b>	<b>Description</b>	<b>Significance</b>	<b>Condition</b>	<b>Treatment</b>
LL00086 Oldware Mound	Prehistoric	Archaeological Site	NE	G	P
LL00087 Faulkner Mound	Historic; Prehistoric; Weeden Island, 450-1000 C.E.	Archaeological Site	NE	F	P
LL00699 Pioneer Cemetery		Historic Cemetery	NE	G	P
LL00700A Quarantine Station	Twentieth century American, 1900-present	Archaeological Site	NE	P	P
LL00701 Padilla Settlement	Nineteenth century American, 1821-1899; Twentieth century American, 1900-present	Archaeological Site	NE	G	P

<b>Table 4. Cultural Sites Listed in the Florida Master Site File</b>					
<b>Site Name and FMSF #</b>	<b>Culture/Period</b>	<b>Description</b>	<b>Significance</b>	<b>Condition</b>	<b>Treatment</b>
LL00702 Clark 1	Prehistoric	Archaeological Site	NE	G	P
LL00703 Clark 2	Prehistoric	Archaeological Site	NE	G	P
LL00704 Clark 3	Prehistoric	Archaeological Site	NE	G	P
LL00733 Foster Bay Midden	Glades, 1000 B.C.E.- 1700 C.E.	Archaeological Site	NE	F	P
LL00734 Foster Bay Homestead	Nineteenth century American, 1821-1899; Twentieth century American, 1900-present	Archaeological Site	NE	G	P
LL00979 Shady Nook	c1940	Historic Structure	NE	G	P
LL01413 NN	Unknown	Archaeological Site	NE	NE	P
LL01493 Padilla Cemetery	Nineteenth century, American, 1821-1899	Historic Cemetery	NE	P	N/A
LL01494 Burrough's Ranch	Nineteenth century American, 1821-1899	Archaeological Site	NE	G	P
LL01606 Mark Pardo Shellworks	Other	Archaeological Site	NRL	F	P
LL01852 Shady Nook	c1940	Historic Structure	NE	G	P
LL01853 Shady Nook	c1940	Historic Structure	NE	G	P
LL01854 Shady Nook	c1940	Historic Structure	NE	G	P
LL01855 Shady Nook	c1940	Historic Structure	NE	G	P
LL01856 Shady Nook	c1940	Historic Structure	NE	G	P

<b>Table 4. Cultural Sites Listed in the Florida Master Site File</b>					
<b>Site Name and FMSF #</b>	<b>Culture/Period</b>	<b>Description</b>	<b>Significance</b>	<b>Condition</b>	<b>Treatment</b>
LL01857 Shady Nook	c1940	Historic Structure	NE	G	P
LL01858 Shady Nook	c1940	Historic Structure	NE	G	P
LL01859 Shady Nook	c1940	Historic Structure	NE	G	P
LL2647 Cayo Costa School	1911-1923	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 Cayo Costa, North Captiva and Jug Creek. 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: Conduct/obtain an assessment of the park's hydrological needs.***

- Action 1 Determine long-term sustainability of fresh groundwater for park use.
- Action 2 Determine how changes in sea level will impact fresh water lens.
- Action 3 Continue to conduct groundwater quality testing.

Bodies of water on Cayo Costa and North Captiva are seasonal, and essentially unaffected by human activities. With no impacts to surface water and no impermeable roads or parking lots at Cayo Costa, North Captiva or Punta Blanca, effort should be directed at the sustainability of the fresh groundwater that is used at the park. Currently, the park pumps water from the fresh water lens, treats it, and supplies it to the shop, residences, bathrooms, and camping area. More information is needed about the longevity of this water supply. With this information, the changes in sea level need to be addressed with it to accurately portray the lifespan of the freshwater lens. As saltwater inundation occurs, deeper wells, or other potable water treatment methods will be needed

**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 21 acres of the park maintained within the optimum fire return interval.***

- Action 1 Update annual burn plan to show pyric communities
- Action 2 Manage areas for wildfire/fuel suppression

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.

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.

Fire at Cayo Costa has been a source of debate for many years. There are 51 acres of pyric natural communities (mesic flatwoods and depression marsh) within Cayo Costa, all of which are intermixed with non-pyric communities (maritime hammock, mangrove swamp). Historically, within the park, only one management zone (CC-01) has been treated with prescribed fire. This zone contains 21 acres of mesic flatwoods and 3 acres of depression marsh. The majority of the natural community within this zone consists of maritime hammock (130 acres). The depression marshes and flatwoods are not adjacent to each other, and much of the maritime hammock is being burned during these prescriptions. The other 27 acres of pyric natural communities are not burned with prescribed fire at all, and are located in the southern section of the island.

Since Cayo Costa has become a state park, four prescribed burns have occurred. There were two burns in 1990 totaling 60 acres, one prescribed burn occurred in 2004 totaling 84, and one in 2010 totaling 56 acres.

While hurricanes and tropical storms are the main types of disturbance on Cayo Costa and North Captiva, lightning strikes and wildfires do occasionally occur. To minimize the occurrence of dangerous wildfires, prescribed fires can be conducted to reduce vegetation fuel levels. Large storms are occasional, and can never be planned or scheduled. In the event of large fuel buildups due to a lack of large storms, prescribed fires should be utilized. District staff will be cognizant of fuel loads found on Cayo Costa, and apply prescribed fire when needed to reduce the risk of catastrophic wildfires.

*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.

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

There are currently no natural communities needing habitat restoration at Cayo Costa, North Captiva, Punta Blanca, or Jug Creek.

*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 0 acres of natural communities.***

There are currently no natural communities needing habitat improvement at Cayo Costa, North Captiva, Punta Blanca, or Jug creek. In the past, areas of Cayo Costa were designated as spoil pile on the northeastern side of the island in management zone CC-01. Since the last management plan, this area, along with other designated spoil piles, became vegetated with coastal strand natural communities. With natural plant cover, and no issues with hydrological flow, these areas are no longer classified as disturbed.

## **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.

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: Develop/Update baseline imperiled species occurrence inventory lists for plants and animals.***

There are 13 state or federally listed imperiled plant species and 29 state or federally listed imperiled animal species known to occur within the park. Surveys for sea turtle nesting, shorebird nesting, and invasive plants allow the opportunity for detailed observations in the field. Staff are trained to document imperiled species occurrence as well as record characteristics of unfamiliar species for identification. Collected data are communicated to the DRP District 4 Biology office, FDACS, FNAI, and FWC. Currently, all imperiled species are monitored either through recommended FWC survey protocols, or through species observations from qualified park staff, volunteers, and district biologists.

**Objective B: Monitor and document 10 selected imperiled animal species in the park.**

- Action 1      Implement monitoring protocols for 10 imperiled animal species including loggerhead sea turtles, green sea turtles, piping plovers, American oystercatchers, least terns, snowy plovers, Wilson's plovers, black skimmers, and eastern indigo snakes.
- Action 2      Complete all required FWC survey protocols for imperiled sea turtles and nesting shorebirds/seabirds.
- Action 3      By 2025, resurvey/replicate line transect distance sampling protocols to estimate the gopher tortoise population on the island and look for changes.

FPS staff coordinates targeted surveys of nine of the 10 imperiled species known to occur in the park in cooperation with Audubon Society of Florida, Florida Shorebird Alliance, and FWC. Monitoring and reporting protocols have been established for each of these species by FWC. Population, nesting occurrence and nesting productivity data are collected from May 1 to October 31, for green and loggerhead sea turtles. Sea turtle stress and mortality data are collected year-round using standard FWC stranding reports. American oystercatcher, Wilson's plover, snowy plover, least tern, and black skimmer population, nesting occurrence, and nest productivity data are collected during six statewide surveys coordinated by FWC from March to August. Though no longer imperiled, osprey and bald eagle nesting occurrence and productivity data are collected during spring nesting season in cooperation with Audubon of Florida and FWC. Piping plover population and migration information is collected during two statewide surveys in the winter. Monitoring protocols are already established by FWC for all imperiled animal species found at Cayo Costa and associated islands.

The gopher tortoise population study completed in 2015 by staff from the Joseph W. Jones Ecological Research Center provides the park with an excellent baseline for tortoise numbers and population strength. The results from the completed survey will assist park and district staff in documentation of shifts in population numbers. District staff received additional training by the Joseph R. Jones Ecological Research Center and will be able to replicate the line transect distance sampling techniques used during the 2015 population study for future assessments of tortoise populations, which should be completed every ten years. The next survey should be conducted by 2025. Park and district staff will contact and work with FWC if decreases in population numbers occur.

Eastern indigo snake population assessment research at Cayo Costa and North Captive being conducted by the Sanibel Captiva Conservation Foundation is ongoing. The goal of this research is to obtain valuable baseline data on eastern indigo snake populations on the barrier islands through measurements, tagging, and genetic analysis. Sightings of eastern indigo snakes at Cayo Costa and North Captiva are reported by park and district staff to the Sanibel-Captiva Conservation Foundation to assist them with locating snakes for this ongoing population study.

***Objective C: Monitor impacts on shorebird and sea turtle nesting by terrestrial nuisance species in the park.***

Predation critically threatens many rare species (Hecht and Nickerson, 1999), with the deleterious impacts of predation losses compounded by habitat loss (Reynolds and Tapper, 1996). In Florida, nesting beaches have been substantially altered by urbanization and development, leaving few beaches isolated from development, thereby severely reducing the amount of habitat suitable for successful nesting by sea turtles and shorebirds (e.g., Rogers et al., 1995). At the same time, predators are found along many beaches where nesting could otherwise succeed. Nest predation can have severe impacts on reproductive success for sea turtles and shorebirds (Engeman et al. 2010).

Current protocols for nesting surveys include data collection on the presence of terrestrial predators. Staff and volunteers are trained to observe and document predator tracks near shorebird nesting habitat, shorebird nest sites, and sea turtle nest sites and false crawls. Self-releasing cages are installed over sea turtle nests by park staff on Cayo Costa and North Captiva to discourage depredation by nuisance species.

Dogs brought by visitors to the park introduce a significant and challenging impact on shorebird nesting. The remoteness of the islands prevents the level of oversight of visitor activities afforded at other parks. The protocol that staff and volunteers use to document the presence of nuisance species near nesting areas also documents the presence of dogs. Evidence of dogs is typically observed during every sea turtle and shorebird nesting survey conducted on the islands. Signage on all of the islands clearly describes the policy on pets at Cayo Costa and North Captiva, but there is evidence of continued non-compliance. The current approach to reducing this impact to shorebird nesting depends on multiple partners including law enforcement personnel. Park staff maintains signage and educates visitors on policies when dogs are encountered in areas of the park where they are prohibited. State administrative code 62D includes enforceable language on the presence of pets in restricted areas. This code is enforced by Lee County Sheriff's deputies and FWC Law Enforcement. Park staff will continue to coordinate with these agencies to increase enforcement at Cayo Costa and North Captiva. Continued monitoring will evaluate the effectiveness of the current approach; however, off-leash dogs will continue to threaten the nesting success of several imperiled species found on Cayo Costa including the American oystercatcher, black skimmer, least tern, sandwich tern, snowy plover, and Wilson's plover.

***Objective D: Monitor and document 6 selected imperiled plant species in the park.***

- Action 1      Develop monitoring protocols for 4 selected imperiled plant species including the cardinal airplant, giant airplant, Florida mayten, and West Indian cock's-comb.
- Action 2      Implement monitoring protocols for 4 imperiled plant species including those listed in Action 1 above and joewood.
- Action 3      Develop and implement a yearly survey for the federally listed west coast prickly apple cactus.

Six plant species have been chosen for survey at Cayo Costa, North Captiva and Jug Creek. They include joewood, which is already monitored yearly, along with Florida mayten, cardinal airplant, giant airplant, and West Indian's cock comb, which need monitoring protocols implemented. The monitoring protocol for the three new plant species will mimic what is currently done for joewood. This includes yearly inspections of current known plant populations, and a parkwide population mapping survey every three years. This allows park and district staff the ability to monitor long term changes in imperiled plant species population numbers. Surveys for these plants will be done in coordination with park staff, district staff, and members of the local native plant society.

The last plant, the west coast prickly apple cactus, was historically found on Cayo Costa. After hurricane Charley in 2004, the cactus has not been observed on any of the island parks. This doesn't mean the cactus is absent, just that it may not be currently identified. With dense, poison ivy laden maritime hammock, surveys are difficult and time consuming.

With the federal endangered listing for this cactus, all of the maritime hammock and coastal strand in Jug Creek, Punta Blanca, Cayo Costa, and North Captiva are now considered critical habitat, with potential as relocation sites for this cactus.

### **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 123 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 45 infested (approximately 275 gross acres) acres in the park, annually, and continuing maintenance and follow-up treatments, as needed.

Park staff at Cayo Costa State Park typically treat 30-50 infested acres annually. To eliminate exotic plants at the park, a constant effort is needed to treat regrowth and to identify new exotic invasives as they occur.

At areas such as Jug Creek and North Captiva, private property adjacent to park property act as seed sources for many exotic plants. To truly eliminate these exotics, park staff should attempt to educate residents about non-natives, and offer the names of native species that work as natural landscaping.

Follow up treatments should include visits to treatment areas 3-4 weeks after the use of herbicide to assess plant die off rates. Areas where trees are cut down should be cleared of remaining wood or left in such a manner that re-rooting will not occur. Monitoring of all natural communities should be conducted yearly to assess the progress and spread of different exotics. Areas that have been historically infested with exotics, such as the Clark #3 cultural site, should be visited monthly to identify regrowth after treatment.

***Objective B: Implement control measures on 4 exotic/nuisance animal species in the park.***

- Action 1 Continue to trap exotic animals in house and report removal to the district office quarterly.
- Action 2 Apply for outside funding to hire a OPS trapper for nuisance animal removal during sea turtle nesting season.
- Action 3 Continue contract trapping to remove exotic/nuisance animals.

Previously, the park trapped exotic wild hogs, racoons, and coyotes with available staff, including an OPS staff member whose responsibility was to remove hogs. In 2016, the USDA was contracted by FPS to eradicate feral hogs on Cayo Costa. This hog eradication effort is currently ongoing at the park. Additional animals that will need to be included in future exotic animal trapping efforts include spiny tailed iguanas, which are rapidly spreading throughout the island.

In 2014 and 2015, the sea turtle conservancy provided funding to contract USDA wildlife services to remove nuisance coastal predators, such as coyotes and racoons, in order to reduce the depredation on sea turtle nests. This trapping effort has been helpful in reducing predation rates of turtle nests at Cayo Costa. Outside grant funding should continue to be pursued whenever available for exotic animal removal at the park.

**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 Cayo Costa 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 26 of 26 recorded cultural resources in the park.***

- Action 1      Annually complete 26 assessments/evaluations of archaeological sites, and develop and implement monitoring program.
- Action 2      Complete 24 Historic Structures Reports (HSR) for identified historic buildings. Prioritize stabilization, restoration, and rehabilitation projects.

All of the known cultural sites within the park should be assessed and evaluated yearly. A majority of the sites can be found along major trails that are visited daily, therefore most of this effort will be spent traveling to inaccessible sites in the southern half of Cayo Costa and North Captiva. Such assessments should include an examination of each site with a discussion of any threats to the site's condition such as natural erosion; vehicular damage; bicycle or pedestrian damage; looting; construction including damage from firebreak construction; animal damage; plant or root damage or other factors that might cause deterioration of the site. These assessments should include a photograph of the site, and a short qualitative description. If action is needed to maintain these sites in their current condition, the district will be notified along with BNCR.

A regular monitoring program of the sites not located in the northern half of Cayo Costa, and all sites on North Captiva and Punta Blanca needs to be developed. With this monitoring, exotic vegetation should be treated, and all visible disturbances should be recorded. Most of the preservation associated with cultural resources on the islands is centered on exotic vegetation management, exotic animal management, and visitor impact management.

The historic structures at Jug Creek, should be evaluated by a preservation architect due to their current conditions and future options for disposition will be considered in consultation with Lee County and other stakeholders.

***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      Conduct Level 1 archaeological survey for 3 priority areas identified by predictive model or other previous study.
- Action 3      Develop and adopt a Scope of Collections Statement.

Currently, major work is needed on identifying cultural sites on Punta Blanca, and entering them into the FMSF. Also, structures used within Cayo Costa have recently become 50 years old, and need to be entered as well. Park and district staff will coordinate with BNCR to accomplish this task.

