**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

MARJORY STONEMAN DOUGLAS BUILDING
3900 COMMONWEALTH BOULEVARD
TALLAHASSEE, FLORIDA 32399-3000

RICK SCOTT
GOVERNOR

JENNIFER CARROLL
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

December 14, 2012

Ms. Sine Murray
Planning Manager
Office of Park Planning, Division of Recreation and Parks
Department of Environmental Protection
3900 Commonwealth Boulevard, MS 525
Tallahassee, FL 32399-3000

**RE: John U. Lloyd Beach State Park – Lease # 2787**

Dear Ms. Murray:

The Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the John U. Lloyd State Park land management plan. The next management plan update is due December 14, 2022.

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

Sincerely,

Marianne S. Gengenbach
Office of Environmental Services
Division of State Lands

# John U. Lloyd Beach State Park

## APPROVED
## Unit Management Plan

**STATE OF FLORIDA**
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**Division of Recreation and Parks**
**December 14, 2012**

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## INTRODUCTION

John U. Lloyd Beach State Park is located in Broward County (see Vicinity Map) in the City of Hollywood. The park is located one mile east of Dania Beach and just south of Fort Lauderdale. Access to the unit is from State Road A1A (North Ocean Drive), off Dania Beach Boulevard (see Reference Map). In addition, the Vicinity Map reflects significant land and water resources existing near the park.

John U. Lloyd Beach State Park comprises 312.69 acres. The primary feature of this park is nearly two and a half miles of sandy beach, which functions as a recreational attraction and an active nesting area for marine turtles. In addition, remnant examples of mangrove wetlands and tropical hammocks are found within the park.

In 1973, the Board of Trustees of the Internal Improvement Trust Fund (Trustees) obtained title to the property that is now John U. Lloyd Beach State Park. The park was acquired using general obligation bonds, donations and the Land Acquisition Trust Fund (LATF). On July 5, 1974, the Trustees conveyed management authority of John U. Lloyd Beach State Park to the Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP) under Lease No. 2787. The lease stipulates that the property must be utilized for the purpose of preserving, developing, improving, operating, maintaining and otherwise managing said lands for public outdoor recreation, park, conservation and related purposes. The lease is for a period of 50 years and will expire on July 5, 2033.

At John U. Lloyd Beach State Park, public outdoor recreation is the designated single use of the property (see Addendum 1). There are no legislative or executive directives that constrain the use of this property.

## PURPOSE AND SIGNIFICANCE OF THE PARK

The purpose of John U. Lloyd Beach State Park is to provide natural areas and sandy beaches for day-use recreation activities and to preserve wildlife habitat in one of the most highly developed urban areas in the state. The park provides opportunities for outdoor resource-based recreation for the enjoyment of Florida residents and visitors.

### Park Significance

- John U. Lloyd Beach State Park provides 2.3 miles of oceanfront shoreline for public beach access in a highly developed urban area.
- The park provides public beaches that are enjoyed by nearly half-a-million Florida residents and visitors each year.
- The park protects nearly two and a half miles of active marine turtle nesting area for three species of marine turtle, including the endangered green marine turtle (*Chelonia mydas*) and leatherback marine turtle (*Dermochelys coriacea*) and the threatened loggerhead marine turtle (*Caretta caretta*).
- The park protects seven types of natural communities and their rare and endemic plants and animals, including beach jacquemontia (*Jacquemontia reclinata*), wood stork (*Mycteria americana),* brown pelican (*Pelecanus occidentalis),* osprey (*Pandion haliaetus)* and three species of imperiled marine turtle, within a highly developed urban area.

- The park protects the site of a dedicated African-American beach in Broward County, which is representative of Florida's history during the Civil Rights Movement.

John U. Lloyd Beach State Park is classified as a state recreation area in DRP's unit classification system. In the management of a state recreation area, major emphasis is placed on maximizing the recreational potential of the unit. However, preservation of the park's natural and cultural resources remains important. Depletion of a resource by any recreational activity is not permitted. In order to realize the park's recreational potential, the development of appropriate park facilities is undertaken with the goal to provide facilities that are accessible, convenient and safe, to support public recreational use or appreciation of the park's natural, aesthetic and educational attributes.

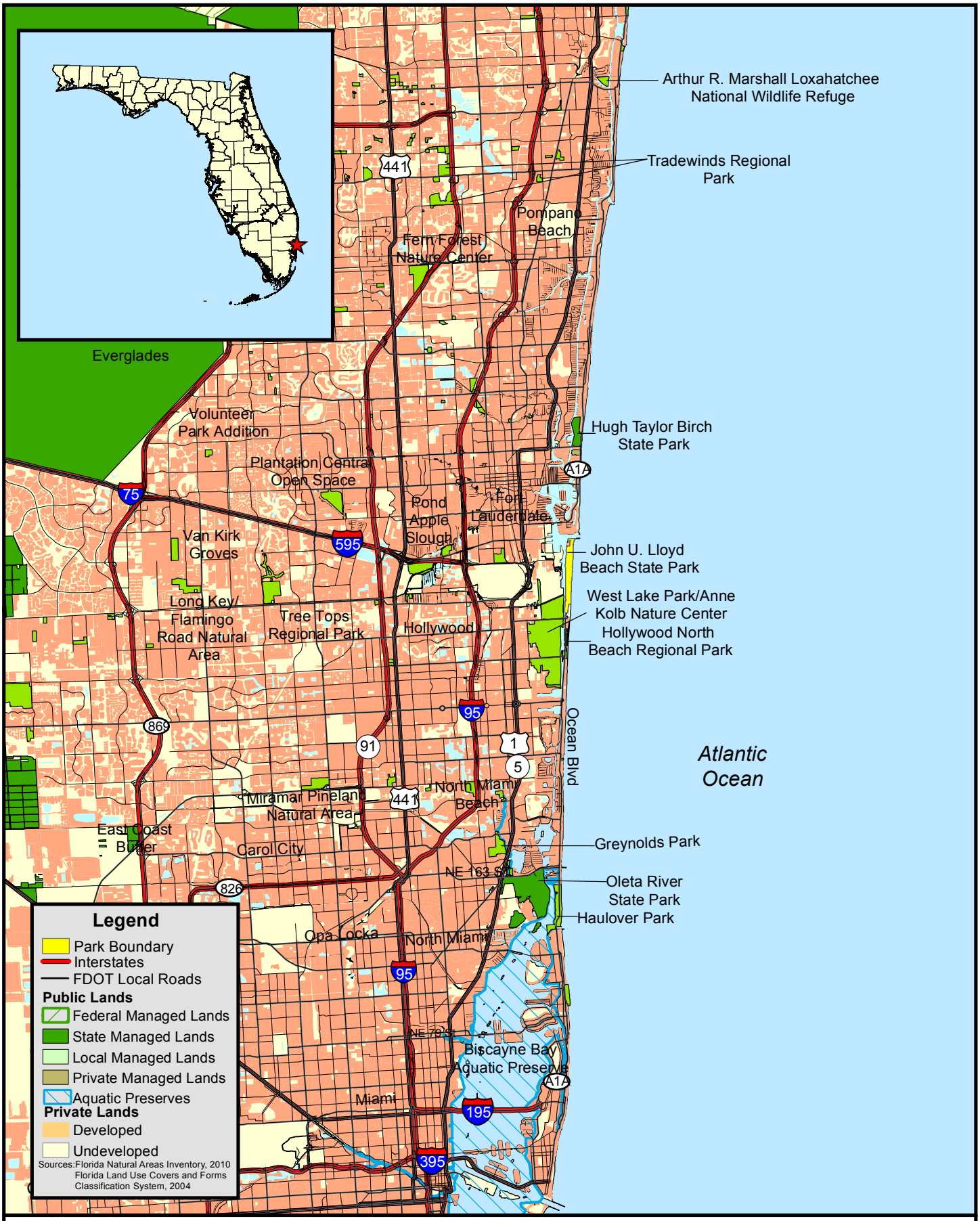
**PURPOSE AND SCOPE OF THE PLAN**

This plan serves as the basic statement of policy and direction for the management of John U. Lloyd Beach 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 2001 approved plan.

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

The Land Use Component is the recreational resource allocation plan for the park. Based on considerations such as access, population, adjacent land uses, the natural and cultural resources of the park, current public uses and existing development, measurable objectives are set to achieve the desired allocation of the physical space of the park. These objectives locate use areas and propose the types of facilities, programs, and 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 DRP's implementation progress, (2) timeframes for completing actions and objectives and (3) estimated costs to complete each action and objective.



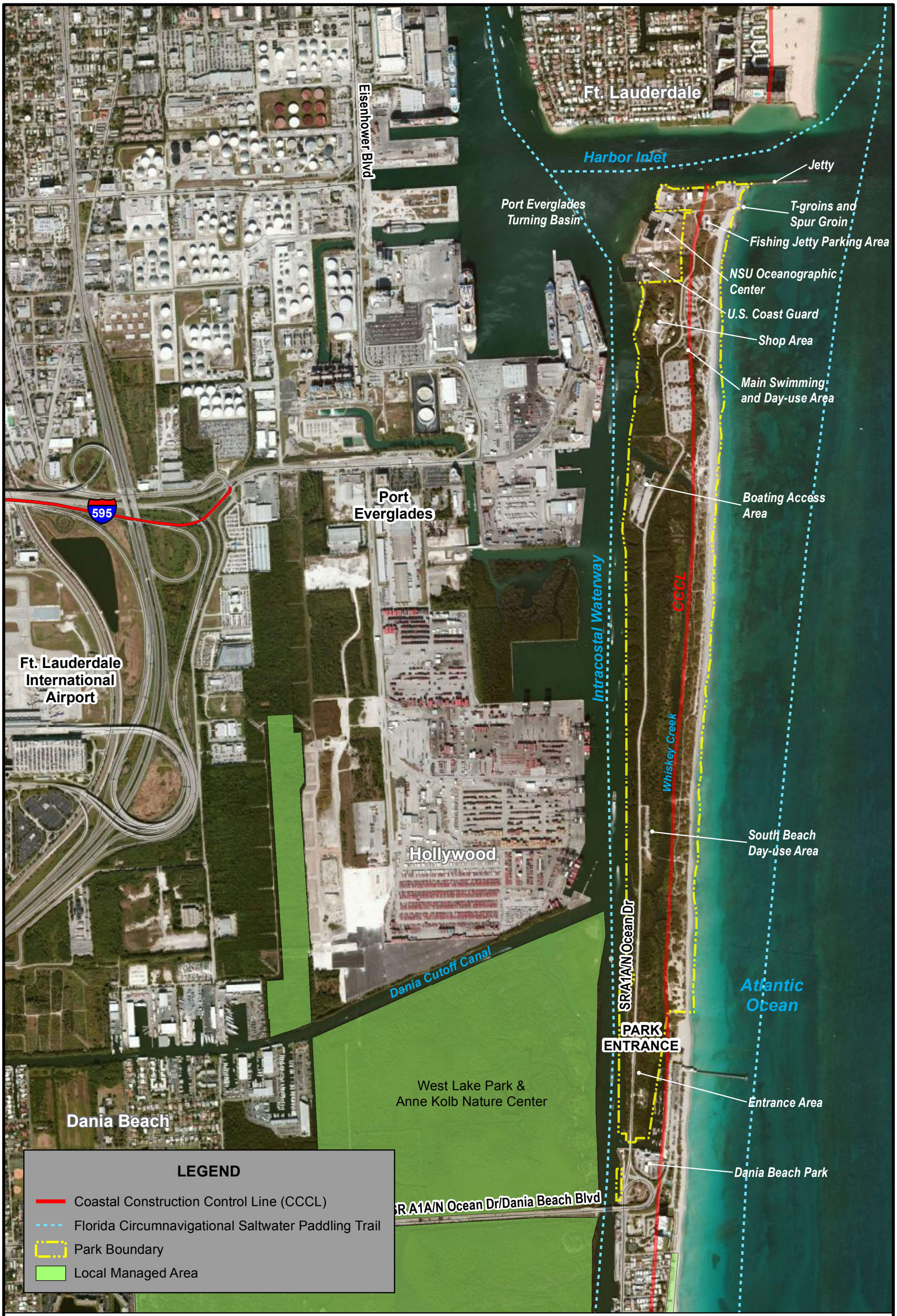

# JOHN U. LLOYD BEACH STATE PARK

N

0 1.25 2.5 5 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks

## VICINITY MAP




JOHN U LLOYD BEACH STATE PARK

N

0 1,250 2,500 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

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 DRP's statutory responsibilities and the resource needs and values of the park. This analysis considered the park's 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 purposes 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.

The use of private land managers to facilitate restoration and management of this park was also analyzed. Decisions regarding this type of management (such as outsourcing, contracting with the private sector, use of volunteers, etc.) will be made on a case-by-case basis as necessity dictates.

## MANAGEMENT PROGRAM OVERVIEW

### Management Authority and Responsibility

In accordance with Chapter 258, Florida Statutes and Chapter 62D-2, Florida Administrative Code, 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 Trustees have granted management authority of certain sovereign submerged lands to 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 DRP's Operations Manual (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.

**1.** Provide administrative support for all park functions.
**2.** Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.
**3.** Restore and maintain the natural communities/habitats of the park.
**4.** Maintain, improve or restore imperiled species populations and habitats in the park.
**5.** Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.
**6.** Protect, preserve and maintain the cultural resources of the park.
**7.** Provide public access and recreational opportunities in the park.
**8.** 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 (FFWCC) assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. In addition, FFWCC aids DRP with wildlife management programs, including imperiled species management and Watchable Wildlife programs. The Florida Department of State (FDOS), Division of Historical Resources (DHR) assists staff to ensure protection of archaeological and historical sites. DEP, Office of Coastal and Aquatic Managed Areas (CAMA) aids staff in aquatic preserves management programs. DEP, Bureau of Beaches and Coastal Systems aids staff in planning and construction

activities seaward of the Coastal Construction Control Line and aids 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, July 31, 2012, and Wednesday, August 1, 2012, respectively. Meetings notices were published in the Florida Administrative Weekly, Friday, July 13, 2012, Volume 38, Issue 28, included on DEP's 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

John U. Lloyd Beach State Park is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and is not under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by DRP.

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 DEP. This park is not within or adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes).

## RESOURCE MANAGEMENT COMPONENT

### INTRODUCTION

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

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 park values.

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

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

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

| Table 1: John U. Lloyd Beach State Park Management Zones | | |
|---|---|---|
| **Management Zone** | **Acreage** | **Managed with Prescribed Fire** |
| JU-01 | 71.38 | No |
| JU-02 | 56.83 | No |
| JU-03 | 92.27 | No |
| JU-04 | 39.37 | No |
| JU-05 | 50.04 | No |
| JU-06 | 0.88 | No |

## RESOURCE DESCRIPTION AND ASSESSMENT

### Natural Resources

#### Topography

John U. Lloyd Beach State Park lies within the Atlantic Coastal Ridge, a subzone of the Atlantic Coastal Lowlands that is a physiographic formation that extends the entire length of the peninsula from the Georgia/Florida line to the Homestead area (Puri and Vernon, 1964). The entire park is located on a barrier island of low topographic relief with elevations ranging from sea level along the shoreline to seven feet along the crest of the dune ridge.

Barrier islands are dynamic systems that are constantly changing. They are narrow, often linear, deposits of sand that parallel the Florida coastline. Shaped by past geological changes, wind, waves and tidal action, barrier islands often occur in long chains, separated from the mainland by estuaries and saltwater wetlands. Here the park is separated from the mainland by the Intracoastal Waterway (ICW). Due to the nature of barrier islands, the topography of the park will continue to be influenced and altered by natural processes such as hurricanes, wind, ocean waves, and currents. For this park, the topography is also influenced by non-natural erosion processes due to dredging associated with Port Everglades and the jetty system north and south of the Port's entrance.

Although a certain level of soil erosion is naturally associated with barrier islands, anthropogenic influences can seriously exacerbate the situation. The process of erosion and accretion can influence the topography of barrier islands. On the ocean side, the jetties at the inlet disrupt the southerly flow of the longshore current and prevent sediments from being deposited on the beach south of the inlet. As a result of the disruption of this sand supply to the beaches south of Port Everglades, periodic beach nourishment and mechanical sand bypassing is required to replenish the beach. Along the ICW, the threat of erosion is associated with the high volume of vessel traffic. Cargo vessels and ocean liners that frequent Port Everglades use the ICW for a turning basin.


JOHN U. LLOYD BEACH
STATE PARK

N

0 500 1,000 2,000
Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2009

MANAGEMENT ZONES MAP

Numerous recreational and commercial boats use the ICW and the inlet for access to the near shore coral reefs.

## Geology

The region in which the park is located is underlain with the Miami Limestone formation deposited during the Pleistocene age. Miami Limestone (formerly Miami Oolite) occurs at or near the surface in southeastern peninsular Florida. It forms the Atlantic Coastal Ridge on which the park is located. Miami Limestone grades laterally northward into the Anastasia Formation. Miami Limestone consists of two distinct layers, an oolitic layer and a bryozoan layer. The oolitic layer consists of white to orange-gray, poorly to moderately drained sandy oolitic limestone (grain stone) with scattered concentrations of fossils. The bryozoan layer consists of white to orange-gray, poorly to well drained, sandy limestone (grain stone and pack stone). Beds of quartz sand and limey sandstones are also present. Fossils present include mollusks, bryozoans and corals. Molds and casts of fossils are common. The highly porous and permeable Miami Limestone forms much of the Biscayne aquifer of the surficial aquifer system. Covering the Miami Limestone is a thin layer of loose sand and organic material. The sand is predominantly calcium carbonate with shell fragments and, to a lesser degree, quartz. The organic portion is mostly a result of detritus material and is found in the mangrove swamps along the western portions of the park.

The formation of this barrier island took place as part of the series of events that shaped Florida. In northern Florida, this peninsula began with sediment deposition from rivers draining the Appalachian Mountains. South of the park, it began from sediments of marine carbonates, shell fragments and microscopic animals being deposited under a shallow sea.

During the Pleistocene epoch, four great Ice Ages brought peninsular exposure with the glacial advances and flooding with its retreat. Each cycle was marked by different thickness and composition of sediments that was laid down during inundation and consolidation during regression. During several events in the Pleistocene, the consolidated coquinoid limestones of the Anastasia Formation were being formed and extend to approximately 140 feet along the eastern edge of the county.

With the beginning of the Wisconsin Ice Age, the final Ice Age of the Pleistocene epoch, the ice increased and sea level steadily fell until about 20,000 years ago. Then the sea reached a low point close to 300 feet below the present level. At that time, the climate was windy, cool and dry--good conditions for forming large dune formations along the coast.

From about 15,000 to 6,000 years ago, this barrier island became more than just a large sandbar. The sea level rose at a relatively rapid rate of more than 3 feet per century. Near the end of this period, modern vegetation and climate became better established, and sea level decreased.