A complete predictive model for locating archaeological sites was completed in 2013 (described more in the cultural resources section). With a majority of the park being considered high sensitivity (70%), more work is needed in locating other potential cultural sites within park property. A level 1 archaeological survey should be completed in 3 priority areas identified by the predictive model at the park.

Cayo Costa will develop and adopt a scope of collections. With many different types of objects seemingly appropriate for display at the park, staff will identify what is desirable and what should not be accepted. This prevents unwanted items from accumulating at the park. Staff should work with the collections manager to create and personalize a scope of collection that represents Cayo Costa and associated islands.

***Objective C: Bring 3 of 26 recorded cultural resources into good condition.***

Action 1 Bring 3 sites into good condition (Faulkner Mound, Foster Bay Mound, and Mark Pardo Shellworks).

Three sites to be brought into good condition include Faulkner Mound, Foster Bay Midden, and Mark Pardo Shellworks. These three sites are currently in fair condition due to past physical disturbances, negative impacts from looting, and damages from exotic plants and animals. With increased park presence at these sites, plus increased management on exotic plants and animals, these actions will help to bring the condition from fair to good. Also, archaeologists and staff associated with BNCR will be contacted on how to properly treat damage from looters, and past ground disturbances.

### **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.

During the development of this plan, the feasibility of timber management activities in the park was analyzed. It was determined that the primary management objectives of the unit could be met without conducting timber management activities for this management plan cycle. Timber management will be re-evaluated during the next revision of the management plan.

### **Coastal/Beach Management**

The DRP manages over 100 miles of sandy beach, which represents one-eighth of Florida's total sandy beach shoreline. Approximately one-quarter of Florida's state parks are beach-oriented parks and account for more than 60 percent of statewide park visitation. The management and maintenance of beaches and their associated systems and processes is complicated by the presence of inlets and various structures (jetties, groins, breakwaters) all along the coast. As a result, beach restoration and nourishment have become increasingly necessary and costly procedures for protecting valuable infrastructure. Beach and inlet management practices affect beaches for long distances on either side of a particular project. DRP staff needs to be aware of and participate in the planning, design, and implementation of these projects to ensure that park resources and recreational use are adequately considered and protected.

Cayo Costa has 7.5 miles, and North Captiva has 2.5 miles of beach within the park boundary. No areas are currently identified as critically eroded. With minimal infrastructure to protect along the sandy coastlines, these island parks are able to grow, shrink, and shift according to natural processes. The dynamic nature of this coastal system is highly evident, and remains unaltered by hard stabilizations or beach nourishment.

Multiple outparcels exist on Cayo Costa and North Captiva, with privately-owned homes built on site. Park staff is working with land owners and short-term renters to identify park boundaries and interpret rules associated with the state park. Identification of the park boundaries helps to prevent new trails, cut vegetation, and ground disturbances from occurring on state owned lands. Cayo Costa, North Captiva, and Punta Blanca are accessible only by boat. A public dock is available at Cayo Costa, along with a ferry service from Pine Island. A second ferry dock is located on the south end of the Island. There are no park docks on North Captiva or Punta Blanca. All of the islands are accessible to visitors through boating up to the beach on the Gulf of Mexico side. Cayo Costa is the most visited island within the park due to the multiple amenities available and due to a regular ferry service.

In 2014, a consolidated substrate hard bottom surface was identified 300 feet off the west coast of Cayo Costa. This hard-consolidated substrate is colonized by a variety of sponges, ascidians, and soft corals that house a multitude of tropical marine fish. This site should be added to the boundary of the park, giving this natural community added protection against live take of these organisms. Also, park staff would be able to control where anchoring occurs to avoid physical damage to this area. By identifying this area as within the park, extra safety precautions could be taken to protect swimmers and snorkelers from passing boats.

The optimum boundary for sovereign submerged lands proposes to include this area on the southern tip of Cayo Costa of consolidated substrate over state sovereign submerged land. Management of the submerged land located 25 feet seaward of the mean high waterline along the Gulf shore of Cayo Costa and North Captiva, is also proposed for resource protection (see Optimum Boundary Map).

As part of the effort to implement our goal to restore and maintain the natural communities and habitats of the state park, the following special management objectives for coastal systems are recommended.

***Objective: Continue to assist federal, state and local agencies with active monitoring of erosion and accretion cycles and assessment of beach and shoreline conditions following natural disasters.***

While Cayo Costa and North Captiva are not currently slated for any type of stabilization or nourishment, park and district staff will assist with outside agencies to ensure the continued preservation of these islands. Staff are constantly documenting changes to the beach profile, and will alert the county if erosion and shoreline loss become egregious. Photo points have been historically documented at the main entrance to the beach adjacent to the campground. These will be used to compare the beach habitat before and after any large storm event.

### **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. DRP does not authorize new physical alterations of marshes through ditching or water control structures.

Even though the 1987 AMP only allowed BTI, the 1999 Amendment to that AMP stated that “the use of methoprene, BTI, and monomolecular films remains unchanged. All other chemicals used on designated lands will be reported”. Because of the heightened concern with the toxicity of Abate, the 1995 Agreement defined the low marsh “recurring breeding areas” as those which needed regular treatment and high marsh “nonrecurring areas” as those which only needed occasional treatment. The types of habitats were mapped, ground-truthed, and adopted by mutual consent. The 1999 Amendment did not institute these designations, but rather identified “treatment areas” and “non-treatment areas”. The Amendment required an annual review meeting between LCMCD and DEP staff, prior to the treatment season, to review maps and decide which acreages should be classified into the two categories for that year.

In 2017, the Lee County AMP was amended to include the use of Naled/Dibrom as an aerial adulticide over Florida State Parks, however, with the exception that adulticiding over Cayo Costa State Park is not approved.

Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation.

### **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 DRP's adaptive management response to future conditions, including the effects of sea level rise, as they develop.

All of the coastal and barrier island features associated with Cayo Costa State Park will be affected by changes in sea level. The islands have been geologically and topographically formed by changes in sea levels over a 3,000-year duration. As levels change, locations of natural communities will shift. As the mean sea level rises, the freshwater lens of the park may become saline, altering an essential freshwater source for the park's flora and fauna.

### **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.

Cayo Costa was subject to a land management review on March 10<sup>th</sup>, 2010 and May 6<sup>th</sup>, 2015. 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.

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## **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

Cayo Costa State Park is located within Lee County, about 22 miles west of Fort Myers, 42 miles northwest of Naples, and 53 miles southeast of Sarasota in the southwest part of the state. Approximately 854,000 people live within 30 miles of the park.

According to the U.S. Census Data (2014), approximately 13% of residents in Lee County identify as black, Hispanic or Latino, or another minority group. Nearly half (45%) of residents in Lee County can be described as youth or seniors (U.S. Census 2010). Fifty-nine percent of the population in Lee County is of working age (16 to 65) (U.S. Census Bureau 2010). Lee County's per

capita personal income was \$42,243 in 2014, just below the statewide average of \$42,737 (U.S. Bureau of Economic Analysis 2014).

Significant opportunities for outdoor resource-based recreation exist within 15 miles of Cayo Costa State Park. Charlotte Harbor Preserve State Park and Estero Bay Preserve State Park offer cycling, boating, paddling, fishing, hiking, and wildlife viewing. Stump Pass Beach State Park, Don Pedro Island State Park, and Gasparilla Island State Park offer swimming, beach access, fishing, hiking, snorkeling, and wildlife viewing. The Charlotte Harbor Aquatic Preserves, maintained by DEP, surrounds several preserves in the area. Recreational opportunities offered at these sites include activities such as birding, paddling, boating, and fishing. Managed by the Florida Forest Service, Myakka State Forest provides paddling, fishing, hiking, bicycling, equestrian activities, wildlife viewing, hunting, and camping. The U.S. Fish and Wildlife Service manages several wildlife refuges which are components of the "Ding" Darling Complex. These refuges offer activities such as wildlife viewing, hiking, paddling, boating, and fishing. Activities differ at each refuge, Pine Island National Wildlife Refuge, for example, does not offer public access to the islands to limit disturbance of shoreline and wetland vegetation and nesting bird and turtle species.

Several parks and preserves managed by Lee and Charlotte County are in the vicinity of the park. Tippecanoe Environmental Park, Four Mile Cove Ecological Preserve, and Charlotte Harbor Buffer Preserve offer wildlife viewing, paddling, and hiking. Deep Lagoon Preserve, Carver Preserve, and Cayo Pelau Preserve offer paddling and wildlife viewing. Charlotte Flatwoods Environmental Park, Pine Island Flatwoods Preserve, and Yellow Fever Creek Preserve offer hiking and wildlife viewing.

Cayo Costa State Park is in the Southwest Vacation Region, which includes Manatee, Sarasota, Charlotte, Lee, Collier, DeSoto, Glades, and Hendry, counties (Visit Florida 2017). According to the 2014 Florida Visitor Survey, approximately 9.6% of domestic visitors to Florida visited this region. Roughly 95% of visitors to the region traveled to the Southwest for leisure purposes. The top activities for domestic visitors were beach/waterfront, followed by culinary experiences and visiting friends or relatives. Winter was the most popular travel season followed closely by Spring. Most visitors traveled by non-air (62%), reporting an average of 5.4 nights and spending an average of \$140 per person per day including transportation (Visit Florida 2017).

Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicates that participation rates in this region for saltwater beach activities, saltwater (boat and non-boat) fishing, saltwater boat-ramp use, freshwater non-boat fishing, canoeing and kayaking, visiting archaeological and historic sites, wildlife viewing, bicycle riding, hiking, picnicking, and camping are higher than the state average with demand for additional facilities increasing through 2020 (FDEP 2017).



### **Existing Use of Adjacent Lands**

The land adjacent to Cayo Costa State Park is occupied with residential and commercial areas. Pine Island, to the east of the island, consists primarily of residential areas interspersed with small commercial areas. Commercial operations on the island include multiple marinas, fishing charters, and seafood wholesalers among others. Portions of the islands are agricultural, particularly for mango groves. Several small preserves protect the natural character of the island, including Baxley Preserve and Pine Islands Flatwoods Preserve. Many of the small keys within Pine Island Sound consist primarily of undevelopable mangrove swamp, with the exception of Useppa Island, which has been residentially developed.

Cape Coral is a master planned community on the mainland adjacent to Fort Myers and east of the park, across Pine Island Sound and Matlacha Pass. The community is primarily residential.

North of Cayo Costa is Gasparilla Island, which hosts a mix of land uses. Gasparilla Island consists of residential and commercial use with a historic town center. On the southern tip of the island, directly across Boca Grande Pass from Cayo Costa, is Gasparilla Island State Park, featuring beach access and a historic lighthouse. Most of the island is designated by Lee County as Central Urban, and the rest of the island is primarily marked as various forms of conservation lands.

North Captiva Island contains parcels that are part of Cayo Costa State Park as well as private residential parcels. The northern tip of the island is a private residential area. Park property is interspersed amongst private parcels on North Captiva.

### **Planned Use of Adjacent Lands**

Surrounding property in Lee County is a series of islands and coastal mainland. Captiva Island to the south of the park has multiple designations. Northern Captiva is designated outer island and conservation land upland and wetland, which is low-density development with minimal existing or planned infrastructure, and southern Captiva is designated for low-density residential, specifically outlying suburban. Southeast Captiva has a mixture of wetlands, conservation wetlands, conservation uplands, and outer island. To the north, Gasparilla Island is designated predominantly as urban community which is intended to be mixed use development (Lee Plan 2010).

Pine Island to the east of the park has wetlands and conservation wetlands along both the east and west coast of the island. Central and north central areas of Pine Island are coastal rural, meaning low-density rural residential development. South central Pine Island is designated outlying suburban (low-density residential) and along the southern coast, low to medium density residential development is allowed (Lee Plan 2010).

Along the mainland coast of Lee County, the predominant designations are wetlands, conservation wetlands, and low-to-mid density residential development (Lee Plan 2010).

Lee County is a member of the Southwest Florida Regional Planning Council. It is expected that Lee County will increase by 500,000 people by 2045, nearly doubling its population (BEBR 2015) making the county population exceed 1.1 million residents.

### **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**

Cayo Costa State Park represents the largest tract of publicly-owned land along the Charlotte Harbor chain of barrier islands. Cayo Costa and North Captiva are narrow elongated islands with low, rolling topographic profiles and irregular configurations. The north-south orientation of the islands parallels the mainland of Lee County. Punta Blanca Island is a small mangrove-dominated island on the bay side of Cayo Costa Island. The north end of Cayo Costa proper provides opportunities for land-based recreation such as hiking, biking, and camping.

#### **Water Area**

The majority of park visitors arrive by ferry service. Pelican Bay, between Cayo Costa Island and Punta Blanca, provides a refuge during prevailing winds and is a popular anchorage for boaters. From the park, visitors can access the open waters of the Gulf and protected water of the greater Charlotte Harbor system for paddling, swimming, and fishing.

#### **Shoreline**

The park boundary encompasses approximately 10 miles of Gulf shoreline. The high-energy Gulf beach along Cayo Costa and North Captiva Islands is the most

popular natural feature of the park and the focal point for many of the available recreational activities, such as swimming, fishing, sunbathing and shell collecting. Except for the north and south ends of Cayo Costa Island, where currents can be strong, and in areas where severe shoreline erosion has occurred, the Gulf beaches provide safe swimming conditions.

### **Natural Scenery**

The state park contains areas of exceptional natural beauty. White sand beaches, open coastal grasslands, and shaded maritime hammocks yield scenery distinctive of the Gulf barrier island environment.

### **Significant Habitat**

The park supports an assemblage of plants, animals and other features exemplifying natural conditions on the Charlotte Harbor chain of barrier islands. The numerous and diverse natural communities of the park are especially attractive to visitors who appreciate nature and solitude. Conditions for wildlife viewing are ideal, particularly for those seeking the abundant bird life.

### **Natural Features**

As a barrier island, Cayo Costa itself is a remarkable natural feature, characterized by minimal development and large areas of dune, hammock, and wetland natural communities.

### **Archaeological and Historic Features**

The park contains cultural sites associated with Calusa mound building, early Spanish arrivals, a late 19<sup>th</sup> century quarantine station, and an early 20<sup>th</sup> century fishing community. Park history and remnant cultural sites present unique opportunities for interpretation.

### **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 island's past is defined by the significance of its geography, and namely, the water resources surrounding the island. The island was prehistorically home to the Calusa Indians before European settlers arrived on Cayo Costa in search of marine and timber resources. Beginning in the 1800s, Europeans began to use the island more frequently. Fishermen in particular established finishing ranchos where seafood products were prepared for export primarily to Cuba. Also in the 1800s, the U.S. utilized the island as a barrier to the port on the mainland, establishing an immigration quarantine station, primarily to screen travelers for yellow fever and malaria. Fishing was the dominant industry on the island, and by the 1900s, approximately 20 fishing families occupied Cayo Costa. During World War II, the U.S. Air Force used Cayo Costa as a target

range for Tampa-area training exercises. In the years leading up to state acquisition, the island was managed as a park by Lee County.

The cottages at Jug Creek are designated historic structures under the Bokeelia Historic District. Four of the cottages were constructed during the 1930s. Two of the cottages were relocated to Jug Creek from Fort Myers in the 1930s. Historically, the cottages were used as fishing lodges for vacationers.

### **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.

Future land use designations for Cayo Costa State Park in the Lee County Plan are primarily for both conservation uplands and conservation wetlands. Portions of the island are designated as outer island. These land uses are compatible with park activities and the minimal development allowances associated with the outer islands designation should not impact current park usage.

### **Current Recreational Use and Visitor Programs**

Cayo Costa State Park offers a wide variety of resource-based recreational opportunities including beach access, cycling, hiking, camping (overnight boat slips, tent camping, and primitive cabins), paddling, swimming, shoreline fishing, shelling, diving, snorkeling, wildlife viewing, and multiple interpretive activities. Interpretive activities include the both natural and cultural resources of the island. Interpretive information is located at the Pelican Bay ranger station. Existing concession services are operated through Captiva Cruises and authorized subcontractors, which offer ferry transit to the park from locations in Punta Gorda, Pine Island, Fort Myers, Sanibel Island, and Captiva Island.

Cayo Costa State Park offers various recreational and interpretive opportunities. The park is part of the Great Florida Birding and Wildlife Trail. Visitors also make use of the island setting to host public or private events. The Barrier Island Parks Society, Friends of Cayo Costa State Park hosts an annual park celebration event, which is open to the public.

Cayo Costa State Park recorded 81,064 visitors in FY 2016/2017. By DRP estimates, the FY 2016/2017 visitors contributed over \$8 million in direct economic impact, the equivalent of adding 129 jobs to the local economy (FDEP 2017).

### **Other Uses**

No uses, other than outdoor resource-based recreation and interpretation, are designated at this park.

## **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 Cayo Costa State Park, all wetlands and floodplain as well as maritime hammock, beach dune, mangrove swamp, and known imperiled species habitat have been designated as protected zones.

## **Existing Facilities**

The park consists of three main areas – Cayo Costa, North Captiva Island, and a small landbase at Jug Creek. Access to Cayo Costa and North Captiva Island is only by boat. Most visitors to the park visit Cayo Costa proper and arrive by ferry service provided by the park's concessionaire. Two docks offer facilitated boat access to Cayo Costa – the main park docks on Pelican Bay and another dock near the south end of the island, which is reserved for authorized ferry boats. Ferry service is not provided to and no visitor amenities exist on the North Captiva portion of the park. Visitors accessing North Captiva Island by private boat may explore the park beach and an interior trail.

The Jug Creek landbase contains six historic cottages, a facility for storage and laundry, boat ramp, and dock. Until 2017, the cottages were used for overnight visitor accommodation and the dock/ramp was available for use by cabin guests for water access. The dock, which is currently used only for park support, was repaired in 2016. The storage/laundry building is in poor condition and only used by park staff and the concessionaire for storage. The condition of the cottages and storage/laundry building is poor, with all structures requiring extensive repair. All cottages were closed for reevaluation of maintenance and potential redevelopment.

Primary access to the island of Cayo Costa is through Pelican Bay, where the majority of the park's facilities are located. Visitor amenities include a boat dock, waiting shelter, interpretive kiosks, and small restroom building. A small ranger station and store are also located at Pelican Bay, providing information, ice, and other essentials for visitors. Overnight docking is permitted for boat campers. The park does not collect entrance fees at the ranger station. Instead, an honor box for fee collection is located at the Pelican Bay docks.

Accessible from Pelican Bay, the Gulf Beach Use Area offers visitors a variety of recreational opportunities, including various beach activities, picnicking, and hiking into the scenic island interior. One restroom building with outdoor

showers for day use is situated at the landward end of the main access path to the open Gulf beach. The site offers two small picnic pavilions.

The camping area, located near the Gulf Beach Use Area, offers 30 tent sites and 12 single-room cabins in a semi-primitive environment. Each site and cabin includes a picnic table, ground grill, and access to potable water. Electricity is not available at any site or cabin. The camping area is sunny and conveniently located near the Gulf beach. Bathhouse facilities are a short walk from the sites and equipped with cold showers and flush toilets. The tent sites and cabins are separated on opposite sides of the main beach access path.

Tram service across Cayo Costa is available daily from 10 a.m. to 4 p.m. to transport visitors and gear for both day and overnight use. Outside of the tram's operating hours, visitors are responsible for portaging gear in and out. The Pelican Bay docks are approximately one mile down unpaved park road from the beach access and camping area. Visitors enjoy both walking and cycling the shared use road. Designated hiking trails exist primarily on the northern half of Cayo Costa and along North Captiva Island's western side. Hiking trails offer opportunities to access several alternative segments of beach along the Cayo Costa shoreline. Beach access points, other than the Gulf Beach Use Area, do not offer visitor amenities.

Support facilities are located adjacent to the Pelican Bay Use Area, including numerous operational facilities for the park – support dock, maintenance shop, pole barn, small office, and residence for the assistant park manager. Electricity for the shop is generated by solar panels.

### **Recreation Facilities**

#### **Pelican Bay Use Area**

Boat Docks  
Waiting Shelter  
Store  
Ranger Station  
Restroom (1)  
Interpretive Kiosks

#### **Gulf Beach Use Area**

Restroom (1)  
Picnic Pavilions (2)

### **Support Facilities**

#### **Pelican Bay Support Area**

Maintenance Shop  
Pole Barns (2)  
Support Dock

#### **Camping Area**

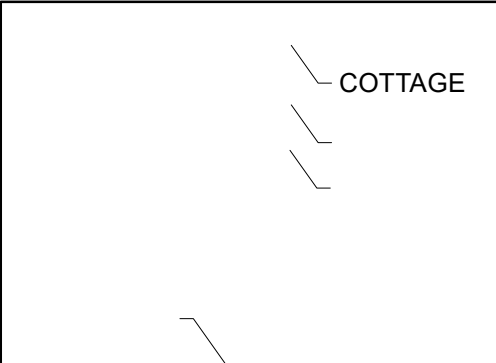
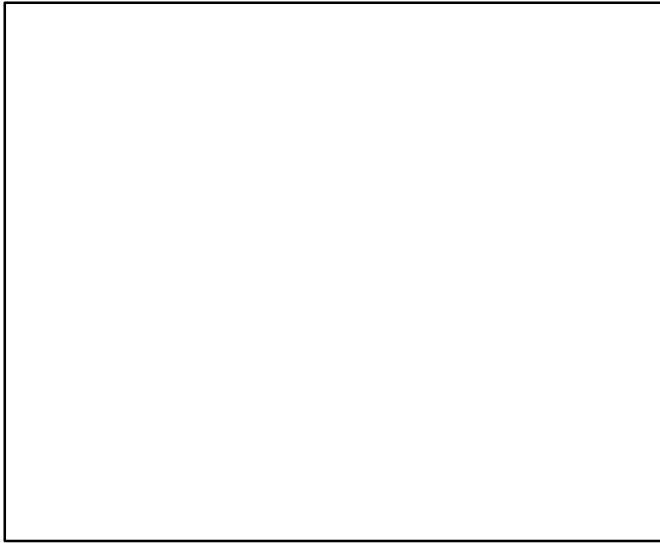
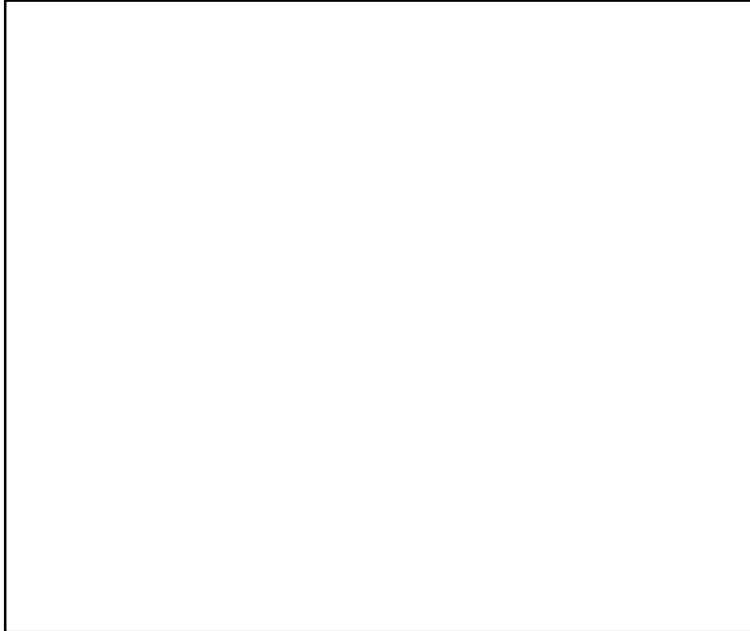
Tent Sites (30)  
Cabins (12)  
Campfire Circles (3)  
Bathhouses (3)

#### **Jug Creek Landbase**






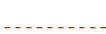


Cottages and Storage (7)  
Dock  
Boat Ramp

#### **Jug Creek Landbase**

Dock and Boat Ramp  
Storage Building



**Legend**

-  Park Boundary
-  Park Road Stabilized
-  Park Road Unstabilized
-  Walkways
-  Hiking Trail
-  Hiking/Biking Trail
-  Camping Sites
-  Structures





## 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 3,892 users per day.***

The park will continue to offer visitor's the opportunity to camp, hike, fish, dive, bike, go shelling, swim, picnic, go boating, and view wildlife among other

activities. Interpretive exhibits around the park will continue to be offered to the public. The park's ability to operate effectively with current visitation levels will be increased.

***Objective: Expand the park's recreational carrying capacity by 848 users per day.***

Providing more facilities in the Gulf Beach Use Area, including additional picnic pavilions, will allow for accommodation of more day visitors. Establishing a group campsite will improve and increase overnight accommodation for large groups. At Jug Creek, restoration or replacement of the cabins will reintroduce the former overnight capacity of the park's landbase Parkwide, general improvements to existing facilities will also have the potential to attract more visitors and enhance the level of recreational service offered by the park.

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

Currently, the park offers a wide variety of interpretive programs. These programs range from guided ranger walks down one of interior nature trails to onsite interpretive talks about marine fauna, such as sea turtles. Programs typically run December through June to provide opportunities during the park's busy season. During other times of the year programs are offered for tour groups and summer camps.

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

The park offers significant opportunities for interpretation and outreach. Recommended improvements to program operations may entail collaboration with the park's concessionaire. Programs may include use of kayaks or paddleboards.

## **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, renovated, and new facilities needed to implement the conceptual land use plan for Cayo Costa State Park:



PAGE 2

PUNTA BLANCA ISLAND

CAYO COSTA

GULF OF MEXICO

Captiva Pass

NORTH CAPTIVA ISLAND

INSET

Jug Creek Landbase  
Renovate/Replace Cottages



INSET

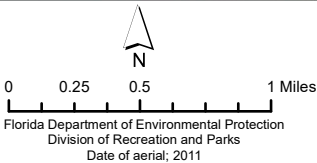
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**Legend**

-  Park Boundary
-  Proposed Facilities





**Legend**

-  Park Boundary
-  Campsites
-  Cabins
-  Proposed Facilities
-  Proposed Development Area
-  Tram Road

**INSET**



Support Area  
Remove/Relocate Shop  
Renovate Dock

Pelican Bay Boat Docks  
Replace Pilings  
Extend/Add Slips  
Install Moorings

Pelican Bay Use Area  
Site Redesign/Masterplan  
Construct Visitor Center

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**INSET**



GULF OF MEXICO

**Cabin Area**  
Renovate/Replace Cabins  
Replace Restrooms  
Enhance Landscape

**Gulf Beach Access**  
Construct Small Picnic Pavilions  
Replace Day Use Restroom

**Tent Area**  
Replace Restrooms  
Develop Group Camp  
Enhance Landscape

**Tram Road**  
Stabilize Road  
Improve Drainage

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***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 6 existing facilities and 1 mile of road.***

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.

**Pelican Bay Use Area**

The dock pilings are in need of repair/replacement to continue safe and reliable use of the park's main access point. Additionally, renovation of the dock should entail lengthening existing boat slips and expansion to include additional boat slips to accommodate increased visitation by private boat. The ranger station and supply store area will be replaced by a new visitor center. The building must be designed off grade and may be up to 1,500 square feet in size. With the new visitor center, the restroom building currently located at this site will be removed, with replacement restrooms being located inside the visitor center. As dock improvements, shop relocation, restroom removal, and visitor center construction are conducted, a comprehensive redesign of the Pelican Bay Use Area is needed to ensure space efficiency, optimal connectivity, and storm resiliency. Master planning may guide scaling and various design elements.

**Pelican Bay Support Area**

The dock located in the support area is in need of extensive repair and renovation. A boathouse should be constructed to separate the park's support boats from the visitor use area and protect vessels from damaging weather conditions. The existing shop has recently undergone repairs and additions, including solar panels for the enhancement of efficient park operations, however, relocation of the shop is still recommended. Relocation alternatives for a new shop include either the Old Water Tower Site or the dredge spoil/burn site. The sheltered interior site would be less vulnerable to storm impacts and offer space for volunteer tent sites. Discontinuation of the existing shop would allow the current site to be repurposed for visitor amenities or partial restoration/landscape enhancement, which are to be addressed through site-specific planning. Docks at this site may be continued for support purposes as the new shop location will not be waterfront.

**Tram Road**

The east-west oriented tram road extending between Pelican Bay and the Gulf Beach Use Area should be improved to provide ease of access by tram service vehicles and walking or cycling. Road improvements should repair and stabilize the road, but not reduce its permeability. Alleviating drainage issues should be

a priority. Wayfinding and interpretive signage may be added or modified as needed to improve the visitor experience as a shared use path for navigating and traversing the island.

### **Gulf Beach Use Area**

To provide additional shelter and convenience for beach visitors, a row of 10 small picnic pavilions should be constructed along the inland periphery of the beach. The row of pavilions should extend perpendicular to the beach access path, with five pavilions to each side of the path. Potential layout may compare to beachside picnic pavilions at Gasparilla Island and Bald Point state parks.

Other improvements to the park's beach use area should include bathhouse replacement. Planned replacement design is for an off-grade structure, located adjacent to the north side of the existing bathhouse. One additional small picnic pavilion is recommended within the footprint of the existing/former bathhouse.

### **Camping Area**

The cabins in this area of the park are in fair to good condition. As needed, improvements and renovations should be made. Recently, park staff added new composite siding and screens to all 12 of the cabins. Future modifications to be implemented in the next ten years include comfort amenities to encourage year-round use, such as non-electric heat fans, but improvements should maintain the primitive character of the cabin experience. The two restrooms in the cabin area should be replaced to meet ADA accessibility standards as well as building codes. Ongoing native landscaping and natural community restoration between the cabin sites and the tent campground should continue. Adjacent to the tent campground, a group camp should be established to accommodate the large groups that are increasingly visiting the island. One medium-sized pavilion should be constructed in the group camp as a cooking and scout activity shelter. The group camp will not require another restroom as the site will share the existing restroom near the tent campground.

### **Utilities**

Electrical utilities on the island should be upgraded as the Pelican Bay Use Area and shop undergo improvements. Island facilities currently operate on engine generators and a supplemental 20kw solar system. The solar system is limited to an 8-hour energy supply, which frequently defaults to the generators. By increasing the solar capacity to 100kw, the park's island facilities could be completely supplied by solar and provide increased reliability.

### **Landbase at Jug Creek**

The historic Jug Creek cottages are in poor condition and not suitable for visitor accommodation. For the site to be fully operational, the cottages would need to undergo extensive renovations or be altogether replaced. Removal of the cottages and replacement with new structures may be considered as an alternative to renovating the current cottages. The Bokeelia Historic District is under jurisdiction of Lee County. Removal of the cottages would require approval by Lee County as well as the Division of Historical Resources. To make



such a decision on the cottages, a historic structures report detailing the condition of the cottages and their historical significance must be conducted and thoroughly assessed. If any cottages are ultimately removed, new structures will be planned and constructed in the historical style of the original Jug Creek cottages. The historic cottages should be recorded in detail and interpreted prior to any removal efforts. Pending the findings of historic structures study, a potential recommendation may be to preserve at least one original cottage for interpretation. Public use of the Jug Creek dock and ramp may resume when cottages are again available for rental.

## **Facilities Development**

Preliminary cost estimates for these recommended facilities and improvements are provided in the Ten-Year Implementation Schedule and Cost Estimates (Table 7) 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:

### **Pelican Bay Use Area**

#### **Boat Docks**

Replace pilings  
Extend/add boat slips  
Install boat moorings

#### **Visitor Center**

Construct visitor center

### **Pelican Bay Support Area**

#### **Dock**

Renovate dock  
Construct boathouse

#### **Shop**

Remove existing shop

### **Old Water Tower Site**

Develop new shop

### **Tram Road**

Improve road

### **Gulf Beach Use Area**

Construct picnic pavilions (11)  
Replace restroom

### **Camping Area**

Renovate/replace cabins  
Replace restrooms  
Enhance landscape  
Develop group camp

### **Utilities**

Upgrade solar electric capacity

### **Landbase at Jug Creek Marina**

Restore or replace cottages

## **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.

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 (Table 5).

<b>Facility/Activity</b>	<b>Existing Capacity</b>		<b>Proposed Additional Capacity</b>		<b>Estimated Recreational Capacity</b>	
	<b>One Time</b>	<b>Daily</b>	<b>One Time</b>	<b>Daily</b>	<b>One Time</b>	<b>Daily</b>
<b>Gulf Beach</b>						
Swimming/ Beach Activities	1,590	2,760			1,590	2,760
Shoreline Fishing	210	420			210	420
Picnicking	32	64	88	176	120	240
<b>Trails</b>						
Shared Use	72	288			72	288
<b>Pelican Bay</b>						
Visitor Center			150	600	150	600
Boat Camping	48	48			48	48
<b>Island Camping Area</b>						
Primitive	240	240			240	240
Cabins	72	72			72	72
Group Camp			30	30	30	30
<b>Jug Creek Landbase</b>						
Cabins			42	42	42	42
<b>Total</b>	<b>2,264</b>	<b>3,892</b>	<b>310</b>	<b>848</b>	<b>2,574</b>	<b>4,740</b>

## **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. Parklands that are potentially surplus to the management needs of DRP are also identified. 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 imposition of permit conditions.