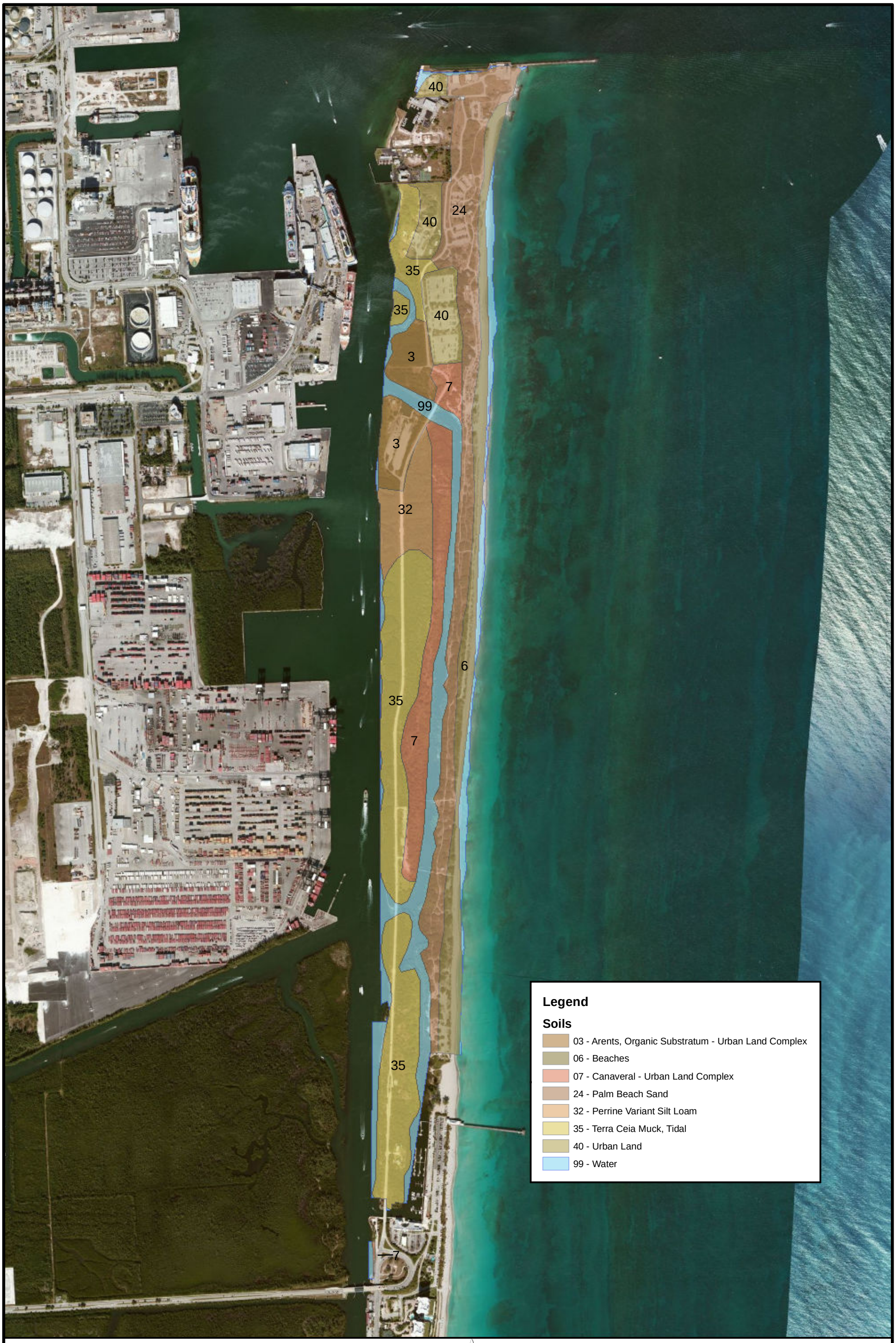
**Soils**

According to the Natural Resources Conservation Service (USDA 1984), seven soil types are found at John U. Lloyd Beach State Park (see Soils Map). A detailed description of these soil types is contained in Addendum 4.

The natural soils of the park are relatively recent due to the young age of the barrier island. They are primarily composed of sand, quartz, and shell fragments. The soil associations of the park and barrier island are classified to be nearly level to gently sloping, poorly to excessively drained, with a mixture of carbonate sand and shell fragments. The predominant soil type is Terra Ceia muck, tidal. This deep (80 inches or more), poorly drained, highly permeable soil is typically found in the mangrove swamps and marshes along the ICW and is of organic origin. Natural vegetation usually consists of red (*Rhizophora mangle*) and black (*Avicennia germinans*) mangroves. Perrine variant silt loam is similar to Terra Ceia muck and supports similar communities and plant and animal species within the park. The most significant difference is the presence of a calcareous silt loam (marl) over well-decomposed organic materials.

Palm Beach sands are geographically associated with Beaches and Canaveral soils. Beaches are on the shoreline and are flooded by wave action. Soil characteristics for the beaches are best observed on the southern portions of the park because beach renourishment projects have covered the northern beaches. Palm Beach sands are found in the upper beaches and dunes of the park where drainage is excessive and the available water capacity is very low. Typical plants include pioneering species such as sea oats (*Uniola paniculata*), coastal sandbur (*Cenchrus spinifex*) and railroad vines (*Ipomoea pes-carprae* spp. *brasiliensis*). Canaveral soils are similar to Palm Beach soils, but are at lower elevations and have a water table within a depth of 40 inches most of the time. This soil type is mostly found in association with the maritime hammock located along the western shore of Whiskey Creek.

The Arents, organic substratum-Urban land complex, is found on either side of the opening for Whiskey Creek. The southern portion is identified at the park's marina and associated parking area and facilities. On the northern side of the creek, this soil type is found in a ruderal area that was once covered with Australian pines (*Casuarina*




JOHN U. LLOYD BEACH
STATE PARK

SOILS MAP

*equisetifolia*). This site (JU-04) has been identified for the location of the proposed overflow boat ramp and associated parking area. The Urban land complex is associated with the park's infrastructure and buildings.

**Minerals**

No known mineral deposits of commercial value occur within the park.

**Hydrology**

In southeast Florida, the principal source of usable fresh groundwater is the Biscayne aquifer. It is recharged by rainfall primarily during the wet summer season. At John U. Lloyd Beach State Park, the Biscayne aquifer extends from near the surface to depths of 200 feet. The aquifer is composed of layers of pure or sandy limestone separated by lenses of sand that range in age from the late Miocene to the Pleistocene. Underlying the Biscayne aquifer is a 500-600 foot layer of Miocene marl and clay that forms a nearly impermeable base to the aquifer. Below this bed of marl and clay, the Floridan aquifer extends from a depth of about 900 feet to more than 3,500 feet.

The hydrological features of John U. Lloyd Beach State Park include the Atlantic Ocean, the ICW, Whiskey Creek and mangrove wetlands. All park waters are classified as Outstanding Florida Waters in accordance with Chapter 27, Section 403.061 of the Florida Statutes and 62-302.700, Florida Administrative Code. This designation is intended to protect and maintain existing acceptable water quality standards of the park's hydrological systems and prevent the further degradation of water quality of that system. However, since the park's largest hydrological features, the Atlantic Ocean and the ICW, extend far beyond the boundaries of the park, management of these systems is complex. The water quality in the ICW has been degraded due to runoff from a highly developed urban and industrial area. The presence of the inlet has also played a role in degraded water quality. In addition to the increase in vessel traffic, the inlet drains a large area of the ICW funneling water from as far away as North Miami through the mangrove wetlands of the park.

Before this area was managed as a state park, it was ditched in an effort to control mosquitoes. These ditches altered the hydrology of the area by disrupting the surficial sheet flow and fragmenting habitats. Most of the mosquito ditches have been filled, but a few remain in the tropical hammock.

Rainfall is abundant during the wet summer season, averaging over 60 inches per year in this area of Florida. However, rainfall is less in the area immediately around the park, as there is a tendency for rain clouds to form and move inland from the coast. Though much of the rain infiltrates into the shallow unconfined Biscayne aquifer, a significant amount runs off into the prominent waterbodies or remains on the surface. Within the park, the aquifer acts as a freshwater lens. Freshwater, being less dense than saltwater, is suspended on top of the saltwater forming a lens. The survival of barrier island

vegetation, other than halophytic species, is entirely dependent on precipitation and recharging of the freshwater lens.

Because of the low topography of the barrier island, flooding can be a problem that affects the park. A combination of high spring tides and strong easterly winds can "stack" up water along the seashore and the ICW, resulting in local flooding. However, this localized flooding does not compare to the flooding associated with a tropical storm or hurricane. In 1926, a hurricane caused a storm surge that reached 10.3 feet above mean sea level in the area.

In the early 1900s, after Congress passed the Swamp and Overflowed Lands Grant Act, drainage districts were formed and, by the late 1920s, much of what was once wetlands in South Florida was drained by numerous canals designed to reclaim land. The Everglades Drainage District was formed in 1906 and immediately began to implement their program to drain the Everglades. A network of canals was dug to drain the wetlands, promote development and provide irrigation to farmlands.

Historically, as water levels increased during the wet season, water flowed east out of the Everglades through natural channels in the Atlantic Coastal Ridge. Maps from the late 1800s indicate that the area now known as Port Everglades Harbor was once Lake Mabel, a freshwater lake that supported vegetation such as sawgrass (*Cladium jamaicensis*) and cattails (*Typha* sp.). However, with the dredging of the ICW in 1912 and the opening of the Port Everglades Inlet to the ocean in 1929, saltwater entering the area created a brackish water environment, killing freshwater species and resulting in the growth of the present mangrove community.

South Florida's wetlands have also experienced secondary impacts from human development pressures. The alteration of southeast Florida's hydrology by the elaborate canal systems designed to protect residents from flooding has impacted wetlands by decreasing the hydrology necessary for maintaining wetland plant species. Pollutants from stormwater runoff combined with the use of fertilizers and pesticides have increased the nutrients introduced into surface waters and degraded the water quality that supports wetland plant species. Another impact has been the introduction of non-native exotic plant species. Two well-known exotics, the melaleuca (*Melaleuca quinquenervia*) and Brazilian pepper (*Schinus terebinthifolius*) trees have overgrown many wetland areas in South Florida. Their rapid growth chokes out native plant species and decreases the habitat value of the wetlands. In addition to decreasing species diversity, exotic vegetation significantly affects hydrology by increasing the rate of evapotranspiration, and therefore the amount of available water leaving a drainage basin. Evapotranspiration is the loss of water to the atmosphere through the processes of evaporation and transpiration. Transpiration is the release of water from plant leaves. Because water transpired through leaves comes from the roots, plants with a more extensive root system have better access to the water table. Some exotic woody plants

such as Brazilian pepper and melaleuca thrive in wet environments, growing in monocultures with extensive canopies and root systems. The colonization of wetland habitats by these hydrophilic invasive exotics puts additional strain on the hydrology by increasing the evapotranspiration of a given wetland and decreasing the water supply.

An increase in population and urban growth along the coast has expanded westward. With this increase, additional demands are being placed on the water resources and their proper management and use. Most of the municipal and industrial supplies of water come from the Biscayne aquifer, not surface water.