The optimum boundary for Cayo Costa State Park includes all remaining public and private lands on Cayo Costa and remaining unimproved private parcels on the central and southern portions of North Captiva Island that are contiguous with existing park boundary. Benefits of these acquisitions would include resource protection and enhanced access for management. On Cayo Costa, acquisition of numerous inholdings would close gaps between portions of the park, providing greater range of shoreline and interior trail access for recreational and interpretive opportunities. If all parcels are acquired, platted road rights of way through the north part of Cayo Costa may additionally be transferred to park management.

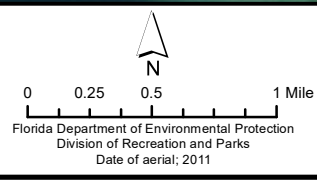
The inland lagoon located near the park use area on the Gulf side at the widest portion of Cayo Costa should be included within the optimum boundary for resource management and protection purposes. The formation of the lagoon occurred within the past 40 years as a result of sand accretion patterns. Except for one private outparcel on the southeast shore, the lagoon waters are surrounded by land managed by the park. The mile-long and .25-mile-wide lagoon covers approximately 102 acres and maintains an average 10-foot depth. Imperiled shorebird and wading species frequently use tidally exposed mudflats and beach shoreline along the lagoon for foraging and resting year-round. The lagoon waters and shoreline are also significant for loggerhead and green sea turtle nesting.

No lands are considered surplus to the management or conservation needs of Cayo Costa State Park at this time.





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## 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 Cayo Costa 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 chiefly within two of the five general categories that encompass the mission of the park and the DRP.

#### Resource Management

##### Natural Resources

- Burned 246 acres (prescribed and wildfire).
- Treated 805 acres of invasive exotic plants.
- Removed 792 feral hogs, 968 racoons, 3 coyotes, 4 feral cats, 7 black spiny tailed iguanas, and 4 armadillos.
- Documented 3,354 loggerhead (*Caretta caretta*) and 58 green (*Chelonia mydas*) imperiled sea turtle nests.
- Surveyed all management zones of the park for invasive exotic plants.
- Tracked all prescribed fire, mechanical treatment and invasive-exotic plant treatment, and surveys in a statewide database.
- Ongoing efforts by park staff to control exotic species, update species lists, and monitor for listed species.
- In 2015, the Joseph W. Jones Ecological Research Center conducted a gopher tortoise survey with population assessment for the park.
- In 2016, DRP and the park partnered with USDA for a successful feral hog removal and eradication effort.

##### Cultural Resources

- Completed a predictive model for the park in 2013.
- The park has trained multiple Archaeological Resource Management (ARM) certified staff. Staff attends refresher training to remain current with best management practices.

## **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 6) 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, several 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 7 may need to be adjusted during the ten-year management planning cycle.



**Table 7**  
**Cayo Costa State Park**  
**Ten-Year Implementation Schedule and Cost Estimates**  
**Sheet 1 of 3**

<b>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.</b>				
<b>Goal I: Provide administrative support for all park functions.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost * (10-years)</b>
<b>Objective A</b>	<b>Continue day-to-day administrative support at current levels.</b>	Administrative support ongoing	<b>C</b>	<b>\$800,000</b>
<b>Objective B</b>	<b>Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.</b>	Administrative support expanded	<b>LT</b>	<b>\$110,000</b>
<b>Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored conditions.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost * (10-years)</b>
<b>Objective A</b>	<b>Conduct/obtain an assessment of the park's hydrological needs.</b>	# Acres within proper hydrological functions	<b>UFN</b>	<b>\$71,500</b>
Action 1	Determine long-term sustainability of fresh groundwater for park use.	Strategy report developed	UFN	\$25,000
Action 2	Determine how changes in sea levels will impact drinking water abundance and quality at the park.	Plan developed/updated	UFN	\$25,000
Action 3	Continue to conduct groundwater quality testing; especially after major storm events.	# Tests completed	C	\$21,500
<b>Goal III: Maintain, improve or restore imperiled species populations and habitats in the park.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost * (10-years)</b>
<b>Objective A</b>	<b>Develop/Update baseline imperiled species occurrence inventory lists for plants and animals, as needed.</b>	List developed/updated	<b>C</b>	<b>\$6,360</b>
<b>Objective B</b>	<b>Monitor and document 10 selected imperiled animal species in the park.</b>	# Species monitored	<b>C</b>	<b>\$331,400</b>
Action 1	Implement monitoring protocols for 10 imperiled animal species including loggerhead sea turtles, green sea turtles, piping plovers, American oystercatchers, least terns, snowy plovers, Wilson's plovers, black skimmers, and eastern indigo snakes.	# Protocols developed	ST	\$111,400
Action 2	Complete all required FWC survey protocols for imperiled sea turtles and nesting shorebirds/seabirds.	# Protocols completed	UFN	\$200,000
Action 3	By 2025, resurvey/replicate line transect distance sampling protocols to estimate the gopher tortoise population on the island and look for changes.	Population survey completed	UFN	\$20,000
<b>Objective C</b>	<b>Monitor impacts on shorebird and sea turtle nesting by terrestrial nuisance species in the park.</b>	Impacts reported	<b>C</b>	<b>\$0</b>
<b>Objective D</b>	<b>Monitor and document 6 selected imperiled plant species in the park.</b>	# Species monitored	<b>UFN</b>	<b>\$5,640</b>
Action 1	Develop monitoring protocols for 4 imperiled plant species including the cardinal airplant, giant airplant, Florida mayten, and West Indian cock's-comb.	# Protocols developed	UFN	\$2,400
Action 2	Implement monitoring protocols for 4 imperiled plant species including those listed in Action 1 above, and joewood.	# Species monitored	UFN	\$1,620
Action 3	Develop and implement a yearly survey for the federally listed west coast prickly apple cactus.	Protocol developed and # monitoring completed	UFN	\$1,620
<b>Objective D</b>	<b>Continue to improve protection and awareness of sensitive shorebird and sea turtle nesting areas.</b>	# Species monitored	<b>C</b>	<b>\$25,000</b>

\* 2017 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 7**  
**Cayo Costa State Park**  
**Ten-Year Implementation Schedule and Cost Estimates**  
**Sheet 2 of 3**

**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.**

<b>Goal IV: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost* (10-years)</b>
<b>Objective A</b>	<b>Annually treat 123 acres of exotic plant species in the park.</b>	# Acres treated	<b>C</b>	<b>\$1,721,000</b>
Action 1	Annually develop/update exotic plant management work plan.	Plan developed/updated	C	\$16,000
Action 2	Implement annual work plan by treating 45 infested acres (approximately 275 gross acres in park, annually, and continuing maintenance and follow-up treatments, as needed.	Plan implemented	UFN	\$1,705,000
<b>Objective B</b>	<b>Implement control measures on 4 exotic and nuisance animal species in the park.</b>	# Species for which control measures implemented	<b>UFN</b>	<b>\$310,050</b>
Action 1	Continue to trap exotic animals in house and report to the district office quarterly.	# exotic and nuisance	UFN	\$110,050
Action 2	Apply for outside funding to hire an OPS trapper for nuisance animal removal during sea turtle nesting season.	OPS position funded	UFN	\$100,000
Action 3	Continue contract trapping to remove exotic/nuisance animals.	# Contract trappers hired	UFN	\$100,000
<b>Goal V: Protect, preserve and maintain the cultural resources of the park.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost* (10-years)</b>
<b>Objective A</b>	<b>Assess and evaluate 26 of 26 recorded cultural resources in the park.</b>	Documentation complete	<b>C</b>	<b>\$75,750</b>
Action 1	Annually complete 26 assessments/evaluations of 26 archaeological sites, and develop and implement monitoring program.	# Assessments completed	C	\$5,000
Action 2	Complete 24 Historic Structures Reports (HSR) for identified historic buildings. Prioritize stabilization, restoration, and rehabilitation projects.	# HSR's completed	UFN	\$70,750
<b>Objective B</b>	<b>Compile reliable documentation for all recorded historic and archaeological resources.</b>	Documentation complete	<b>C</b>	<b>\$96,500</b>
Action 1	Ensure all known sites are recorded or updated in the Florida Master Site File.	# Sites recorded or updated	C	\$4,200
Action 2	Conduct Level 1 archaeological survey for 3 priority areas identified by other previous study.	# Archeological surveys	UFN	\$90,000
Action 3	Develop and adopt a Scope of Collections Statement.	Scope of Collections completed	UFN	\$2,300
<b>Objective C</b>	<b>Bring 3 of 26 recorded cultural resources into good condition.</b>	<b>Restoration completed</b>	<b>UFN</b>	<b>\$30,000</b>
Action 1	Bring 3 sites into good condition (Faulkner Mound, Foster Bay Mound, and Mark Pardo Shellworks).	# Sites in good condition	UFN	\$30,000

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**Table 7**  
**Cayo Costa State Park**  
**Ten-Year Implementation Schedule and Cost Estimates**  
**Sheet 3 of 3**

**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.**

<b>Goal VI: Provide public access and recreational opportunities in the park.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost* (10-years)</b>
<b>Objective A</b>	<b>Maintain the park's current recreational carrying capacity of 3,892 users per day.</b>	# Recreation/visitor opportunities per day	<b>C</b>	<b>\$55,000</b>
<b>Objective B</b>	<b>Expand the park's recreational carrying capacity by 848 users per day.</b>	# Recreation/visitor opportunities per day	<b>LT</b>	<b>\$10,000</b>
<b>Objective C</b>	<b>Continue to provide the current repertoire of 5 interpretive, educational, and recreational programs on a regular basis.</b>	# Interpretive/education programs	<b>C</b>	<b>\$20,000</b>
<b>Objective D</b>	<b>Develop new interpretive, educational and recreational programs.</b>	# Interpretive/education programs	<b>ST</b>	<b>\$10,000</b>
<b>Goal VII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.</b>		<b>Measure</b>	<b>Planning Period</b>	<b>Estimated Manpower and Expense Cost* (10-years)</b>
<b>Objective A</b>	<b>Maintain all public and support facilities in the park.</b>	Facilities maintained	<b>C</b>	<b>\$45,000</b>
<b>Objective B</b>	<b>Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.</b>	Plan implemented	<b>LT</b>	<b>\$10,000</b>
<b>Objective C</b>	<b>Improve and/or repair 6 existing facilities as identified in the Land Use Component.</b>	# Facilities/Miles of Trail/Miles of Road	<b>LT</b>	<b>\$500,000</b>
<b>Objective D</b>	<b>Expand maintenance activities as existing facilities are improved and new facilities are developed.</b>	Facilities maintained	<b>LT</b>	<b>\$15,000</b>
<b>Summary of Estimated Costs</b>				
<b>Management Categories</b>			<b>Total Estimated Manpower and Expense Cost* (10-years)</b>	
Resource Management			<b>\$2,618,200</b>	
Administration and Support			<b>\$910,000</b>	
Capital Improvements			<b>\$570,000</b>	
Recreation Visitor Services			<b>\$95,000</b>	
Law Enforcement Activities <sup>1</sup>				
			<sup>1</sup> Law enforcement activities in Florida State Parks are conducted by the FWC Division of Law Enforcement and by local law enforcement agencies.	

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UFN = currently unfunded need



## **Addendum 1—Acquisition History**





## Cayo Costa State Park Acquisition History

LAND ACQUISITION HISTORY REPORT					
<b>Park Name</b>	Cayo Costa State Park				
<b>Date Updated</b>	9/18/2017 (revised on 01/29/2018 and Lee County owned parcels are included in the area of the park)				
<b>County</b>	Lee County, Florida				
<b>Trustees Lease Number</b>	Trustees Lease No. 3426				
<b>Current Park Size</b>	2566.88 acres.				
<b>Purpose of Acquisition</b>	The State of Florida acquired Cayo Costa State Park for recreational purposes.				
<b>Acquisition History (includes only acquisitions with areas of 10 acres or more)</b>					
Parcel Name or Parcel DM-ID	Date Acquired	Initial Seller	Initial Purchaser	Size in acres	Instrument Type
DMID3662	12/21/1976	North Captiva Company	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	130.134	Warranty Deed
DMID3780	8/22/1984	Lee County	Trustees	130.672	County Deed
DMID3664	12/10/1976	John Lehr	Trustees	110.898	Warranty Deed
DMID3779	8/15/1984	Lee County, Florida	Trustees	87.914	County Deed
DMID3665	12/15/1976	Cayo Costa Land, Inc.	Trustees	79.52	Indenture
DMID3648	12/18/1976	Georgia L. Webster Allyson Sue Bixler Mary Lynn Bixler	Trustees	78.361	Warranty Deed
DMID349939	12/31/1998	Edison Community College Foundation, Inc.	Trustees	75.044	Warranty Deed
DMID3670	12/17/1976	Robert M. Taylor Individually and as Trustees	Trustees	67.518	Indenture
DMID3677	4/4/1978	Thompson S. Baker	Trustees	63.059	Warranty Deed
DMID3663	10/14/1976	Edythe M. Garten and Clyde H. Wilson	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	40.417	Warranty Deed
DMID3649	1/28/1977	John William Pocock and his wife Elizabeth S. Pocock	Trustees	35.255	Warranty Deed
DMID3688	9/9/1980	Cayo Costa Land, Inc.	Trustees	35.244	Indenture
DMID47	9/9/1980	Cayo Costa Land, Inc.	Trustees	33.229	Indenture
DMID3636	11/23/2017	Addison B. Miller Robert M. Christianson and Alfred D. Petersen, as Trustees	Trustees	30.769	Indenture
DMID6832	10/7/1976	Meldon L. Glenn	Trustees	27.19	Warranty Deed
DMID3647	3/10/1977	Goergia L. Webster Allyson Sue Bixler and Mary Lynn Bixler	Trustees	24.229	Indenture
DMID3680	4/5/1978	Charles J. Dahdah and Wilson M. Biggers, individually and as Trustees	Trustees	22.798	Warranty Deed
DMID3722	1/27/1983	Safety Harbor Corporation	Trustees	20.982	Warranty Deed
DMID3666	12/15/1976	Cayo Costa Land, Inc.	Trustees	19.302	Indenture
DMID15272	7/23/1997	George Diercks	Trustees	16.777	Warranty Deed
DMID3671	11/23/1976	Addison B. Miller Robert M. Christianson and Alfred D. Petersen	Trustees	13.777	Indenture

## Cayo Costa State Park Acquisition History

DMID3686	5/10/1978	Douglas Bathey and his wife Mercy Bathey	Trustees	16.12	Warranty Deed
DMID15274	5/26/1998	The Diocese of Venice	Trustees	12.454	Warranty Deed
DMID3646	10/26/1977	Travis A. Gresham and his wife Frances H. Gresham	Trustees	12.106	Warranty Deed
DMID3657	9/7/1976	Nelson P. Rose and his wife Elizabeth H. Rose	State of Florida	11.95	Warranty Deed
DMID3656	9/7/1976	Nelson P. Rose and his wife Elizabeth H. Rose	State of Florida	11.423	Warranty Deed
DMID3676	4/20/1978	Cayo Costa Land, Inc.	The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees)	10.683	Indenture
DMID3655	10/15/1976	Peggy B. Kling	Trustees	10.58	Indenture
DMID3659	9/7/1976	Joseph G. Fogg and his wife Elizabeth T. Fogg	State of Florida	10.214	Warranty Deed

### Management Lease

Parcel Name or Lease Number	Date Leased	Initial Lessor	Initial Lessee	Current Term	Expiration Date
Lease No. 3426	2/25/1986	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	50 (fifty) year	2/24/2036
Outstanding Issue	Type of Instrument	Brief Description of the Outstanding Issue		Term of the Outstanding Issue	
The property will be used only for recreation and public purposes.	Federal Patent	<i>If control over the property is given to other entity or if the subject lands are not used for park purpose, title to the subject lands shall revert to back to the United States of America.</i>		Perpetual	
Life estate	Warranty Deed	The deed is subject to a certain exclusive use of the subject property by the grantor for as long as at least one of the grantors alive.		Perpetual	

## **Addendum 2—Advisory Group Members and Report**



## Cayo Costa State Park Advisory Group Members and Report

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{List}

## Cayo Costa State Park Advisory Group Members and Report

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{Report}

### **Addendum 3—References Cited**





## Cayo Costa State Park References Cited

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## **Addendum 4—Soil Descriptions**



## **Cayo Costa State Park Soil Descriptions**

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**(2) Canaveral fine sand** - This is a nearly level, moderately well drained and intermittently somewhat poorly drained soil on low ridges. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is black and dark gray fine sand mixed with shell fragments and is about 15 inches thick. The underlying layers are light brownish gray and light gray fine sand mixed with shell fragments to a depth of 80 inches or more.

Included with this soil are small areas of Captiva and Kesson soils. Included soils generally make up less than 10 percent of any mapped areas.

In most years, under natural conditions, this soil has a water table depth of 18 to 40 inches for 2 to 6 months. The water table recedes to a depth of more than 40 inches during February through July. The available water capacity is very low. Natural fertility is low. Permeability is very rapid.

Natural vegetation consists of cabbage palm, seagrape, wild coffee, and an understory of vines and weeds.

**(5) Captiva fine sand** - This is nearly level, poorly drained soil in sloughs. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black fine sand about 6 inches thick. The underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. The upper 9 inches is pale brown with light gray streaks, the next 11 inches is light gray with many pale brown mottles, the next 4 inches is light gray with about 30 percent multicolored shell fragments, and the lower 50 inches is light gray.

Included with this soil in mapping are small areas of Canaveral and Kesson soils. Also included are scattered areas of Captiva fine sand that is ponded and soils that are similar to Captiva soils but have more than 35 percent multicolored shell fragments larger than 2 millimeters between depths of 10 and 40 inches. Included soils make up about 5 to 10 percent of any mapped area.

In most years, under natural conditions, this soil has a water table within a depth of 10 inches for 1 to 2 months. The water table is at a depth of 10 to 40 inches for 10 months during most years. In some years, the soils are covered by standing water for several days.

The available water capacity is low. Permeability is very rapid.

Natural vegetation consists of cabbage palm, Brazilian pepper, sand cordgrass, leather fern, and wax myrtle.

## Cayo Costa State Park Soil Descriptions

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**(22) Beaches** – Beaches consist of narrow strips of nearly level, mixed sand and shell fragments along the Gulf of Mexico. These areas are covered with saltwater at daily high tides.

The areas are subject to movement by the wind and tide and are bare of vegetation in most places. The only vegetation is salt-tolerant plants. Beaches are geographically associated with Canaveral soils.

Beaches are used intensively for recreation during the entire year. Homes, condominiums, beach cottages and motels have been built on the fringes of beaches in many places.

**(23) Wulfert Muck** - This is a nearly level, very poorly drained soil in broad tidal swamps. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is muck that is dark reddish brown to a depth of 12 inches and dark brown to a depth of 36 inches. Beneath the muck is gray fine sand with light gray streaks and about 10 percent shell fragments.

Included with this soil in mapping, and making up about 15 percent of the mapping unit, are small areas of Kesson soils and soils similar to Wulfert soils, but with limestone at a depth of 20 to 40 inches.

The water table fluctuates with the tide. Areas are subject to tidal flooding. The available water capacity is high in the organic horizons and low in the horizons below. Natural fertility is medium. Permeability is rapid. Natural vegetation consists of American mangrove, black mangrove, and needlegrass.

**(24) Kesson fine sand** - This is a nearly level, very poorly drained soil in broad tidal swamps. Areas are subject to tidal flooding. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is about 6 inches of sand that contains shell fragments. The underlying layers are fine sand that contains shell fragments, and they extend to a depth of 80 inches or more. The upper 4 inches is pale brown, the next 3 inches is light brown, the next 25 inches is light gray with dark gray streaks, and the lower 42 inches is white.

Included with this soil in mapping are areas of Captiva and Wulfert soils and soils that have organic surface layers. Also included are soils that have loamy material throughout. Included soils make up about 10 to 15 percent of any mapped area.

The water table fluctuates with the tide. The available water capacity is low. Natural fertility is low. Permeability is moderately rapid or rapid.

Natural vegetation consists of black mangrove, batis, oxeye daisy, and American mangrove.

## Cayo Costa State Park Soil Descriptions

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**(48) St. Augustine sand** - This is a nearly level, somewhat poorly drained soil that was formed by earthmoving operations. Most areas are former sloughs and depressions or other low areas that have been filled with sandy material. Slopes are smooth to slightly convex and range from 0 to 2 percent.

This soil has no definite horizonation because of mixing during reworking of the fill material. Typically, the upper 30 inches consists of mixed very dark grayish brown, very dark gray, dark gray, and gray sand with a few lenses of silt loam; it is about 20 percent multicolored shell fragments less than 3 inches in diameter. Below this to a depth of 80 inches or more there is undisturbed fine sand. The upper 10 inches is dark grayish brown with about 15 percent multicolored shell fragments. The lower 40 inches is light gray with about 30 percent multicolored shell fragments.

Included with this soil in mapping are areas where the fill material is underlain by organic soils and other areas where the fill material is less than 20 inches thick. Also included are areas that contain lenses or pockets of organic material throughout the fill. In addition, there are small scattered areas where the fill material is more than 35 percent shells or shell fragments. Several areas with some urban development have been included.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is 24 to 36 inches below the surface of the fill material for 2-4 months. It is below a depth of 60 inches during extended dry periods.

The available water capacity is low. Permeability is estimated to be rapid. Natural fertility is low.

Most of the natural vegetation has been removed. The present vegetation consists of cabbage palm and various scattered weeds.

This soil is poorly suited to most plants unless topsoil is spread over the surface to make a suitable root zone.

This soil has severe limitations for most urban and recreational uses. The sandy nature of the fill material, the high-water table, and rapid permeability can cause pollution of ground water in areas with septic tank adsorption fields.

This St. Augustine soil is in capability subclass VIIc.





## **Addendum 5—Plant and Animal List**



## Cayo Costa State Park Plants

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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### PTERIDOPHYTES

Giant leather fern.....	<i>Acrostichum danaeifolium</i>	
Toothed midsorus fern;		
Swamp fern.....	<i>Blechnum serrulatum</i>	
Wild Boston fern .....	<i>Nephrolepis exaltata</i>	
Golden polypody .....	<i>Phlebodium aureum</i>	
Resurrection fern .....	<i>Pleopeltis polypodioides</i> var. <i>michauxiana</i>	
Whisk fern .....	<i>Psilotum nudum</i>	
Lacy bracken .....	<i>Pteridium aquilinum</i> var. <i>caudatum</i>	
Tailed bracken .....	<i>Pteridium aquilinum</i> var. <i>pseudocaudatum</i>	
Widespread maiden fern;		
Southern shield fern.....	<i>Thelypteris kunthii</i>	
Marsh fern .....	<i>Thelypteris palustris</i> var. <i>pubescens</i>	
Shoestring fern.....	<i>Vittaria lineata</i>	
Virginia chain fern.....	<i>Woodwardia virginica</i>	

### GYMNOSPERMS

Slash pine .....	<i>Pinus elliottii</i>	
Coontie.....	<i>Zamia pumila</i>	

### ANGIOSPERMS

#### Monocots

False sisal .....	<i>Agave decipiens</i>	
Sisal hemp* .....	<i>Agave sisalana</i>	
Bushy bluestem .....	<i>Andropogon glomeratus</i> var. <i>pumilus</i>	
Broomsedge bluestem .....	<i>Andropogon virginicus</i>	
Broomsedge bluestem .....	<i>Andropogon virginicus</i> var. <i>decipiens</i>	
Tall threeawn .....	<i>Aristida patula</i>	
Arrowfeather threeawn .....	<i>Aristida purpurascens</i>	
Sprenger's asparagus-fern* .....	<i>Asparagus aethiopicus</i>	
Common asparagus-fern* .....	<i>Asparagus setaceus</i>	
Common carpetgrass.....	<i>Axonopus fissifolius</i>	
Hairy gramma .....	<i>Bouteloua hirsuta</i>	
Coastal sandbur.....	<i>Cenchrus spinifex</i>	
Jamaica swamp sawgrass.....	<i>Cladium jamaicense</i>	
Coconut palm* .....	<i>Cocos nucifera</i>	
Whitemouth dayflower.....	<i>Commelina erecta</i>	
String-lily; Seven sisters.....	<i>Crinum americanum</i>	
Bermudagrass* .....	<i>Cynodon dactylon</i>	
Poorland flatsedge .....	<i>Cyperus compressus</i>	
Swamp flatsedge .....	<i>Cyperus ligularis</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Pine-barren flatsedge .....	<i>Cyperus ovatus</i>	
Flat leaf flatsedge .....	<i>Cyperus planifolius</i>	
Many spike flatsedge .....	<i>Cyperus polystachyos</i>	
Fourangle flatsedge .....	<i>Cyperus tetragonus</i>	
Durban crowfootgrass* .....	<i>Dactyloctenium aegyptium</i>	
Needleleaf witchgrass .....	<i>Dichantherium aciculare</i>	
Cypress witchgrass .....	<i>Dichantherium dichotomum</i>	
Hemlock witchgrass.....	<i>Dichantherium portoricense</i>	
Southern crabgrass .....	<i>Digitaria ciliaris</i>	
Slender crabgrass;		
Shaggy crabgrass .....	<i>Digitaria filiformis</i>	
Saltgrass .....	<i>Distichlis spicata</i>	
Indian goosegrass* .....	<i>Eleusine indica</i>	
Tampa butterfly orchid .....	<i>Encyclia tampensis</i>	
Gophertail lovegrass.....	<i>Eragrostis ciliaris</i>	
Pinewoods fingergrass .....	<i>Eustachys petraea</i>	
Carolina fimbry .....	<i>Fimbristylis caroliniana</i>	
Hurricanegrass .....	<i>Fimbristylis cymosa</i>	
Marsh fimbry .....	<i>Fimbristylis spadicea</i>	
Spiked crested coralroot .....	<i>Hexalectris spicata</i> .....	MAH
Mangrove spiderlily .....	<i>Hymenocallis latifolia</i>	
Smallcane; Florida tibisee .....	<i>Lasiacis divaricata</i>	
Rose natalgrass* .....	<i>Melinis repens</i>	
Hairawn muhly .....	<i>Muhlenbergia capillaris</i>	
Monk orchid* .....	<i>Oeceoclades maculata</i>	
Bitter Panicgrass .....	<i>Panicum amarum</i>	
Beaked panicum .....	<i>Panicum anceps</i>	
Switchgrass.....	<i>Panicum virgatum</i>	
Blue crowngrass .....	<i>Paspalum caespitosum</i>	
Bahiagrass* .....	<i>Paspalum notatum</i>	
Thin paspalum .....	<i>Paspalum setaceum</i>	
Seashore paspalum .....	<i>Paspalum vaginatum</i>	
Senegal date palm* .....	<i>Phoenix reclinata</i>	
Starrush whitetop .....	<i>Rhynchospora colorata</i>	
Gray's beaksedge.....	<i>Rhynchospora grayi</i>	
Southern beaksedge.....	<i>Rhynchospora microcarpa</i>	
Wigeon-grass .....	<i>Ruppia maritima</i>	
Cabbage palm .....	<i>Sabal palmetto</i>	
Duck potato;		
Common arrowhead .....	<i>Sagittaria latifolia</i>	
Bowstring hemp;		
Mother-in-law's tongue* .....	<i>Sansevieria hyacinthoides</i>	
Tall nutgrass; Whip nutrush .....	<i>Scleria triglomerata</i>	
Saw-palmetto.....	<i>Serenoa repens</i>	
Sea purslane .....	<i>Sesuvium portulacastrum</i>	
Coastal foxtail; Coastal		

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
bristlegrass .....	<i>Setaria corrugata</i>	
Coral foxtail; Coral		
bristlegrass .....	<i>Setaria macrosperma</i>	
Knotroot foxtail; Yellow		
bristlegrass .....	<i>Setaria parviflora</i>	
Narrowleaf blue-eyed grass .....	<i>Sisyrinchium angustifolium</i>	
Ear-leaf greenbriar .....	<i>Smilax auriculata</i>	
Sand cordgrass .....	<i>Spartina bakeri</i>	
Saltmeadow cordgrass .....	<i>Spartina patens</i>	
Coral dropseed .....	<i>Sporobolus domingensis</i>	
Smutgrass* .....	<i>Sporobolus indicus</i>	
West Indian dropseed* .....	<i>Sporobolus indicus</i> var. <i>pyramidalis</i>	
Seashore dropseed .....	<i>Sporobolus virginicus</i>	
St. Augustinegrass .....	<i>Stenotaphrum secundatum</i>	
American evergreen* .....	<i>Syngonium podophyllum</i>	
Northern needleleaf .....	<i>Tillandsia balbisiana</i> .....	MS, MAH
Cardinal airplant;		
Common wild-pine .....	<i>Tillandsia fasciculata</i> .....	MS, MAH
Twisted airplant;		
Banded airplant .....	<i>Tillandsia flexuosa</i> .....	MS, MAH
Potbelly airplant .....	<i>Tillandsia paucifolia</i>	
Ballmoss .....	<i>Tillandsia recurvata</i>	
Southern needleleaf .....	<i>Tillandsia setacea</i>	
Spanish moss .....	<i>Tillandsia usneoides</i>	
Giant airplant; Giant wild-pine ..	<i>Tillandsia utriculata</i> .....	MS, MAH
Purple queen* .....	<i>Tradescantia pallida</i>	
Purple sandgrass .....	<i>Triplasis purpurea</i>	
Eastern gamagrass;		
Fakahatcheegrass .....	<i>Tripsacum dactyloides</i>	
Southern cattail .....	<i>Typha domingensis</i>	
Sea oats .....	<i>Uniola paniculata</i>	
Tropical signalgrass .....	<i>Urochloa distachya</i>	
Washington fan palm* .....	<i>Washingtonia robusta</i>	
Elliot's yellow-eyed grass .....	<i>Xyris elliotii</i>	
Spanish bayonet .....	<i>Yucca aloifolia</i>	
Manila templegrass .....	<i>Zoysia matrella</i>	