In Broward County, the threat of saltwater intrusion into the aquifer and well fields has been a historical problem exacerbated by urbanization, development, a decrease in the recharge areas, canals, drainage and consumptive water use. The saltwater lens is wedge-shaped, being thickest at the coast and thinning to an edge further inland. Because the saltwater is slightly heavier than freshwater, it will move inland until balanced by fresh-water pressure. During dry periods, the saltwater tends to encroach further inland. During wet times, freshwater tends to push seaward and displace and override the encroaching saltwater. Because the park depends on municipal water, its water supply is critically geared to rainfall, saltwater intrusion and urban growth.

**Natural Communities**

This section of the management plan describes and assesses each of the natural communities found in the state park. It also describes 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, and imperiled species management are discussed in the Resource Management Program section of this component.

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

When a natural community within a park reaches the desired future condition, it is considered to be in a "maintenance condition." Required actions for sustaining a community's maintenance condition may include: maintaining optimal fire return intervals for fire dependant 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 linking natural communities across the landscape.

The park contains six distinct natural communities as well as ruderal and developed areas (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:** A coastal mound or ridge of unconsolidated sediments found along shorelines with high energy waves. Vegetation will consist of herbaceous dune forming grass species such as sea oats and cordgrass (*Spartina sp.*). Other typical species may include sea rocket (*Cakile lanceolata*), railroad vine, seashore paspalum (*Paspalum distichum*), beach morning glory (*Ipomoea imperati*), and beach sunflower (*Helianthus debilis var. debilis*). Occasionally shrubs, such as seagrape (*Coccoloba uvifera*), may be scattered within the herbaceous vegetation.

**Description and assessment:** The beach dune community parallels the shoreline and is located in Management Zones JU-01 and JU-02 (Refer to Management Zone Map). The beach dune community is continuously decolonized by plants, since storm waves or high tides disturb it periodically. Beyond the limit of yearly wave action, wind-blown sand can accumulate around plants as they grow upward to form the foredune. Since a supply of loose sand is always present, sand burial is a constant factor on the foredune, its rate dependent on the force and direction of the winds and the mobility of the sand grains (Meyers and Ewel 1990). Foredunes are usually built by grasses whose upward growth keeps pace with sand burial and whose lateral growth helps build a continuous dune ridge (Meyers and Ewel 1990).

The southern portion of the beach (JU-01) is in excellent condition. Here the dune ridge reaches the highest point in the park and the primary dune is colonized by a healthy population of sea oats, beach spurge (*Chamaesyce sp.*) and the imperiled beach star (*Cyperus pedunculatus*). These plants help to stabilize and form the primary dune system that provides protection against storm surge. Scattered foredunes are formed by the growth of pioneering plants such as beach elder (*Iva imbracata*), railroad vine and sea purslane *(Sesuvium portulacastrum)*. The excellent condition of the beach dune community found in this management zone may be attributed to the low visitation rate


JOHN U. LLOYD BEACH
STATE PARK

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Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2009

NATURAL COMMUNITIES
EXISTING CONDITIONS MAP

experienced on this stretch of beach. Most park visitors frequent the northern section of the beach where the majority of visitor facilities are located.

The northern portion of the beach (JU-02) is in fair condition. A primary dune system does not exist. Instead, remnant dunes are scattered and have been colonized by a mixture of grasses and herbs including railroad vine and sea purslane. This area of the park has the highest visitation rate and associated visitor facilities, including parking areas, pavilions, a restaurant, jetty and restrooms. Although there is a broad beach, it has been replenished several times because of recent active hurricane seasons. Hurricanes Frances (2004), Jeanne (2004), Katrina (2005) and Wilma (2005) caused significant erosion along the park's entire beach and structurally damaged the jetty, which was temporarily closed to visitors due to public safety concerns. These episodic storm events led to a beach renourishment project by Broward County and the U.S. Army Corps of Engineers (USACE) in 2005 that included construction of two T-groins, one spur groin and the placement of sand. Prior to this renourishment, two other beach nourishment projects took place. In 1976, one million cubic yards of material was placed on the beach, and, in 1989, 600,000 cubic yards of material was placed on the beach.

**General management measures:** The main impact to the beach dune community, which includes the park's sandy beaches, is caused by visitor traffic and erosion. While some level of erosion is natural in a beach dune community, particularly along the shoreline, efforts will continue to mitigate visitor impacts that unnaturally accelerate erosion within the beach dune. Management activities implemented in both management zones: JU-01 and JU-02, to minimize erosion include the planting of native dune building vegetation, removal of exotic vegetation and establishing designated access trails as needed. The park has an active restoration program in which approximately 400,000 sea oats have been planted, along with other native dune vegetation, to stabilize sediment, prevent erosion and create a primary dune system. The majority of the plantings have taken place on the northern portion of the beach (JU-02) where the dunes are scattered and the visitation rate is high. The park closed off these areas by using rope fences in an effort to minimize impacts from visitors and establish walkways to provide visitor access to the beach. To reduce impacts from foot traffic on the south beach (JU-01), two dune walkways are employed with signs directing visitors to access the beach at these designated areas.

Additional management strategies, such as periodic large-scale beach nourishment projects, are required to counteract the effects of erosion. Because of the size of these projects, a monitoring component is required. When appropriate, beach nourishment projects will also include the construction of dunes planted with native vegetation. These types of management projects will be coordinated with the appropriate local, state and federal agencies. Please refer to the Coastal/Beach Management section for more discussion concerning erosion and beach nourishment issues.

The beach community serves as critical nesting habitat for federal and state listed marine turtles. Florida beaches are one of the three major nesting areas in the world for loggerhead marine turtles (*Caretta caretta*). Other imperiled marine turtles that use the park for nesting are the leatherback (*Dermochelys coriacea*) and green (*Chelonia mydas*). The park will continue to participate in statewide monitoring programs for nesting marine turtles and assist in the recovery efforts for these imperiled species. These programs and efforts are discussed in the Resource Management Program section of this component.

**COASTAL STRAND**

**Desired future condition:** Characterized by stabilized, wind-deposited coastal dunes that are thickly vegetated with evergreen salt-tolerant shrubs. An ecotonal community generally lies between the beach dune and maritime hammock, scrub or tidal swamp. Coastal strand dunes contain deep, well-drained sands that are generally quite stable, but become susceptible to severe damage if the vegetation is significantly disturbed. Tropical species become more prevalent including sea grape, coin vine (*Dalbergia brownei*), myrsine (*Rapanea punctata*), buttonsage (*Lantana incolucrata*), white indigoberry (*Randia aculeata*), cabbage palm and numerous others. In well-developed communities, smooth-domed canopies develop as the taller vegetation is "pruned" by the windblown salt spray that kills the outer buds. This process is not as prevalent on the west coast of Florida or on the lee-side of islands due to prevailing easterly winds. Significant debate exists on the relative occurrence of natural fires compared to inland pyric communities. However, variability outside this range may occur based on site-specific conditions and management goals.

**Description and assessment:** The coastal strand is mostly found in the southern area of the park west of the beach dune community and extending to the mangrove fringe bordering the eastern shoreline of Whiskey Creek (Management Zone JU-01). Fragments of the coastal strand can be found north of Whiskey Creek scattered among the pavilions, parking areas and other public facilities. The coastal strand is sometimes referred to as a transitional or ecotonal zone because it begins in the shelter of the beach dune community and continues inland until an inland plant community, such as a tidal swamp, tropical hammock or scrub, is encountered. Presumably, the same coastal stresses that operate in the beach dune community operate at a lower frequency or intensity in the coastal zone and prevent its being colonized by inland plant communities (Meyers and Ewel 1990). Many plant species inhabit both the beach dune and coastal strand communities. However, the coastal strand has a more diverse assemblage of vegetation with a notable increase in the abundance of vascular plant species such as sea grape, cabbage palm and coin vine.

The coastal strand community at John U. Lloyd Beach State Park is in good condition. Once dominated with Brazilian pepper and Australian pine, many of the invasive exotics have been removed and native vegetation planted. This vegetation is still in a

relatively young phase, so the characteristic salt pruned canopy of the well-developed coastal strands is not evident here. To minimize visitor impacts to the vegetation, the park has successfully used dune walkways and limited visitor access in certain areas to visitors. Visitor facilities, such as parking areas and pavilions, were constructed in the coastal strand fragmenting the habitat. The loss of coastal strand vegetation may increase the rate of erosion since plants no longer exist to capture and hold the wind blown sand. Although the fragments of coastal strand found north of Whiskey Creek are isolated, they are in good condition. Where feasible the park has incorporated these fragmented parcels with their dune restoration program. Dune vegetation, namely sea oats, is often planted in close proximity to an isolated fragment of coastal strand in an effort to restore an ecosystem rather than individual communities.

**General management measures:** Following a large-scale invasive exotic removal project, seedlings and new recruits of exotic vegetation are starting to recolonize the coastal strand community. A maintenance program has been designed for the continued treatment and monitoring of invasive exotics. The park has developed and implemented a revegetation plan to guide staff with the planting of native vegetation. These programs are initiated throughout the year when resources are available.

**MARITIME HAMMOCK**

**Desired future condition:** A coastal evergreen hardwood forest occurring in narrow bands along stabilized coastal dunes. Canopy species will typically consist of live oak (*Quercus virginiana*), red bay (*Persea borbonia*), and cabbage palm. The canopy is typically dense and often salt-spray pruned. Understory species may consist of yaupon holly (*Ilex vomitoria*), saw palmetto (*Serenoa repens*), and/or wax myrtle (*Myrica cerifera*). Very sparse or absent herbaceous groundcover will exist. Variation in species composition exists along the coast, as you head southward tropical species become more prevalent.

**Description and assessment:** The maritime hammock contributes greatly to the overall biodiversity of the park due to its tropical flora element that is only found in south Florida. The largest examples of this natural community are located along Whiskey Creek east of the park drive in management zone JU-03. This community consists of a mixture of warm temperate and tropical vegetation, including gumbo limbo (*Bersera simaruba*), coco plum (*Chrysobalanus icaco*) and black ironwood (*Krugiodendron ferreum*), and is in good condition. The maritime hammock has significantly increased its coverage throughout the park due to restoration projects implemented by park staff. These restoration projects included the removal of invasive exotic plants, including Australian pine and Brazilian pepper, and planting of native hammock vegetation.