### DICOTS

Rosary pea* .....	<i>Abrus precatorius</i>	
Earleaf Acacia* .....	<i>Acacia auriculiformis</i>	
Triangle Cactus .....	<i>Acanthocereus tetragonus</i> .....	SHM, MAH
Devil's horsewhip .....	<i>Achyranthes aspera</i> L. var. <i>pubescens</i>	
Beach false foxglove .....	<i>Agalinis fasciculata</i>	
Seminole false foxglove .....	<i>Agalinis filifolia</i>	
Saltmarsh false foxglove .....	<i>Agalinis maritima</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Golden trumpet*	<i>Allamanda cathartica</i>	
Yellow joyweed	<i>Alternanthera flavescens</i>	
Alligatorweed*	<i>Alternanthera philoxeroides</i>	
Southern amaranth	<i>Amaranthus australis</i>	
Florida amaranth	<i>Amaranthus floridanus</i>	
Common ragweed	<i>Ambrosia artemisiifolia</i>	
Coastal ragweed	<i>Ambrosia hispida</i>	
Toothcups; Pink redstem	<i>Ammannia latifolia</i>	
Bastard false indigobush	<i>Amorpha fruticosa</i>	
Marlberry	<i>Ardisia escallonioides</i>	
Whorled milkweed	<i>Asclepias verticillata</i>	
Showy milkworty	<i>Asemeia violacea</i>	
Crested saltbush	<i>Atriplex pentandra</i>	
Black mangrove	<i>Avicennia germinans</i>	
Saltwater false willow	<i>Baccharis angustifolia</i>	
Groundsel tree;		
Sea myrtle	<i>Baccharis halimifolia</i>	
Herb-of-grace	<i>Bacopa monnieri</i>	
Saltwort; Turtleweed	<i>Batis maritima</i>	
Orchid tree*	<i>Bauhinia variegata</i>	
Beggarticks; Romerillo	<i>Bidens alba</i>	
Silverhead; Saphire	<i>Blutaparon vermiculare</i>	
Scarlet spiderling	<i>Boerhavia coccinea</i>	
Smallhead doll's-daisy	<i>Boltonia diffusa</i>	
Bushy seaside oxeye	<i>Borrichia frutescens</i>	
American bluehearts	<i>Buchnera americana</i>	
Watergrass*	<i>Bulbostylis barbata</i>	
Gumbo limbo	<i>Bursera simaruba</i>	
Gray nicker	<i>Caesalpinia bonduc</i>	
Coastal searocket	<i>Cakile lanceolata</i>	
American beautyberry	<i>Callicarpa americana</i>	
Baybean; Seaside jackbean	<i>Canavalia rosea</i>	
Goatweed	<i>Capraria biflora</i>	
Bird pepper	<i>Capsicum annuum</i> var. <i>glabriusculum</i>	
Tabasco pepper	<i>Capsicum frutescens</i>	
Papaya	<i>Carica papaya</i>	
Natal plum*	<i>Carissa macrocarpa</i>	
Love vine; Devil's gut	<i>Cassytha filiformis</i>	
Australian pine*	<i>Casuarina equisetifolia</i>	
Madagascar periwinkle*	<i>Catharanthus roseus</i>	
West Indian cock's comb	<i>Celosia nitida</i>	MAH, SHM
Spurred butterfly-pea	<i>Centrosema virginianum</i>	
Night flowering jessamine*	<i>Cestrum nocturnum</i>	
Partridge pea	<i>Chamaecrista fasciculata</i>	
Sensitive pea	<i>Chamaecrista nictitans</i> var. <i>aspera</i>	
Limestone sandmat	<i>Chamaesyce blodgettii</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Dixie sandmat .....	<i>Chamaesyce bombensis</i>	
Pillpod sandmat .....	<i>Chamaesyce hirta</i>	
Hyssopleaf sandmat .....	<i>Chamaesyce hyssopifolia</i>	
Spotted sandmat .....	<i>Chamaesyce maculata</i>	
Coastal beach sandmat .....	<i>Chamaesyce mesembrianthemifolia</i>	
Snowberry; Milkberry .....	<i>Chiococca alba</i>	
Coco plum .....	<i>Chrysobalanus icaco</i>	
Bush goldenrod; Woody goldenrod .....	<i>Chrysoma pauciflosculosa</i>	
Coastal plain golden aster .....	<i>Chrysopsis scabrella</i>	
Purple thistle .....	<i>Cirsium horridulum</i>	
Sorrelvine; Marinevine .....	<i>Cissus trifoliata</i>	
Tread softly .....	<i>Cnidoscolus stimulosus</i>	
Seagrape .....	<i>Coccoloba uvifera</i>	
Buttonwood .....	<i>Conocarpus erectus</i>	
Canadian horseweed .....	<i>Conyza canadensis</i>	
Leavenworth's tickseed .....	<i>Coreopsis leavenworthii</i>	
Pine-barren frostweed .....	<i>Crocanthemum corymbosum</i>	
Shakeshake* .....	<i>Crotalaria incana</i>	
Smooth rattlebox* .....	<i>Crotalaria pallida</i> var. <i>obovata</i>	
Low rattlebox .....	<i>Crotalaria pumila</i>	
Pursh's rattlebox .....	<i>Crotalaria purshii</i>	
Rattleweed .....	<i>Crotalaria retusa</i>	
Rabbit-bells .....	<i>Crotalaria rotundifolia</i>	
Vente conmigo .....	<i>Croton glandulosus</i> var. <i>floridanus</i>	
Seaside croton .....	<i>Croton punctatus</i>	
Madagascar rubbervine* .....	<i>Cryptostegia madagascariensis</i>	
Fiveangled dodder .....	<i>Cuscuta pentagona</i>	
Leafless swallowwort .....	<i>Cynanchum scoparium</i>	
Coinvine .....	<i>Dalbergia ecastaphyllum</i>	
Whitetassels .....	<i>Dalea carnea</i>	
Dixie ticktrefoil .....	<i>Desmodium tortuosum</i>	
Sixangle foldwing .....	<i>Dicliptera sexangularis</i>	
Varnish leaf .....	<i>Dodonaea viscosa</i>	
West Indian chickweed; Drymary* .....	<i>Drymaria cordata</i>	
Lilac tasselflower* .....	<i>Emilia sonchifolia</i>	
American burnweed; Fireweed .....	<i>Erechtites hieraciifolius</i>	
Oakleaf fleabane .....	<i>Erigeron quercifolius</i>	
Beach creeper .....	<i>Ernodea littoralis</i>	
Coralbean .....	<i>Erythrina herbacea</i>	
White stopper .....	<i>Eugenia axillaris</i>	
Spanish stopper .....	<i>Eugenia foetida</i>	
Surinam cherry* .....	<i>Eugenia uniflora</i>	
Dogfennel .....	<i>Eupatorium capillifolium</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Slender dwarf morning-glory ....	<i>Evolvulus alsinoides</i>	
Strangler fig .....	<i>Ficus aurea</i>	
Indian laurel* .....	<i>Ficus microcarpa</i>	
Florida yellowtops .....	<i>Flaveria floridana</i>	
Narrowleaf yellowtops .....	<i>Flaveria linearis</i>	
Florida swamp privet .....	<i>Forestiera segregata</i>	
Southern umbrella sedge .....	<i>Fuirena scirpoidea</i>	
White twinevine .....	<i>Funastrum clausum</i>	
Downy milkpea .....	<i>Galactia regularis</i>	
Coastal bedstraw .....	<i>Galium hispidulum</i>	
Caribbean purple everlasting ....	<i>Gamochaeta antillana</i>	
Seven-year apple.....	<i>Genipa clusiifolia</i>	
Silk oak* .....	<i>Grevillea robusta</i>	
Prickly apple cactus;		
West coast prickly-apple .....	<i>Harrisia aboriginum</i>	CS, MAH
East coast dune sunflower.....	<i>Helianthus debilis</i>	
West coast dune sunflower.....	<i>Helianthus debilis</i> subsp. <i>vestitus</i>	BD, CG
Scorpion tail .....	<i>Heliotropium angiospermum</i>	
Seaside heliotrope;		
Salt heliotrope .....	<i>Heliotropium curassavicum</i>	
Bladder mallow .....	<i>Herissantia crispa</i>	
Camphor weed .....	<i>Heterotheca subaxillaris</i>	
Coastalplain hawkweed.....	<i>Hieracium megacephalon</i>	
Roundleaf bluet .....	<i>Houstonia procumbens</i>	
Manyflower marshpennywort ....	<i>Hydrocotyle umbellata</i>	
Nightblooming cactus* .....	<i>Hylocereus undatus</i>	
Moonflower .....	<i>Ipomoea alba</i>	
Beach morning-glory .....	<i>Ipomoea imperati</i>	
Ocean-blue morning-glory.....	<i>Ipomoea indica</i>	
Railroad vine .....	<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>	
Saltmarsh morning-glory .....	<i>Ipomoea sagittata</i>	
Beach moonflower.....	<i>Ipomoea violacea</i>	
Juba's bush .....	<i>Iresine diffusa</i>	
Big-leaf marsh elder .....	<i>Iva frutescens</i>	
Beach elder .....	<i>Iva imbricata</i>	
Scarlet jungleflame* .....	<i>Ixora coccinea</i>	
Joewood .....	<i>Jacquinia keyensis</i>	CS, CG, MAH
Chandelier plant* .....	<i>Kalanchoe delagoensis</i>	
Life plant; Cathedral bells* ....	<i>Kalanchoe pinnata</i>	
Virginia saltmarsh mallow .....	<i>Kosteletzkya pentacarpos</i>	
White mangrove .....	<i>Laguncularia racemosa</i>	
Lantana; Shrub verbena*.....	<i>Lantana camara</i>	
Buttonsage.....	<i>Lantana involucrata</i>	
Trailing shrub verbena.....	<i>Lantana montevidensis</i>	
Pineland pinweed .....	<i>Lechea sessiliflora</i>	
Virginia pepperweed.....	<i>Lepidium virginicum</i>	

\* Non-native Species



## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
White leadtree*	<i>Leucaena leucocephala</i>	
Gopher apple.....	<i>Licania michauxii</i>	
Carolina sea lavender .....	<i>Limonium carolinianum</i>	
Coral honeysuckle.....	<i>Lonicera sempervirens</i>	
Small fruit primrosewillow .....	<i>Ludwigia microcarpa</i>	
Creeping primrosewillow .....	<i>Ludwigia repens</i>	
Christmasberry .....	<i>Lycium carolinianum</i>	
Garden tomato*.....	<i>Lycopersicon esculentum</i>	
False mallow .....	<i>Malvastrum corchorifolium</i>	
Mazapan; Turkscape mallow*.....	<i>Malvaviscus penduliflorus</i>	
Mango* .....	<i>Mangifera indica</i>	
Florida mayten .....	<i>Maytenus phyllanthoides</i>	CS, SHM
Axilflower.....	<i>Mecardonia acuminata</i> subsp. <i>peninsularis</i>	
Snow squarestem .....	<i>Melanthera nivea</i>	
Chocolate weed*.....	<i>Melochia corchorifolia</i>	
Creeping cucumber .....	<i>Melothria pendula</i>	
Poorman's patch; Stickleaf .....	<i>Mentzelia floridana</i>	
Noyau vine.....	<i>Merremia dissecta</i>	
Climbing hempvine.....	<i>Mikania scandens</i>	
Balsampear* .....	<i>Momordica charantia</i>	
Spotted beebalm.....	<i>Monarda punctata</i>	
Wax myrtle .....	<i>Myrica cerifera</i>	
Chiggery grape .....	<i>Myriopus volubilis</i>	
Myrsine.....	<i>Myrsine cubana</i>	
Tropical puff .....	<i>Neptunia pubescens</i>	
Oleander* .....	<i>Nerium oleander</i>	
Seaside evening-primrose .....	<i>Oenothera humifusa</i>	
Southern beeblossom .....	<i>Oenothera simulans</i>	
Clustered millie graines.....	<i>Oldenlandia uniflora</i>	
Prickly-pear cactus .....	<i>Opuntia humifusa</i>	
Shell-mound prickly-pear .....	<i>Opuntia stricta</i>	BD, CS, CG
Leafless swallowwort .....	<i>Orthosia scoparia</i>	
Butterweed .....	<i>Packera glabella</i>	
Florida pellitory.....	<i>Parietaria floridana</i>	
American nailwort .....	<i>Paronychia americana</i>	
Papey nailwort.....	<i>Paronychia chartacea</i>	
Coastalplain nailwort .....	<i>Paronychia herniarioides</i>	
Pineland nailwort .....	<i>Paronychia patula</i>	
Rugel's nailwort .....	<i>Paronychia rugelii</i>	
Virginia creeper .....	<i>Parthenocissus quinquefolia</i>	
Corkystem passion flower .....	<i>Passiflora suberosa</i>	
Spreading cinchweed.....	<i>Pectis prostrata</i>	
Devil's backbone .....	<i>Pedilanthus tithymaloides</i> subsp. <i>smallii</i>	
Red bay .....	<i>Persea borbonia</i>	
Swamp smartweed; mild waterpepper .....	<i>Persicaria hydropiperoides</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Guinea hen weed .....	<i>Petiveria alliacea</i>	
Capeweed; Turkey tangle fogfruit .....	<i>Phyla nodiflora</i>	
Drummond's leaf flower .....	<i>Phyllanthus abnormis</i>	
Coastal groundcherry .....	<i>Physalis angustifolia</i>	
Walter's groundcherry .....	<i>Physalis walteri</i>	
Pokeweed .....	<i>Phytolacca americana</i>	
Jamaican dogwood .....	<i>Piscidia piscipula</i>	
Devil's claw; Pullback .....	<i>Pisonia aculeata</i>	
Cat's claw .....	<i>Pithecellobium unguis-cati</i>	
Rosy camphorweed .....	<i>Pluchea baccharis</i>	
Sweetscent .....	<i>Pluchea odorata</i>	
Painted leaf .....	<i>Poinsettia cyathophora</i>	
Boykin's milkwort .....	<i>Polygala boykinii</i>	
Procession flower .....	<i>Polygala incarnata</i>	
Swamp smartweed; Rustweed; Juniperleaf .....	<i>Polypremum procumbens</i>	
Little Hogweed* .....	<i>Portulaca oleracea</i>	
Pink purslane .....	<i>Portulaca pilosa</i>	
Red-stem purslane .....	<i>Portulaca rubricaulis</i>	
Sweet everlasting; Rabbit tobacco .....	<i>Pseudognaphalium obtusifolium</i>	
Guava* .....	<i>Psidium guajava</i>	
Wild coffee .....	<i>Psychotria nervosa</i>	
Blackroot .....	<i>Pterocaulon pycnostachyum</i>	
Mock bishopsweed .....	<i>Ptilimnium capillaceum</i>	
Jamaican capertree .....	<i>Quadrella jamaicensis</i>	
Live oak .....	<i>Quercus virginiana</i>	
White indigo-berry .....	<i>Randia aculeata</i>	
Red mangrove .....	<i>Rhizophora mangle</i>	
Michaux's snoutbean .....	<i>Rhynchosia michauxii</i>	
Rougeplant .....	<i>Rivina humilis</i>	
Annual glasswort .....	<i>Salicornia bigelovii</i>	
Carolina willow .....	<i>Salix caroliniana</i>	
Tropical sage .....	<i>Salvia coccinea</i>	
Southern river sage .....	<i>Salvia misella</i>	
Water pimpernel; Limewater brooksweed .....	<i>Samolus ebracteatus</i>	
Pineland pimpernel; Seaside brooksweed .....	<i>Samolus valerandi</i> subsp. <i>parviflorus</i>	
Perennial glasswort .....	<i>Sarcocornia ambigua</i>	
Inkberry .....	<i>Scaevola plumieri</i> .....	BD, CS, CG
Beach naupaka* .....	<i>Scaevola taccada</i> var. <i>sericea</i>	
Australian umbrella tree; Octopus tree* .....	<i>Schefflera actinophylla</i>	
Brazilian pepper* .....	<i>Schinus terebinthifolia</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Sweetbroom; Licoriceweed.....	<i>Scoparia dulcis</i>	
Princess-of-the-night* .....	<i>Selenicereus pteranthus</i>	
Glossy shower* .....	<i>Senna surattensis</i>	
Gulf coast swallowwort .....	<i>Seutera angustifolia</i>	
Elliott's fanpetal.....	<i>Sida elliotii</i>	
Broomweed.....	<i>Sida ulmifolia</i>	
Saffron plum .....	<i>Sideroxylon celastrinum</i>	
False mastic .....	<i>Sideroxylon foetidissimum</i>	
American black nightshade.....	<i>Solanum americanum</i>	
Black nightshade.....	<i>Solanum chenopodioides</i>	
Chapman's goldenrod .....	<i>Solidago odora</i> var. <i>chapmanii</i>	
Seaside goldenrod.....	<i>Solidago sempervirens</i>	
Spiny sow-thistle* .....	<i>Sonchus asper</i>	
Common sow-thistle* .....	<i>Sonchus oleraceus</i>	
Yellow necklace pod* .....	<i>Sophora tomentosa</i> var. <i>occidentalis</i>	
Yellow necklace pod .....	<i>Sophora tomentosa</i> var. <i>truncata</i>	
Prostrate false buttonweed.....	<i>Spermacoce prostrata</i>	
Woodland false buttonweed.....	<i>Spermacoce remota</i>	
Creeping oxeye* .....	<i>Sphagneticola trilobata</i>	
Blue porterweed .....	<i>Stachytarpheta jamaicensis</i>	
Common chickweed.....	<i>Stellaria media</i>	
Diamond-flowers.....	<i>Stenaria nigricans</i>	
Pineland scalypink.....	<i>Stipulicida setacea</i>	
Sea blite .....	<i>Suaeda linearis</i>	
Bay cedar .....	<i>Suriana maritima</i>	
Annual saltmarsh aster .....	<i>Symphotrichum subulatum</i>	
Java plum .....	<i>Syzygium cumini</i>	
Cape honeysuckle* .....	<i>Tecoma capensis</i>	
Australian almond* .....	<i>Terminalia muelleri</i>	
Portia tree* .....	<i>Thespesia populnea</i>	
Blackeyed susan vine*.....	<i>Thunbergia alata</i>	
Poison ivy .....	<i>Toxicodendron radicans</i>	
Jamacian feverplant*.....	<i>Tribulus cistoides</i>	
Forked bluecurls .....	<i>Trichostema dichotomum</i>	
Coat buttons* .....	<i>Tridax procumbens</i>	
Florida valerian.....	<i>Valeriana scandens</i>	
White crownbeard;		
Frost weed .....	<i>Verbesina virginica</i>	
Giant ironweed .....	<i>Vernonia gigantea</i>	
Four-leaf vetch .....	<i>Vicia acutifolia</i>	
Hairy pod cowpea .....	<i>Vigna luteola</i>	
Summer grape .....	<i>Vitis aestivalis</i>	
Muscadine .....	<i>Vitis rotundifolia</i>	
Sleepy morning .....	<i>Waltheria indica</i>	
Tallowwood; Hog plum .....	<i>Ximenia americana</i>	
Hercules'-club.....	<i>Zanthoxylum clava-herculis</i>	

\* Non-native Species

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
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Wild lime; Lime pricklyash..... *Zanthoxylum fagara*

### INVERTEBRATES

#### ECHINODERMS

Purple sea urchin .....	<i>Arbacia punctulata</i> .....	MUS
Lined sea star .....	<i>Luidia clathrata</i> .....	MUS
Nine-armed seastar .....	<i>Luidia senegalensis</i> .....	MUS
Short-spined urchin .....	<i>Lytechinus variegatus</i> .....	MUS
Five-holed keyhole urchin .....	<i>Mellita quinquesperforata</i> .....	MUS

#### GASTROPODS

Mottled sea hare .....	<i>Aplysia brasiliiana</i> .....	MUS
Striate bubble .....	<i>Bulla striata</i> .....	MUS
Lightning whelk .....	<i>Busycon sinistrum</i> .....	MUS
Pear whelk .....	<i>Busycotypus spiratus</i> .....	MUS
Jujube topsnail .....	<i>Calliostoma jujubinum</i> .....	MUS
Common nutmeg .....	<i>Cacellaria reticulata</i> .....	MUS
Ribbed canthari .....	<i>Cantharus multangulus</i> .....	MUS
Mauve-mouth drill .....	<i>Calotrophon ostrearum</i> .....	MUS
Fly specked cerith .....	<i>Cerithium muscarum</i> .....	MUS
Lace murex .....	<i>Chicoreus dilectus</i> .....	MUS
Apple murex .....	<i>Chicoreus pomum</i> .....	MUS
Florida cone .....	<i>Conus anabathrum</i> .....	MUS
Alphabet cone .....	<i>Conus spurius atlanticus</i> .....	MUS
Spiny slippersnail .....	<i>Crepidula aculeata</i> .....	MUS
Eastern white slippersnail .....	<i>Crepidula atrasolea</i> .....	MUS
Atlantic slippersnail .....	<i>Crepidula fornicata</i> .....	MUS
Spotted slippersnail .....	<i>Crepidula maculosa</i> .....	MUS
Cayenne keyhole limpet .....	<i>Diodora meta</i> .....	MUS
Banded tulip .....	<i>Fasciolaria liliium</i> .....	MUS
True tulip .....	<i>Fasciolaria tulipa</i> .....	MUS
Atlantic figsnail .....	<i>Ficus papyratia</i> .....	MUS
Crown conch .....	<i>Melongena corona</i> .....	MUS
Colorful moon snail .....	<i>Naticarius canrena</i> .....	MUS
Shark's eye .....	<i>Neverita duplicata</i> .....	MUS
Coffeebean trivia .....	<i>Niveria pediculus</i> .....	MUS
Lettered olive .....	<i>Oliva sayana</i> .....	MUS
Scotch bonnet .....	<i>Phalium granulatum</i> .....	MUS
Milk moon snail .....	<i>Polinices lacteus</i> .....	MUS
Tinted canthari .....	<i>Pollia tincta</i> .....	MUS

## Cayo Costa State Park Plants

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Atlantic marginella .....	<i>Prunum apicinum</i> .....	MUS
Junonia.....	<i>Scaphella junonia</i> .....	MUS
White baby's ear .....	<i>Sinum perspectivum</i> .....	MUS
Florida fighting conch .....	<i>Strombus alatus</i> .....	MUS
Common American auger .....	<i>Terebra dislocata</i> .....	MUS
Florida horse conch .....	<i>Triplofusus giganteus</i> .....	MUS
Chesnut turbans .....	<i>Turbo castanea</i> .....	MUS
Gulf oyster drill.....	<i>Urosalpinx perrugata</i> .....	MUS
Florida wormsnails .....	<i>Vermicularia knorrrii</i> .....	MUS
Sanibel turrets.....	<i>Zonulispira crocata</i> .....	MUS

### BIVALVES

Cut-ribbed ark .....	<i>Anadara floridana</i> .....	MUS
Transverse ark.....	<i>Anadara ovalis</i> .....	MUS
Buttercup lucine.....	<i>Anodontia alba</i> .....	MUS
Pointed venus clam .....	<i>Anomalocardia auberiana</i> .....	MUS
Common jingle shell.....	<i>Anomia ephipium</i> .....	MUS
Mossy ark .....	<i>Arca imbricata</i> .....	MUS
Turkey wing .....	<i>Arca zebra</i> .....	MUS
Florida spiny jewelbox .....	<i>Archinella cornuta</i> .....	MUS
Atlantic calico scallop.....	<i>Argopecten gibbus</i> .....	MUS
Atlantic bay scallop .....	<i>Argopecten irradians</i> .....	MUS
Stiff penshell .....	<i>Atrina rigida</i> .....	MUS
Sawtooth penshell.....	<i>Atrina serarata</i> .....	MUS
Fallen angelwing .....	<i>Barnea truncata</i> .....	MUS
Broad-ribbed cardita.....	<i>Carditamera floridana</i> .....	MUS
Scaly scallop .....	<i>Caribachlamys muscosus</i> .....	MUS
Leafy jewelbox.....	<i>Chama macerophylla</i> .....	MUS
Cross-barred venus clam .....	<i>Chione elevata</i> .....	MUS
Imperial venus clam.....	<i>Chione latilirata</i> .....	MUS
Eastern oyster .....	<i>Crassostrea virginica</i> .....	MUS
Angelwing .....	<i>Cyrtopleura costata</i> .....	MUS
Atlantic giant cockle .....	<i>Dinocardium robustum</i> .....	MUS
Cross-hatched lucine .....	<i>Divaricella quadrisulcata</i> .....	MUS
Coquina clam .....	<i>Donax variabilis</i> .....	MUS
Disc dosinia.....	<i>Dosinia discus</i> .....	MUS
Elegant dosinia .....	<i>Dosinia elegans</i> .....	MUS
Minor jackknife clam.....	<i>Ensis minor</i> .....	MUS
Ribbed mussel .....	<i>Geukensia demissa</i> .....	MUS
Comb bittersweet.....	<i>Glycymeris pectinata</i> .....	MUS
Common egg cockle .....	<i>Laevicardium laevigatum</i> .....	MUS
Rough scallop .....	<i>Lindapecten muscosus</i> .....	MUS
Thick buttercup lucine .....	<i>Lucina pectinata</i> .....	MUS
Pennsylvania lucine .....	<i>Lucina pensylvanica</i> .....	MUS
Calico clam.....	<i>Macrocallista maculata</i> .....	MUS

## Cayo Costa State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Sunray venus clam.....	<i>Macrocallista nimbosa</i> .....	MUS
Southern quahog .....	<i>Mercenaria campechiensis</i> .....	MUS
Ponderous ark .....	<i>Noetia ponderosa</i> .....	MUS
False angelwing .....	<i>Petriocolaria pholadiformis</i> .....	MUS
Atlantic pearl oyster .....	<i>Pinctada imbricata</i> .....	MUS
Atlantic kittenpaw .....	<i>Plicatula gibbosa</i> .....	MUS
Channeled duckclam.....	<i>Raeta plicatella</i> .....	MUS
Alternate tellin .....	<i>Tellina alternata</i> .....	MUS
Rose petal tellin .....	<i>Tellina lineata</i> .....	MUS
Speckled tellin .....	<i>Tellina listeri</i> .....	MUS
Tampa tellin .....	<i>Tellina tampaensis</i> .....	MUS
Florida pricklycockle .....	<i>Trachycardium egmontianum</i> .....	MUS
Yellow pricklycockle.....	<i>Trachycardium muricatum</i> .....	MUS

### JELLYFISH

Moon jellyfish .....	<i>Aurelia aurita</i> .....	MUS
Ovate comb jellyfish.....	<i>Beroe ovate</i> .....	MUS
Sea nettle .....	<i>Chrysaora quinquecirrha</i> .....	MUS

### ARTHROPODS

### CRUSTACEANS

Blue crab .....	<i>Callinectes sapidus</i> .....	MUS,
Striped hermit crab .....	<i>Clibanarius vittatus</i> .....	MUS
Horseshoe crab.....	<i>Limulus polyphemus</i> .....	MUS
Ghost crab .....	<i>Ocypode quadrata</i> .....	BD, MUS

## Cayo Costa State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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### VERTEBRATES

#### FISH

#### Sharks, Rays

Spotted eagle ray.....	<i>Aetobatus narinari</i> .....	MUS
Southern stingray .....	<i>Dasyatis Americana</i> .....	MUS
Bull shark .....	<i>Carcharhinus leucas</i> .....	MUS
Blacktip shark.....	<i>Carcharhinus limbatus</i> .....	MUS
Sandbar shark .....	<i>Carcharhinus plumbeus</i> .....	MUS
Nurse shark.....	<i>Ginglymostoma cirratum</i> .....	MUS
Bonnethead shark.....	<i>Sphyrna tiburo</i> .....	MUS

#### Bony Fishes

Sheepshead .....	<i>Archosargus probatocephalus</i> .....	MUS
Trumpet fish.....	<i>Aulostomus maculatus</i> .....	MUS
Gafftopsail catfish .....	<i>Bagre marinus</i> .....	MUS
Blue runner .....	<i>Caranx crysos</i> .....	MUS
Jack crevalle.....	<i>Caranx hippos</i> .....	MUS
Common snook.....	<i>Centropomus undecimalis</i> .....	MUS
Spotted seatrout .....	<i>Cynoscion nebulosus</i> .....	MUS
Ladyfish.....	<i>Elops saurus</i> .....	MUS
Goliath grouper.....	<i>Epinephelus itajara</i> .....	MUS
White grunt.....	<i>Haemulon plumierii</i> .....	MUS
Pinfish .....	<i>Lagodon rhomboides</i> .....	MUS
Mangrove snapper.....	<i>Lutjanus griseus</i> .....	MUS
Atlantic tarpon.....	<i>Megalops atlanticus</i> .....	MUS
Flathead mullet.....	<i>Mugil cephalus</i> .....	MUS
Gag grouper .....	<i>Mycteroperca microlepis</i> .....	MUS
Gulf flounder .....	<i>Paralichthys albiguttata</i> .....	MUS
Black drum.....	<i>Pogonias cromis</i> .....	MUS
Cobia.....	<i>Rachycentron canadum</i> .....	MUS
Red drum.....	<i>Sciaenops ocellatus</i> .....	MUS
Spanish mackerel.....	<i>Scomberomorus maculatus</i> .....	MUS
Southern puffer .....	<i>Sphoeroides nephelus</i> .....	MUS
Florida pompano .....	<i>Trachinotus carolinus</i> .....	MUS

## Cayo Costa State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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### AMPHIBIANS

#### Frogs and Toads

Florida cricket frog .....	Acris gryllus dorsalis .....	DM, MAH
Eastern narrowmouth toad .....	Gastrophryne carolinensis.....	DM, MAH
Green treefrog .....	Hyla cinerea.....	DM, MAH
Squirrel treefrog .....	Hyla squirella .....	DM, MAH
Southern leopard frog.....	Lithobates sphenoccephalus .....	DM, MAH
Cuban treefrog* .....	Osteopilus septentrionalis.....	MTC
Southern chorus frog .....	Pseudacris nigrita .....	DM

### REPTILES

#### Turtles and Tortoises

Loggerhead sea turtle.....	Caretta caretta.....	BD, MUS
Green sea turtle.....	Chelonia mydas.....	BD, MUS
Florida snapping turtle.....	Chelydra serpentina .....	BD, DM
Gopher tortoise.....	Gopherus polyphemus.....	CB, CS, CG
Striped mud turtle.....	Kinosternon baurii .....	DM, MH
Kemp's ridley sea turtle .....	Lepidochelys kempii.....	BD, MUS
Ornate diamondback terrapin ...	Malaclemys terrapin macrospilota.....	MS, MUS
Peninsula cooter .....	Pseudemys peninsularis .....	DM, MUS
Florida box turtle .....	Terrapene bauri.....	CS, MAH

#### Alligators and Crocodiles

American alligator .....	Alligator mississippiensis .....	DM, MAH, MUS
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#### Lizards

Green anole .....	Anolis carolinensis .....	MTC
Six-lined racerunner .....	Aspidoscelis sexlineatus .....	MTC
Black spinytail iguana* .....	Ctenosaura similis .....	DV
Southeastern five-lined skink ...	Eumeces inexpectatus.....	MTC
Brown anole* .....	Norops sagrei.....	MTC
Ground skink.....	Scincella lateralis.....	SM

#### Snakes

Southern black racer .....	Coluber constrictor priapus .....	MTC
Eastern diamondback .....	Crotalus adamanteus .....	CS, CG
Southern ringneck snake .....	Diadophis punctatus punctatus.....	MTC
Eastern indigo snake .....	Drymarchon couperi.....	CS, CG, DV

\* Non-native Species



## Cayo Costa State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Scarlet kingsnake.....	<i>Lampropeltis triangulum elapsoides</i> .....	MAH
Eastern coachwhip .....	<i>Masticophis flagellum flagellum</i> .....	CS, CG, MF
Mangrove salt marsh snake.....	<i>Nerodia clarkii compressicauda</i> .....	MS, MUS
Eastern ratsnake.....	<i>Pantherophis alleghaniensis</i> .....	MTC
Florida brown snake .....	<i>Storeria victa</i> .....	MF, MAH
Peninsula ribbon snake .....	<i>Thamnophis sauritus sackenii</i> .....	MTC

### BIRDS

#### Loons and Grebes

Common loon.....	<i>Gavia immer</i> .....	MUS
Horned grebe .....	<i>Podiceps auritus</i> .....	MUS

#### Albatrosses, Petrels, and Shearwaters

Sooty shearwater.....	<i>Puffinus griseus</i> .....	MUS
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#### Anhinga, Cormorants, Pelicans, and Frigatebirds

Anhinga .....	<i>Anhinga anhinga</i> .....	BM, BS, CDLK
Magnificent frigatebird.....	<i>Fregata magnificens</i> .....	MUS
Northern gannet .....	<i>Morus bassanus</i> .....	MUS
American white pelican .....	<i>Pelecanus erythrorhynchos</i> .....	MUS, OF
Brown pelican.....	<i>Pelecanus occidentalis</i> .....	MUS, OF
Double crested cormorant .....	<i>Phalacrocorax auritus</i> .....	MUS, MS

#### Wading Birds

Great egret .....	<i>Ardea alba</i> .....	BD, MUS, MAH, MS
Great blue heron.....	<i>Ardea herodias</i> .....	MS, MUS, DM
Cattle egret.....	<i>Bubulcus ibis</i> .....	MTC
Green heron .....	<i>Butorides virescens</i> .....	DM, MS, MUS
Little blue heron.....	<i>Egretta caerulea</i> .....	MUS, MS, BD
Reddish egret .....	<i>Egretta rufescens</i> .....	MUS
Snowy egret.....	<i>Egretta thula</i> .....	MUS, MS, BD
Tricolored heron.....	<i>Egretta tricolor</i> .....	MUS, MS, BD
White ibis.....	<i>Eudocimus albus</i> .....	MTC
Wood stork .....	<i>Mycteria americana</i> .....	MS
Yellow-crowned night heron .....	<i>Nyctanassa violacea</i> .....	MUS, MAH, MS
Black-crowned night heron.....	<i>Nycticorax nycticorax</i> .....	MUS, MAH, MS
Roseate spoonbill .....	<i>Platalea ajaja</i> .....	MUS
Glossy ibis.....	<i>Plegadis falcinellus</i> .....	MUS

## Cayo Costa State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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### Ducks, Geese, and Swans

Blue-winged teal .....	<i>Anas discors</i> .....	BM, BS, CDLK
Mottled duck .....	<i>Anas fulvigula</i> .....	OF
Lesser scaup .....	<i>Aythya affinis</i> .....	MUS, MS, DM
Canvasback.....	<i>Aythya valisineria</i> .....	MUS
Red-breasted merganser.....	<i>Mergus serrator</i> .....	MUS
Ruddy duck.....	<i>Oxyura jamaicensis</i> .....	MUS