A large restoration project to remove Australian pines and other invasive plants from the park was completed in 2005. The removal of the exotic vegetation opened the canopy allowing additional sunlight to penetrate the maritime hammock enabling some species of native vegetation to colonize the area. The highly endangered beach

jacquemontia (*Jacquemontia reclinata*) was recently found growing in an area once dominated by exotics. In the late 1980's beach jacquemontia was reported in the park, however, its presence could not be substantiated. In January of 2010, the plant's presence was confirmed and now John U. Lloyd Beach State Park supports about 30 percent of the entire known population of this species in south Florida. Records indicate that this is one of the largest known populations in the state. Beach jacquemontia is usually found growing in the coastal strand but this population is located in the maritime hammock, separated from the coastal strand by a mangrove lined tidal creek: Whiskey Creek.

A very small percentage of the ditches once used for mosquito control traverse the tropical hammock. The majority of these mosquito ditches were restored under past mitigation projects. The few that remain have not been maintained and the ditches are filling in naturally through recruitment of sediment and native vegetation.

**General management measures:** Following a large-scale invasive exotic removal project, seedlings and new recruits of exotic vegetation are starting to recolonize the maritime hammock. Long term monitoring and periodic treatment is needed to prevent the reestablishment of these exotics. A maintenance program has been designed for the continued treatment and monitoring of invasive exotics. The park has developed and implemented a revegetation plan to guide staff with the planting of native vegetation. These programs are initiated periodically throughout the year when resources are available.

The park will continue to monitor the growth of the beach jacquemontia to determine if the plant should be relocated to the coastal strand. It is currently growing among exotic vegetation. Although the population has been marked, indirect impacts from removal of invasive exotic vegetation are still a possibility due to overspray from herbicides and damage from the physical removal of the exotic regrowth. Should the park decide to relocate a portion of the population, only those plants that are immediately threatened by exotic removal activities will be considered as candidates.

The majority of mosquito ditches were incorporated into past restoration projects. The few remaining mosquito ditches will be monitored to determine if the park should continue to allow them to fill naturally or design a project to backfill them. In their present condition, the ditches have a minimal effect on the hydrology of the park.

**MANGROVE SWAMP**

**Desired future condition:** Typically a dense forest occurring along relatively flat, low wave energy, marine and estuarine shorelines. The dominant overstory includes red mangrove, black mangrove, white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus*). These four species can 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 typically dominated the deepest water, followed by black mangrove in the intermediate zone, and white mangroves and buttonwood in the highest, least tidally influenced zone. Mangroves 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, shrub species can include seaside oxeye (*Borrichia arborescens, B. frutescens*), and vines including gray nicker bean (*Caesalpinia bonduc*), coin vine (*Dalbergia ecastaphyllum*), and rubbervine (*Rhabdadenia biflora*), and herbaceous species such as saltwort (*Batis maritime*), shoregrass (*Monanthocloe littoralis*), perennial glasswort (*Sarcocornia perennis*), and giant leather fern (*Acrostichum danaeifolium*). Soils are generally anaerobic and are saturated with brackish water at all times, becoming inundated at high tides. Mangrove swamps occur on a wide variety of soils, ranging from sands and mud to solid limestone rock. Soils in south Florida are primarily calcareous marl muds or calcareous sands. In older mangrove swamps containing red mangroves, a layer of peat can build up over the soil from decaying plant material (primarily red and black mangrove roots).

**Description and assessment:** The mangrove swamp comprises the largest natural community in John U. Lloyd Beach State Park and is in excellent condition. The best example of this natural community is located in management zone JU-03 and portions of JU-05. Unlike most vascular plants, mangroves have managed to adapt to a harsh environment characterized by anaerobic sediments, fluctuating water levels and waters with high concentrations of salt. They have accomplished this through evolutionary adaptations of their root systems, morphological and physiological mechanisms for maintaining salt balance, and reproductive dispersal strategies (Meyers and Ewel 1990). This community is found along the relatively low energy intertidal and supratidal shorelines of Whiskey Creek and the ICW. The oxygen-poor soil limits root growth to within a few feet of the surface. Mangroves do not have a deep taproot to anchor them during storm events, but they produce extensive, interlaced, horizontal roots that keep them anchored and help to minimize erosion. Some species, such as the red mangrove, have developed prop roots that extend into the soil bracing the tree during storm events.

Mangroves play an important role in the marine and estuarine ecosystems of the park. They are the primary producers, establishing the microbial food web that sustains a wide variety of species. Over 220 fish species have been recorded utilizing the mangroves at some point during their lifecycle. Important commercial and recreational marine species find food and shelter in the mangrove swamp. The shallow waters, entanglement of roots, and abundant food make this an ideal nursery for fish and invertebrate species such as the spiny lobster (P*anularis argus*), snook (*Centropomus undecimalis)*, and mangrove snapper (*Lutjanus apodus)*. A wide variety of birds, including the endangered wood stork (*Mycteria americana)*, the double-crested cormorant (*Phalacrocorax auritus)*, and the brown pelican (*Pelicanus occidentalis)*, use mangroves for nesting, roosting, and protection from predators and the elements.

Sessile invertebrates, such as oysters and barnacles, use the network of roots and tree trunks as points of attachment whenever these surfaces are void of macroalgae. These invertebrates have been documented to filter large volumes of water thereby maintaining water quality within the mangrove community. During periods of tropical storms and hurricanes, mangroves have been shown to baffle storm and wave energy due to their extensive root system that helps to stabilize the shoreline.

Port Everglades has conducted several mitigation projects along the ICW (JU-05) and Whiskey Creek (JU-03) that have improved tidal flushing and increased the total acreage of this natural community by 23 acres. Restoration projects by park and district staff, as well as volunteers, have also contributed to the acreage of the mangrove swamp by planting numerous red mangroves along the eastern shoreline of Whiskey Creek in management zone JU-01. Mangroves throughout the park now provide a seed source for the surrounding area and help to maintain a healthy mangrove community that protects the park's shores against erosion. They also provide roosting and nesting areas for shorebirds, shelter and refuge to fish species and sites for attachment for sessile organisms such as barnacles and oysters.

A small area along the ICW is being eroded from prop wash and boat wake. This is threatening Park Drive. The shoreline begins to erode at the end of the riprap.

**General management measures:** The major threat to this community is erosion from the high volume of vessel traffic in the ICW. Commercial vessels of varying size use the industrial port complex of Port Everglades that is located on the western shore of the ICW across from the park. Recreational and commercial vessels use the Port Everglades Inlet that delineates the northern boundary of the park. The high boat traffic in this part of the ICW is directly attributable to the presence of the inlet and Port Everglades. The park has a small marina that also adds to vessel traffic.

Riprap comprised of native limerock was used in a past mitigation project by Port Everglades to protect 7,300 linear feet of the park's shoreline along the ICW in management zones JU-05 and JU-04 against erosion by decreasing the wakes from passing vessels. In addition, the project involved planting approximately 160,000 red mangroves behind the riprap to stabilize the sediment and create additional wetlands. Although this project was successful, impacts from erosion are noticeable just past the southern boundary of the riprap in JU-05. The DRP will study the feasibility and impacts to the submerged resources of a project that will involve extending the riprap, backfilling the eroded area and planting red mangroves to stabilize the shore.

This area is designated as a "Minimum Wake Zone" which helps to moderate vessel speed reducing wave action from vessel wakes. The waters of Whiskey Creek are also classified as a "No Wake Zone." The park will continue to support these regulated

zones and monitor these areas for any changes in the condition of the mangrove swamp.

Another potential impact is degradation of water quality. Because mangroves grow under stressful conditions, any factor that further stresses a tree may be potentially fatal. In addition, certain types of pollutants, such as petroleum and its by-products, have been shown to kill mangroves by coating and clogging pneumatophores, which are the aerating branches of the black mangrove protruding from the sediment around the base of the tree.

Due to the close proximity of the park to Port Everglades, the potential of hazardous spills is a constant threat to the natural resources of the park. All spills are reported immediately to the park office. Park staff responds to the site of the spill and assesses the impact of the spill following the procedures in the Emergency Action Plan that is on file at the park office. The U.S. Coast Guard (USGS), with an office adjacent to the park, also responds to the spill. A coordinated cleanup plan is designed and implemented by appropriate agencies.

The park will also continue to enforce and utilize state and federal regulations and designations to protect these valuable natural resources. Mangroves are designated as essential fish habitat and habitat areas of particular concern (HAPC) by the South Atlantic Fishery Management Council. HAPCs are rare, particularly susceptible to human-induced degradation, ecologically important, and most often found in an environmentally stressed area.

**ESTUARINE UNCONSOLIDATED SUBSTRATE**

**Desired future condition:** Will consist of expansive, relatively open areas of subtidal, intertidal, and supratidal zones that lack dense populations of sessile plant species. Unconsolidated substrates will be composed of unsolidified material and include algae, marl, mud, mud/sand, sand or shell. This community may support a large population of infaunal organisms as well as a variety of transient planktonic and pelagic organisms. While these areas may seem relatively barren, the densities of infaunal organisms in subtidal zones can be quite numerous, making this habitat an important feeding ground for many bottom feeding fish. Unconsolidated substrates are important because they form the foundation for the development of other marine and communities.

**Description and assessment:** The estuarine unconsolidated substrate is characterized by a bottom composed of loose material (e.g., marl, mud, sand and shell). Within the park, this natural community is in good condition. The best example of this community is the shallow waters of Whiskey Creek in management zone JU-03 and along the mangrove fringe of the ICW in JU-05 and JU-04. Because of the low energy associated with these areas of the park, sediment is able to accumulate and submerged aquatic vegetation including seagrasses and macroalgae are able to grow. Seagrasses including

turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass (*Halodule wrightii*) grow along the shoreline of the ICW. The seagrass coverage is too sparse and patchy to be considered a grass bed community, but its presence helps to decrease erosion and turbidity by anchoring the sediment. The low energy waters also present opportunities for sessile organisms such as the Eastern oyster (*Crassostrea virginica*) to attach and colonize an area. In addition to enhancing water quality, oyster bars provide food and shelter for numerous crustaceans and mollusks. The crown conch (*Melongena corona*) and the blue crab (*Callinectes sapidus*) can be found foraging around the oyster bar in Whiskey Creek.