### Diurnal Raptors

Cooper's hawk .....	<i>Accipiter cooperii</i> .....	OF
Sharp-shinned hawk.....	<i>Accipiter striatus</i> .....	OF
Short-tailed hawk .....	<i>Buteo brachyurus</i> .....	MTC
Red-tailed hawk.....	<i>Buteo jamaicensis</i> .....	OF
Red-shouldered hawk .....	<i>Buteo lineatus</i> .....	MTC
Broad-winged hawk.....	<i>Buteo platypterus</i> .....	OF
Turkey vulture .....	<i>Cathartes aura</i> .....	MTC
Northern harrier.....	<i>Circus cyaneus</i> .....	OF
Black vulture .....	<i>Coragyps atratus</i> .....	MTC
Swallow tailed kite .....	<i>Elanoides forficatus</i> .....	OF
Merlin .....	<i>Falco columbarius</i> .....	OF
Peregrine falcon.....	<i>Falco peregrinus</i> .....	BD, OF
Southeastern American kestrel .	<i>Falco sparverius paulus</i> .....	OF
Southern bald eagle .....	<i>Haliaeetus leucocephalus</i> .....	MTC
Osprey .....	<i>Pandion haliaetus</i> .....	MTC

### Quails

Northern bobwhite .....	<i>Colinus virginianus</i> .....	MF
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### Coots, Cranes, Gallinules, and Rails

American coot .....	<i>Fulica americana</i> .....	DM, MUS
Common gallinule .....	<i>Gallinula galeata</i> .....	DM
Purple gallinule .....	<i>Porphyrio martinica</i> .....	MUS, DM
Sora .....	<i>Porzana carolina</i> .....	DM
Clapper rail .....	<i>Rallus longirostris</i> .....	DM

### Shorebirds

Spotted sandpiper.....	<i>Actitis macularius</i> .....	MUS
Ruddy turnstone .....	<i>Arenaria interpres</i> .....	MUS
Sanderling .....	<i>Calidris alba</i> .....	MUS
Dunlin .....	<i>Calidris alpina</i> .....	MUS
Red knot.....	<i>Calidris canutus rufa</i> .....	MUS

## Cayo Costa State Park Animals

Common Name	Scientific Name	Primary Habitat Codes (for imperiled species)
Stilt sandpiper .....	<i>Calidris himantopus</i> .....	MUS
Western sandpiper .....	<i>Calidris mauri</i> .....	MUS
Pectoral sandpiper.....	<i>Calidris melanotos</i> .....	MUS
Least sandpiper .....	<i>Calidris minutilla</i> .....	MUS
Semipalmated sandpiper.....	<i>Calidris pusilla</i> .....	MUS
Piping plover .....	<i>Charadrius melodus</i> .....	BD, MUS
Snowy plover .....	<i>Charadrius nivosus</i> .....	BD, MUS
Semipalmated plover.....	<i>Charadrius semipalmatus</i> .....	BD, MUS
Killdeer.....	<i>Charadrius vociferus</i> .....	BD, MUS, CG
Wilson's plover .....	<i>Charadrius wilsonia</i> .....	BD, MUS
Common snipe.....	<i>Gallinago gallinago</i> .....	DM
American oystercatcher .....	<i>Haematopus palliatus</i> .....	MUS
Black-necked stilt.....	<i>Himantopus mexicanus</i> .....	MUS
Short-billed dowitcher .....	<i>Limnodromus griseus</i> .....	MUS
Long-billed dowitcher .....	<i>Limnodromus scolopaceus</i> .....	MUS
Marbled godwit .....	<i>Limosa fedoa</i> .....	MUS
Long-billed curlew.....	<i>Numenius americanus</i> .....	MUS
Whimbrel .....	<i>Numenius phaeopus</i> .....	MUS
Black-bellied plover .....	<i>Pluvialis squatarola</i> .....	MUS
American avocet .....	<i>Recurvirostra americana</i> .....	MUS
Lesser yellowlegs .....	<i>Tringa flavipes</i> .....	MUS
Greater yellowlegs .....	<i>Tringa melanoleuca</i> .....	MUS
Solitary sandpiper .....	<i>Tringa solitaria</i> .....	MUS
Willet.....	<i>Tringa semipalmata</i> .....	MUS

### Gulls, Terns, and Skimmers

Bonaparte's gull.....	<i>Chroicocephalus philadelphia</i> .....	MUS
Gull-billed tern.....	<i>Gelochelidon nilotica</i> .....	MUS
Caspian tern.....	<i>Hydroprogne caspia</i> .....	MUS
Herring gull .....	<i>Larus argentatus</i> .....	MUS
Ring-billed gull .....	<i>Larus delawarensis</i> .....	MUS
Great black-backed gull .....	<i>Larus marinus</i> .....	MUS
Laughing gull.....	<i>Leucophaeus atricilla</i> .....	MUS
Black tern .....	<i>Chlidonias niger</i> .....	MUS
Bridled tern.....	<i>Onychoprion anaethetus</i> .....	MUS
Black skimmer .....	<i>Rynchops niger</i> .....	BD, MUS
Least tern .....	<i>Sternula antillarum</i> .....	MUS
Forster's tern.....	<i>Sterna forsteri</i> .....	MUS
Common tern .....	<i>Sterna hirundo</i> .....	MUS
Royal tern .....	<i>Thalasseus maximus</i> .....	MUS
Sandwich tern .....	<i>Thalasseus sandvicensis</i> .....	MUS

### Alcids

Razorbill .....	<i>Alca torda</i> .....	MUS
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## Cayo Costa State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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### Pigeons and Doves

Common ground-dove .....	<i>Columbina passerina</i> .....	MTC
Eurasian collared-dove* .....	<i>Streptopelia decaocto</i> .....	MTC
Mourning dove .....	<i>Zenaida macroura</i> .....	MTC

### Old World Parrots

Budgerigar* .....	<i>Melopsittacus undulatus</i> .....	DV
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### Cuckoos

Yellow-billed cuckoo .....	<i>Coccyzus americanus</i> .....	MH, MS
Mangrove cuckoo .....	<i>Coccyzus minor</i> .....	MH, MS

### Owls

Great horned owl .....	<i>Bubo virginianus</i> .....	CS, MAH, MF
Eastern screech owl .....	<i>Megascops asio</i> .....	MAH
Barred owl .....	<i>Strix varia</i> .....	MAH
Barn owl .....	<i>Tyto alba</i> .....	MAH

### Goatsuckers and Swifts

Chuck-will's widow .....	<i>Caprimulgus carolinensis</i> .....	MF, MAH
Chimney swift .....	<i>Chaetura pelagica</i> .....	MTC
Common nighthawk .....	<i>Chordeiles minor</i> .....	OF

### Hummingbirds

Ruby-throated hummingbird.....	<i>Archilochus colubris</i> .....	OF
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### Woodpeckers

Northern flicker .....	<i>Colaptes auratus</i> .....	MAH
Pileated woodpecker .....	<i>Dryocopus pileatus</i> .....	MF, MAH
Red-bellied woodpecker .....	<i>Melanerpes carolinus</i> .....	MF, MAH
Downy woodpecker .....	<i>Picoides pubescens</i> .....	MAH
Yellow-bellied sapsucker .....	<i>Sphyrapicus varius</i> .....	MAH

### Kingfishers

Belted kingfisher .....	<i>Megaceryle alcyon</i> .....	MUS, MAH, MS, DM
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\* Non-native Species

## Cayo Costa State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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### Flycatchers

Eastern wood-pewee .....	<i>Contopus virens</i> .....	MAH
Great crested flycatcher .....	<i>Myiarchus crinitus</i> .....	MF, MAH
Eastern phoebe .....	<i>Sayornis phoebe</i> .....	MAH
Gray kingbird .....	<i>Tyrannus dominicensis</i> .....	MAH, MS

### Shrikes and Vireos

Loggerhead shrike .....	<i>Lanius ludovicianus</i> .....	CS, CG
Black-whiskered vireo .....	<i>Vireo altiloquus</i> .....	MAH
Yellow-throated vireo .....	<i>Vireo flavifrons</i> .....	MAH
White-eyed vireo .....	<i>Vireo griseus</i> .....	MF, MAH
Blue-headed vireo .....	<i>Vireo solitarius</i> .....	MF, MAH

### Crows and Jays

American crow .....	<i>Corvus brachyrhynchos</i> .....	MTC
Fish crow .....	<i>Corvus ossifragus</i> .....	MTC
Blue jay .....	<i>Cyanocitta cristata</i> .....	MTC

### Swallows

Purple martin .....	<i>Progne subis</i> .....	OF
Bank swallow .....	<i>Riparia riparia</i> .....	OF
Northern rough-winged swallow .....	<i>Stelgidopteryx serripennis</i> .....	OF
Tree swallow .....	<i>Tachycineta bicolor</i> .....	OF

### Wrens

Marsh wren .....	<i>Cistothorus palustris</i> .....	DM
Sedge wren .....	<i>Cistothorus platensis</i> .....	DM, MS
Carolina wren .....	<i>Thryothorus ludovicianus</i> .....	MF, MAH
House wren .....	<i>Troglodytes aedon</i> .....	MTC

### Bluebirds, Gnatcatchers, Kinglets, and Thrushes

Hermit thrush .....	<i>Catharus guttatus</i> .....	MAH
Gray-cheeked thrush .....	<i>Catharus minimus</i> .....	MAH
Swainson's thrush .....	<i>Catharus ustulatus</i> .....	MAH
Veery .....	<i>Catharus fuscescens</i> .....	MAH
Barn swallow .....	<i>Hirundo rustica</i> .....	OF
Wood thrush .....	<i>Hylocichla mustelina</i> .....	MAH
Northern waterthrush .....	<i>Parkesia noveboracensis</i> .....	MAH
Louisiana waterthrush .....	<i>Parkesia motacilla</i> .....	MF, MAH
Blue-gray gnatcatcher .....	<i>Polioptila caerulea</i> .....	MF, MAH

\* Non-native Species

## Cayo Costa State Park Animals

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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Ruby-crowned kinglet .....	<i>Regulus calendula</i> .....	MF, MAH
American Robin .....	<i>Turdus migratorius</i> .....	MTC

### Mimids

Grey catbird .....	<i>Dumetella carolinensis</i> .....	MF, MAH
Northern mockingbird .....	<i>Mimus polyglottos</i> .....	MTC
Brown thrasher .....	<i>Toxostoma rufum</i> .....	MF, MAH

### Starlings

European starling* .....	<i>Sturnus vulgaris</i> .....	MTC
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### Waxwings

Cedar waxwing .....	<i>Bombycilla cedrorum</i> .....	MF
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### Warblers

Common yellowthroat .....	<i>Geothlypis trichas</i> .....	MF, MAH
Worm-eating warbler .....	<i>Helmitheros vermivorum</i> .....	MAH
Orange-crowned warbler .....	<i>Leiothlypis celata</i> .....	MAH
Swainson's warbler .....	<i>Limnothlypis swainsonii</i> .....	MAH
Black-and-white warbler .....	<i>Mniotilta varia</i> .....	MAH
Tennessee warbler .....	<i>Leiothlypis peregrina</i> .....	MAH
Prothonotary warbler .....	<i>Protonotaria citrea</i> .....	MAH
Ovenbird .....	<i>Seiurus aurocapilla</i> .....	MAH
Northern parula .....	<i>Setophaga americana</i> .....	MF, MAH
Black-throated blue warbler .....	<i>Setophaga caerulescens</i> .....	MAH
Hooded warbler .....	<i>Setophaga citrina</i> .....	MAH
Yellow-rumped warbler .....	<i>Setophaga coronata</i> .....	MAH
Prairie warbler .....	<i>Setophaga discolor</i> .....	MF
Yellow-throated warbler .....	<i>Setophaga dominica</i> .....	MAH
Magnolia warbler .....	<i>Setophaga magnolia</i> .....	MAH
Palm warbler .....	<i>Setophaga palmarum</i> .....	CS, MAH
Yellow warbler .....	<i>Setophaga petechia</i> .....	MAH
Pine warbler .....	<i>Setophaga pinus</i> .....	MAH
American redstart .....	<i>Setophaga ruticilla</i> .....	MF, MAH
Blackpoll warbler .....	<i>Setophaga striata</i> .....	MAH
Cape May warbler .....	<i>Setophaga tigrina</i> .....	MAH
Black-throated green warbler ...	<i>Setophaga virens</i> .....	MAH

### Sparrows

Swamp sparrow .....	<i>Melospiza georgiana</i> .....	DM, MAH
Eastern towhee .....	<i>Pipilo erythrophthalmus</i> .....	CS, CG, MAH

\* Non-native Species

**Cayo Costa State Park Animals**

Common Name	<i>Scientific Name</i>	Primary Habitat Codes (for imperiled species)
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**Cardinals, Tanagers, Grosbeaks, and Buntings**

Northern cardinal .....	<i>Cardinalis cardinalis</i> .....	MTC
Indigo bunting .....	<i>Passerina cyanea</i> .....	MAH
Painted bunting .....	<i>Passerina ciris</i> .....	MAH
Scarlet tanager .....	<i>Piranga olivacea</i> .....	MAH
Summer tanager .....	<i>Piranga rubra</i> .....	MAH
Rose-breasted grosbeak .....	<i>Pheucticus ludovicianus</i> .....	MAH

**Icterids**

Red-winged blackbird .....	<i>Agelaius phoeniceus</i> .....	DM, MAH, CG
Baltimore oriole .....	<i>Icterus galbula</i> .....	MAH
Orchard oriole .....	<i>Icterus spurius</i> .....	MAH
Boat-tailed grackle .....	<i>Quiscalus major</i> .....	MTC
Common grackle .....	<i>Quiscalus quiscula</i> .....	MTC

**Meadowlarks**

Bobolink .....	<i>Dolichonyx oryzivorus</i> .....	DM
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**Finches and Old World Sparrows**

Pine siskin .....	<i>Spinus pinus</i> .....	SM, CB
American goldfinch .....	<i>Spinus tristis</i> .....	OF

**MAMMALS**

**Cingulates**

Nine-banded armadillo* .....	<i>Dasypus novemcinctus</i> .....	MTC
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**Didlphids**

Virginia opossum .....	<i>Didelphis virginiana</i> .....	MTC
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**Rodents**

Black rat* .....	<i>Rattus rattus</i> .....	MTC
Eastern gray squirrel .....	<i>Sciurus carolinensis</i> .....	MTC
Hispid cotton rat .....	<i>Sigmodon hispidus</i> .....	MTC

\* Non-native Species

**Cayo Costa State Park Animals**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Primary Habitat Codes (for imperiled species)</b>
<b>Lagomorphs</b>		
Marsh rabbit .....	<i>Sylvilagus palustris</i> .....	DM, MAH
<b>Carnivores</b>		
Coyote* .....	<i>Canis latrans</i> .....	MTC
Feral cats* .....	<i>Felis catus</i> .....	DV
North American river otter .....	<i>Lontra canadensis</i> .....	DM, MS, MUS
Bobcat .....	<i>Lynx rufus</i> .....	CS, CG, MAH, MS
Florida black bear .....	<i>Ursus americanus floridanus</i> .....	MTC
<b>Omnivores</b>		
Raccoon .....	<i>Procyon lotor</i> .....	MTC
Feral hog* .....	<i>Sus scrofa</i> .....	MTC
<b>Sirens</b>		
Florida manatee .....	<i>Trichechus manatus latirostris</i> .....	MUS
<b>Cetaceans</b>		
Atlantic bottle-nose dolphin .....	<i>Tursiops truncatus</i> .....	MUS

\* Non-native Species



## Primary Habitat Codes

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### 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

## Primary Habitat Codes

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### 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

## Primary Habitat Codes

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### 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 .....	ABF
Abandoned pasture .....	ABP
Agriculture .....	AG
Canal/ditch .....	CD
Clearcut pine plantation .....	CPP
Clearing .....	CL
Developed .....	DV
Impoundment/artificial pond .....	IAP
Invasive exotic monoculture .....	IEM
Pasture - improved .....	PI
Pasture - semi-improved .....	PSI
Pine plantation .....	PP
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**



## **Imperiled Species Ranking Definitions**

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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).

## Imperiled Species Ranking Definitions

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- 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.



## Imperiled Species Ranking Definitions

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### 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.

## Imperiled Species Ranking Definitions

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### 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.

## Imperiled Species Ranking Definitions

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### **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**



## **Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties (revised March 2013)**

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**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.

**Management Procedures for Archaeological and Historical Sites and Properties on State-Owned or Controlled Properties (revised March 2013)**

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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](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



## Eligibility Criteria for National Register of Historic Places

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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) religious property deriving its primary significance from architectural or artistic distinction or historical importance; or
  - b) 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) 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) cemetery which derives its primary significance from graves of persons of transcendent importance, from age, distinctive design features, or association with historic events; or

## Eligibility Criteria for National Register of Historic Places

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- e) a 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
- f) a property achieving significance within the past 50 years, if it is of exceptional importance.

## Preservation Treatments as Defined by Secretary of Interior's Standards and Guidelines

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**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.