Although this habitat type appears barren, it supports a diverse array of infaunal organisms including the parchment tubeworm (*Chaetopterus variopedatus*) and the lug worm (*Capitella capitata*). Because of its rich biodiversity, the unconsolidated substrate community is an important feeding ground for bottom-dwelling fish, invertebrates and wading and shore birds.

**General management measures:** The regulated speed zones on Whiskey Creek and the ICW will achieve the desired future condition and protect the shallow submerged resources. In addition, the shallow waters of Whiskey Creek help to protect the estuarine unconsolidated substrate by preventing motorized vessels from traversing its entire length. Only a small section of the creek from the marina (JU-05) to the concession (JU-02)is deep enough for motorized vessels. The remainder of the creek can only be traversed by non-motorized vessels. DRP will continue to support these regulated speed zones.

**MARINE UNCONSOLIDATED SUBSTRATE**

**Desired future condition:** Will consist of expansive unvegetated, open areas of mineral-based substrate composed of shell, coralgal, marl, mud and/or sand (sand beaches). Desired conditions include preventing soil compaction and disturbances, such as the accumulation of pollutants.

**Description and assessment:** The marine unconsolidated substrate is found in the supratidal zone, the area of the beach where the waves meet the land. Where the marine unconsolidated substrate naturally occurs, it is in the desired future condition. Although this natural community appears to be in good condition, sediment composition has changed due to storms and the quality of sands introduced by beach nourishment projects. The high wave energy prohibits the growth of vegetation and prevents soil compaction. The infaunal organisms found here help to support migrating and resident shorebirds.

**General management measures:** Natural erosion from storms and wave action are to be expected. Since the marine unconsolidated substrate is that area of the beach where the waves and land meet, this is one of the highest recreation areas within the park. Foot

traffic associated with high visitation may increase the erosion process but the natural process of sand transport and deposition tends to replace the sand on the beach and minimizes any impacts to this community. In addition, the non-natural process of sand deposition through beach nourishment projects may help to abate the erosion process.

**RUDERAL**

**Desired future condition:** The ruderal areas within the park will be managed to remove priority invasive plant species (FLEPPC Category I and II species). Other management measures include limited restoration efforts designed to minimize the effect of the ruderal areas on adjacent natural areas. Cost-effectiveness, return on investment and consideration of other higher priority restoration projects within the park will determine the extent of restoration measures in ruderal areas.

**Description and assessment:** The majority of the ruderal areas in John U. Lloyd Beach State Park are associated with developed areas in Management Zones JU-02, JU-04 and JU-05. Where feasible, the park has initiated restoration projects to restore these areas to the surrounding natural community. The park has completed several projects to restore two previous ruderal areas along Whiskey Creek to maritime hammock in Management Zone JU-03. Despite past disturbance, some areas are in transition to natural communities. This is especially evident at the south entrance station to the park where mangroves have begun to reclaim portions of the ruderal area bordering Whiskey Creek. A large ruderal area on the north shore of Whiskey Creek in Management Zone JU-04, located west of the bridge, has been selected as the site for the proposed overflow boat ramp and associated parking area as discussed in the Land Use Component.

**General management measures:** Control of FLEPPC Category I and II species in this area, particularly Australian pine and Brazilian pepper, remains a priority to prevent their spread into the natural communities of the park.

**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 include staff residences, maintenance buildings and recreational or service facilities. The majority of structures and facilities are located in the northern end of John U. Lloyd Beach State Park along the park drive in Management Zones JU-02, JU-04 and JU-05. Construction of a new boat ramp on the north shore of Whiskey Creek across from the current boat ramp and marina has been approved (see Land Use Component).

**General management measures:** Control of FLEPPC Category I and II species in this area, particularly Australian pine and Brazilian pepper, remains a priority to prevent their spread into the natural communities of the park.

**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 (FFWCC) or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened or of special concern.

John U. Lloyd Beach State Park is an active participant in the statewide marine turtle-monitoring program. The park provides critical nesting habitat for three species of marine turtles: loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*). In addition, the park serves as a state index and survey beach for nesting marine turtles. During the nesting season, park staff conduct daily surveys of the beach recording the previous night's activities including number of crawls, false crawls, species identification and number of nests. The data collected from the park is used by state and federal agencies to formulate policy on nesting marine turtles. To increase public awareness and appreciation for the marine turtle, the park utilizes interpretive programs that include presentations and walks along the beach for a chance encounter with a nesting female turtle. Night walks are offered twice a week during nesting season and follow established no-disturbance guidelines.

The population of nesting marine turtles is stable but tends to follow statewide trends. For example, if the population of nesting loggerhead turtles is in decline around the state, this trend is also reflected in the regional population nesting at the park. The major threats to nesting marine turtles, their nests and turtle hatchlings include predation from natural and introduced animals, disorientation from artificial lighting, habitat loss and impediments to nesting from structures and escarpments. Raccoons (*Procyon lotor*) destroy more marine turtle eggs in the park than any other predator. However, a host of predators benefit from the nesting season including ghost crabs (*Ocypode quadrata*) and red fire ants (*Solenopsis invicta*). Even snakes such as the Eastern coachwhip (*Masticophis flagellum*) have been observed removing hatchlings from a nest.

The park's beaches also experience light pollution that disorients hatchlings and, in some cases, cause female turtles to abandon nesting attempts. Although the lighting issues at the park originate from several outside sources, the most significant is Port Everglades. The Australian pines that once dominated the park helped to reduce the amount of light that was reaching the nesting beach. The removal of these invasive exotics throughout the park has provided numerous open areas where light now penetrates increasing light pollution on the beach. The constant activity at the Port

requires lighting throughout the night. Port Everglades is voluntarily developing a light management plan that will address these concerns. Additional information on these issues is found in the Natural Resource Management section.

The Florida manatee (*Trichecus manatus latrirostris*) is also commonly observed in park waters; however, it is not a full time resident. The park has interpretative programs that assist with educating the public about this imperiled species. The park also supports the designation of the ICW as a "No Wake Zone" and the posting of manatee warning signs informing boaters that this species may be present.

Beach jacquemontia was recently discovered in the maritime hammock. This is one of the largest known populations of this imperiled species recorded in Florida. The major threat to the imperiled plant species comes from exotic plant infestation reducing the amount of suitable habitat for these species. Ongoing exotic removal by both park staff and contractors continue to reduce this threat.

Many of the listed wading birds such as herons, egrets and wood storks utilize the tidal creeks, mudflats, and mangroves for foraging areas. The tropical maritime hammock is an important stopover point during migration for neotropical migrants such as the worm-eating warbler (*Helmitheros vermivorus*) and American redstart (*Setophaga ruticilla*). Although some of the imperiled bird species are not residents of the park, they have been observed using the natural resources of the park. The park will continue to implement a systems management approach that involves managing the resources as a complete ecosystem. This strategy will provide for the resources needed to assist in the recovery and stabilization of the imperiled species that use the park.

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** |
| | **FFWCC** | **USFWS** | **FDACS** | **FNAI** | | |
| **PLANTS** | | | | | | |
| Golden leather fern *Acrostichum aureum* | | | LE | G3,S2 | | Tier 1 |
| Sea lavender *Argusia gnaphalodes* | | | LT | G4,S3 | | Tier 1 |
| Beach star *Cyperus pedunculatus* | | | LE | G5,S1 | | Tier 1 |
| Beach jacquemontia *Jacquemontia reclinata* | | LE | LE | G1,S1 | 2 | Tier 1 |
| Burrowing Four-o'clock *Okenia hypogaea* | | | LE | G3,S2 | | Tier 1 |
| Florida Keys blackbead *Pithecellobium keyense* | | | LT | | | Tier 1 |
| Bahama ladder brake *Pteris bahamensis* | | | LT | G4,S3 | | Tier 1 |
| Beachberry *Scaevola plumieri* | | | LT | | | Tier 1 |
| Cardinal airplant *Tillandsia fasciculata var. densispica* | | | LE | | | Tier 1 |
| Giant airplant *Tillandsia utriculata* | | | LE | | | Tier 1 |
| Coontie *Zamia integrifolia* | | | LT | | | Tier 1 |
| **FISH** | | | | | | |
| Mangrove rivulus *Rivulus marmoratus* | LS | LS | | G3, S3 | | Tier 1 |
| **REPTILES** | | | | | | |
| Loggerhead marine turtle *Caretta caretta* | LT | LT(S/A) | | G5, S4 | 3, 8, 9, 10, 13 | Tier 4 |
| Green marine turtle *Chelonia mydas* | LE | | | G5, S3 | 3, 8, 9, 10, 13 | Tier 4 |
| Leatherback marine turtle *Dermochelys coriacea* | LE | LT | | G4T3, S3 | 3, 8, 9, 10, 13 | Tier 4 |
| **BIRDS** | | | | | | |
| Short-tailed hawk *Buteo brachyurus* | | | | G4G5, S1 | | Tier 1 |

| Table 2: Imperiled Species Inventory | | | | | | |
|---|---|---|---|---|---|---|
| **Common and Scientific Name** | **Imperiled Species Status** | | | | **Management Actions** | **Monitoring Level** |
| | **FFWCC** | **USFWS** | **FDACS** | **FNAI** | | |
| Little blue heron *Egretta caerulea* | LS | | | G5, S4 | | Tier 1 |
| Snowy egret *Egretta thula* | LS | | | G5, S3 | | Tier 1 |
| Tricolored heron *Egretta tricolor* | LS | | | G5, S4 | | Tier 1 |
| American swallow-tailed kite *Elanoides forficatus* | | | | G5, S2 | | Tier 1 |
| White ibis *Eudocimus albus* | LS | | | G5, S4 | | Tier 1 |
| Merlin *Falco columbarius* | | | | G4, S2 | | Tier 1 |
| Southern bald eagle *Haliaeetus leucocephalus* | LT | LT | | G4, S3 | | Tier 1 |
| Worm-eating warbler *Helmitheros vermivorus* | | | | G5, S1 | | Tier 1 |
| Wood stork *Mycteria americana* | LE | LE | | G4, S2 | | Tier 1 |
| Osprey *Pandion haliaetus* | LS | | | G5, S3S4 | | Tier 1 |
| Brown pelican *Pelecanus occidentalis* | LS | | | G4, S3 | | Tier 1 |
| Black skimmer *Rynchops niger* | LS | | | G5, S3 | | Tier 1 |
| American redstart *Setophaga ruticilla* | | | | G5, S2 | | Tier 1 |
| Least tern *Sterna antillarum* | LT | LE | | G4, S5 | | Tier 1 |
| **MAMMALS** | | | | | | |
| Florida manatee *Trichechus manatus latrirostris* | E | E | | G2, S2 | 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

**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 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.

Numerous exotic removal projects have been conducted by park and district staff as well as contractual means on all parcels associated with the management of John U. Lloyd Beach State Park. Between 2003 and 2005, an exotic removal program targeted the predominant exotic plant species Australian pines, Brazilian pepper and melaleuca,

throughout the 158 acres of upland communities within the park. The majority of these exotics were eradicated from park property. Unfortunately, due to limited funding, resources and delayed maintenance of the treated areas, exotic plants are beginning to recolonize certain sections of the project area. Maintenance and monitoring are conducted by park or district staff on regular intervals or as resources allow. Many invasive exotic plants occur on and adjacent to disturbed land. Threats for new invasions come from several sources: exotics already established in the park, seed dispersal by natural means (birds, wind, water, etc.) and neighboring developments. These areas are a high priority for exotic plant treatment because they threaten unique habitats and are a seed source for an otherwise pristine area.

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.

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

| **Common and *Scientific* Name** | **FLEPPC Category** | **Distribution** | **Management Zone(s)** |
|---|---|---|---|
| **PLANTS** | | | |
| Javanese bishopwood<br>*Bischofia javanica* | I | 1 | JU-01, JU-03, JU-04, JU-06 |
| Australian pine<br>*Casuarina equisetifolia* | I | 3 | JU-03, JU-04 |
| Lather leaf<br>*Colubrina asiatica* | I | 6 | JU-05 |
| Carrotwood<br>*Cupaniopsis anacardiopsis* | I | 1 | JU-01, JU-04 |
| Air potato<br>*Dioscorea bulbifera* | I | 2 | JU-03, JU-04 |
| Pothos<br>*Epipremnum pinnatum* | II | 1 | JU-03 |
| Surinam cherry<br>*Eugenia uniflora* | I | 1 | JU-03 |
| Hibiscus<br>*Hibiscus tiliaceus* | II | 1 | JU-05, JU-04, JU-02 |
| Brazilian jasmine<br>*Jasminum fluminense* | I | 1 | JU-03 |
| Lead tree<br>*Leucaena leucocephala* | II | 3 | JU-04 |
| Melaleuca<br>*Melaleuca quinquenervia* | I | 1 | JU-03 |

| Table 3: Inventory of FLEPPC Category I and II Exotic Plant Species | | | |
|---|---|---|---|
| Tuberous sword fern<br>*Nephrolepis cordifolia* | I | 2 | JU-03 |
| Guava<br>*Psidium guajava* | I | 1 | JU-03 |
| Chinese brake fern<br>*Pteris vittata* | II | 2 | JU-03 |
| Solitaire palm<br>*Ptychosperma elegans* | II | 1 | JU-03 |
| Castor bean<br>*Ricinus communis* | II | 3 | JU-03, JU-04 |
| | | 6 | JU-02 |
| Bowstring hemp<br>*Sansevieria hyacinthoides* | II | 3 | JU-03 |
| Beach naupaka<br>*Scaevola taccada* | I | 2 | JU-02, JU-03 |
| Schefflera<br>*Schefflera actinophylla* | I | 1 | JU-01, JU-03, JU-04 |
| Brazilian pepper<br>*Schinus terebinthifolius* | I | 2 | JU-03, JU-04, JU-05 |
| Wedelia<br>*Sphagneticola trilobata* | II | 2 | JU-03, JU-05, JU-04 |
| Arrowhead vine<br>*Syngonium podophyllum* | I | 1 | JU-02, JU-03 |
| Tropical-almond<br>*Terminalia catappa* | II | 1 | JU-03, JU-04, JU-05 |
| Seaside mahoe<br>*Thespesia populnea* | I | 6 | JU-05 |
| | | 3 | JU-03 |
| | | 2 | JU-01, JU-04 |
| Small-leaf spiderwort<br>*Tradescantia fluminensis* | I | 1 | JU-03 |
| Puncture vine<br>*Tribulus cistoides* | II | 1 | JU-03, JU-04, JU-02 |
| Caesar's weed<br>*Urena lobata* | II | 6 | JU-03, JU-05 |
| | | 2 | JU-01, JU-04 |
| Para grass<br>*Urochloa mutica* | I | 1 | JU-03 |

**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.

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, DRP actively removes exotic animals from state parks, with priority being given to those species causing the greatest ecological damage.

In some cases, native wildlife may also pose management problems or nuisances within state parks. A nuisance animal is an individual native animal whose presence or activities create special management problems. Examples of animal species from which nuisance cases may arise include raccoons, venomous snakes and alligators that are in public areas. Nuisance animals are dealt with on a case-by-case basis in accordance with DRP's Nuisance and Exotic Animal Removal Standard.

Several species of exotic reptiles have been observed in the park including the brown anole (*Anolis sagrei*) and the curly-tailed lizard (*Leiocephalus sp.*). Although currently under control at the park, the population of green iguanas throughout south Florida has significantly increased during the past few years. Feeding on the flowers of a wide variety of plant species, iguanas pose a threat to numerous imperiled species in south Florida. Without flowers, plants cannot produce fruit or seed to sustain or replenish the population. The Cuban tree frog (*Osteopilus septentrionalis*) has also been observed in the park.

Raccoons (*Procyon lotor*) are an abundant native species that impact marine turtle conservation at many Florida beaches through nest depredation (Stancyk 1982). Compounding the problem, raccoon populations flourish in association with humans because they often receive artificial support through refuse or direct feeding (Smith and Engeman 2002). They are the top predator on marine turtle nests at the park, preying on eggs and hatchlings. Monitoring of nest predation is noted during daily nesting surveys. In an effort to reduce predation rates and help in the recovery of the three listed species of marine turtle, a trap and removal program has been implemented. All predators trapped under this program are removed according the protocols set forth in

the Florida Park Service Operations Manual. Predator removal programs have proven very successful. The Hobe Sound National Wildlife Refuge (HSNWR), in Martin County, has had a predator removal program in place since the early 2000s. The beach at the refuge is similar to the beach at the park. Both areas are high-density nesting beaches that serve the same three species of nesting marine turtles. Prior to a predator control program, historical nest predation at HSNWR was 95 percent. Consequently, predator control was identified as the most important conservation tool at HSNWR, and predator control optimized by predator monitoring led to highly successful results whereby predation had been reduced to low levels (7–13.5 percent of monitored nests) in 2002 and 2003 (Engeman and Smith 2006) .

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.

**Special Natural Features**

John U. Lloyd Beach State Park contains a rare, tropical coastal hammock (maritime hammock), as listed by the FNAI list of significant natural resources, and has a diverse assemblage of tropical trees, including mastic (*Sideroxylon foetidissimum*) and paradise tree (*Simarouba glauca*), as well as tropical understory, including wild coffee (*Psychotria nervosa*) and Spanish stopper (*Eugenia foetida*). Generally, because of the cooler weather, tropical species rapidly decline northward along the coast to Cape Canaveral. This unit is near the northernmost point where one still encounters a high percentage of tropical species. The examples seen in south Florida today represent remnants of a once extensive system. Because of the desirability for development of the remaining coastal property in south Florida, it is certain that the remaining examples of this community will become even more endangered outside of protected areas.

The mangrove communities in John U. Lloyd Beach State Park are also quite rare in Broward County due to extensive urbanization. This community with its tree canopy, masses of aerial roots, muddy substrate and small pools offers many types of habitat niches to various invertebrates and vertebrates as well as serving as a nursery site for many species (Odum et al. 1985). Although partially isolated, the overall health of this community is in good condition due to recent restoration efforts as mitigation for past wetland impacts as part of past Port Everglades expansion.

## Cultural Resources

This section addresses the cultural resources present in John U. Lloyd Beach State Park that may include archaeological sites, historic buildings and structures, cultural landscapes, folklife, 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 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 use in 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.

The FMSF lists no archeological resources for the park.

**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.

No historical structures are present at the park.

**Collections**

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

**Description:** The beach has regional historical significance and was designated as a Florida Heritage Site: F-652-2008, sponsored by the Florida State Parks System and the Florida Department of State (DOS). A sign was erected in a dedication ceremony in 2011 that describes the events leading up to this historical landmark. During the earlier part of the 20th century, African-Americans living in south Florida used Fort Lauderdale beaches but met with significant resistance from oceanfront property owners. On May 14, 1946, a delegation from the Negro Professional and Business Men's League, Inc., petitioned the county "seeking a public bathing beach for colored people in Broward County." In 1954, the county acquired a barrier island site, designated it for segregation and promised to make it accessible, but a road was never built. After years of protests including wade-ins on all-white public beaches, the county was ordered to fulfill their earlier obligations thus creating a "colored beach."

**Condition Assessment:** The condition of the beach has been described in the Natural Communities Section (see Beach Dune). As previously discussed, the beach is in good condition but is subject to natural and man-made influences that alter this area and are beyond the control of the park. For example, hurricanes, tropical storms and disruption of sand disposition all impact the beach and require specific management strategies

such as nourishment projects to replenish sands along the shore. Additional management objectives are discussed in the Coastal/Beach Management section.

**Level of Significance:** The designation of this beach as a "colored beach" by Broward County, the subsequent protests and county injunctions to stop the protests, and the county attorney who ruled in favor of the defendants all played an important role in the regional Civil Rights Movement. John U. Lloyd, the county attorney at the time of these landmark cases, is the namesake of the park.

**General management measures:** Management of the beach includes implementing pertinent strategies that range from planting native vegetation to beach nourishment projects. The management goals for the park are discussed in the Coastal/Beach Management section.

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

**Table 4: Cultural Sites Listed in the Florida Master Site File**

| Site Name and FMSF # | Culture/Period | Description | Significance | Condition | Treatment | Management Zone |
|---|---|---|---|---|---|---|
| F-652-2008 Colored Beach at John U. Lloyd Beach State Park | Historic/Civil Rights Movement | Florida Heritage Site | NE | G | N/A | JU-01, JU-02 |

**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 DRP's management goals for John U. Lloyd Beach State Park. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While 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 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, 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 Chapters 253.034 and 259.037, Florida Statutes.

The goals, objectives and actions identified in this management plan will serve as the basis for developing annual work plans for the park. The ten-year management plan is

based on conditions that exist at the time the plan is developed, and 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 restoration needs.***

Park staff will continually monitor the hydrological function of the park and assess the park's natural communities for future restoration needs, as needed.

***Objective: Restore natural hydrological conditions and functions to approximately one acre of maritime hammock natural community.***

The few remaining mosquito ditches are being filled naturally with sediment and native vegetation. Park staff will continue to monitor the progress of this natural recruitment of sediment and vegetation to determine if additional measures are needed.

***Objective: Monitor and analyze water resources at the park.***

The most important responsibility for surface water management at the park is to maintain and, if feasible, improve the estuarine nursery grounds and reduce nutrient input into surrounding waters. All of the hydrological features that influence the park's ecosystem extend beyond the boundaries and jurisdiction of the park. Park and district staff work in partnership with other agencies to ensure that the water quality of the park is maintained at acceptable levels.

A water quality monitoring program is in place and sampling is conducted by the Florida Department of Health (FDOH) through the Broward County Health

Department. The testing in the recreational waters of the park is part of the ongoing statewide water quality monitoring program to determine bacterial levels for public health and safety.

Occasional oil spills that occur in the ICW and the near shore waters of the Atlantic Ocean also affect the water quality of the park's hydrological resources. Park and district staff work with Port Everglades, the Division of Emergency Response, and the USCG to monitor and coordinate clean up efforts following each incident. Coordination by park staff may include ensuring public safety and monitoring for potential impacts on natural resources.

**Natural Communities Management**

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

As discussed above, 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.

**Natural Communities Restoration:** In some cases, the reintroduction and maintenance of natural processes is not enough to reach the natural community desired future conditions 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 communities' 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, small-scale vegetation management and so forth.

Large-scale beach nourishment and sand bypassing projects will be required on an as needed basis to protect facilities, buildings and other natural communities. In addition to the park's infrastructure, the USCG, the U.S. Navy and NOVA Southeastern University (NSU) have buildings on the island that also need protection from eroding beaches.

The natural communities at John U. Lloyd Beach State Park have benefitted from past large scale restoration projects. Past mitigation projects have restored tidal flushing to promote a healthy, fully functioning, estuarine tidal marsh. Large-scale invasive exotic removal projects targeted exotic vegetation in all of the upland communities within the park. Because of these projects and the efforts of park staff, only maintenance actions in these areas are recommended.

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

> ***Objective: Conduct habitat/natural community restoration activities on 1.7 acres of coastal strand community.***

Only one restoration project is proposed at the park. The area is associated with the proposed realignment of the park drive, which is described in the Land Use Component. Following the road realignment project, a site-specific restoration plan will be developed to restore disturbed areas to coastal strand.

**Natural Communities 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 (see Desired Future Conditions Map).

> ***Objective: Conduct natural community improvement activities on one acre of ruderal and one acre of developed communities.***

A small percentage of the overall acreage of the park persists in a ruderal condition. Certain ruderal areas are scheduled for development and no resource management activities will take place until construction activities are completed. Upon completion of the development project, the park will determine if additional resource management activities are warranted. The enhancement of other ruderal areas to upland and wetland habitats will be accomplished by removing existing invasive exotic vegetation, planting native vegetation and monitoring the area for regrowth of invasive exotics.

Erosion is threatening to undermine Park Drive. DRP will determine the effectiveness and feasibility of extending the existing riprap south along the ICW to act as a barrier and reduce the wave action that is causing the erosion. In addition to the riprap, red mangroves will be grown and planted behind the boulders to stabilize the sediment. The eroded area will need to be backfilled to the existing shoreline. The intent of this project would be to mimic the existing shoreline protection. District biologists will assist in identifying potential impacts from this project on the surrounding natural communities.

## Imperiled Species Management

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

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 FFWCC'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, FFWCC, 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 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: Update baseline imperiled species occurrence inventory lists for plants and animals.***

Park staff and district biologists will continue to develop partnerships with other agencies and academic institutions to assist with the updates of inventory lists for additional imperiled species.

DV
CS
DV
DV
MS
UC
EUS
DV
MS
BD
EUS
CS
MUS
MAH
DV

## Legend

- BD - Beach Dune 31.04 ac.
- CS - Coastal Strand 64.82 ac.
- MAH - Maritime Hammock 35.43 ac.
- MS - Mangrove Swamp 80.09 ac.
- EUS - Estuarine Unconsolidated Substrate 30.82 ac.
- MUS - Marine Unconsolidated Substrate 7.59 ac.
- DV - Developed 61.11 ac.
- UC - Utility Corridor 0.20 ac.

JOHN U. LLOYD BEACH
STATE PARK

N
0 500 1,000 2,000
Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2009

NATURAL COMMUNITIES
DESIRED FUTURE CONDITIONS MAP

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

John U. Lloyd Beach State Park is an active participant in the statewide marine turtle-monitoring program. Monitoring protocols have been established by FFWCC. Three species of marine turtles: loggerhead, green, and leatherback, use the beach for nesting. The park serves as a state index and survey beach for nesting marine turtles. During the nesting season, park staff conducts daily surveys of the beach recording the previous night's activities including the number of crawls, false crawls, species identification and the number of nests. In addition to the daily surveys, park staff also participates in the state's marine turtle stranding and salvage program that collects data on stranded, injured or dead marine turtles. The data collected from the park is used by state and federal agencies to formulate policy on nesting marine turtles. To increase public awareness and appreciation for the marine turtle, the park utilizes interpretive programs that include presentations and twice-weekly walks along the beach for a chance encounter with a nesting female turtle.

***Objective: Maintain predation levels of marine turtle nests at or below 10 percent.***

Predation from natural and introduced animal species is one of the major threats to marine turtle nests and hatchlings. Raccoons and opossums are the primary predators in the park. Depredation is a part of the natural system and, to a certain extent, compensated by the high reproductive output of marine turtles. However, predators will sometimes become so proficient at finding and destroying nests that they may threaten all the nests on a beach. Resource managers may sometimes control predators such as raccoons by trapping and removing nuisance animals from the beach. Another method for controlling mammalian predation without killing the predators is to place a self-releasing screen or cage over threatened nests. Park staff use a combination of flat screening and a predator removal program to maintain predation levels at or below the required 10 percent that was established by FFWCC. Raccoons are opportunistic predators that have adapted well to coexist in the urban developments throughout Florida. Scientific documentation indicates that certain behavior is learned. During the marine turtle nesting season, the population of raccoons prowling the beach increases. For these reasons, the screening does not always prevent nest depredation by raccoons, so it becomes necessary to remove the nuisance predator from the park. The predator removal program is an effective means of controlling nest depredation and is administered by the USDA.

***Objective: Reduce the level and intensity of artificial lighting from outside sources on the beach.***

Artificial lights on the nesting beach result in the disorientation of the turtle hatchlings following emergence from the nest cavity. Bright lights from Port Everglades illuminate the beach with enough intensity to cause turtle hatchlings to disorient and crawl away from the water. The majority perish in the upland communities. In some cases, female

turtles have abandoned their nesting attempts and returned to the ocean. Park staff are working closely with Port Everglades on this lighting issue. A presentation followed by a night tour of the beach was given to several of the Port's supervisors. Port Everglades has been receptive to using alternative lighting where feasible and have started installing shields on some of the outdoor lights including the high mast lights. Cruise and cargo ships that also use the Port present additional lighting issues. A light management plan is currently being developed by Projects Environmental Manager at Port Everglades and will be submitted to FFWCC for approval when completed. DRP will have a chance to review and comment on the plan. The park will continue to work closely with FFWCC and Port Everglades to address hatchling disorientation and further reduce the level and intensity of artificial lighting on the park's beaches.

***Objective: Minimize impacts from coastal armament and other impediments to nesting by working closely with regulatory and coastal engineering agencies.***

Beach renourishment projects alter the physiology and topography of the beach and pose another threat to nesting marine turtles. Following beach nourishment, a certain amount of "cliffing" will take place along the mean high water line where the waves continuously erode the recently deposited beach sand. Over time, the height and severity of the escarpments will decrease to form a more gradual slope. Depending upon the severity, these escarpments can be a hindrance to nesting marine turtles by preventing their access to the beach. Immediately following a beach renourishment project, nesting frequencies drastically decrease. It may take as long as three years for nesting frequencies to return to levels experienced prior to beach nourishment.

Additional shoreline structures, similar to the two groins and the jetty, will cause indirect impacts to the nesting turtles by interfering with their access to nesting grounds. However placement of such structures along the park's beach should be discouraged in favor of alternatives to coastal armoring. DRP acknowledges that these structures, in addition to periodic beach nourishment, projects are an important management tool. The park service will work closely with other agencies and contractors to minimize impacts to nesting turtles by restricting work to the non-nesting season and continuing to conduct daily nesting surveys.

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

John U. Lloyd Beach State Park has one of the largest known populations of beach jacquemontia in Florida. The park will continue to monitor the growth of the beach jacquemontia to determine the health and potential impacts to the plants. A portion of the current population is growing among exotic vegetation. Although this population has been marked, indirect impacts, such as overspray from herbicides and damage from the physical removal of the exotic regrowth, are still a possibility. Although park staff practice avoidance and use caution when working in this area, relocation to a more suitable area of the park will be considered as a possible option to protect certain plants.

Should the park decide to relocate a portion of the population, only those plants that are immediately threatened by exotic removal activities will be considered as candidates.

Biologists at Fairchild Tropical Botanical Gardens are drafting a species management plan for the beach jacquemontia for all of south Florida. Although the plan is not park specific, DRP will work with Fairchild Tropical Botanical Gardens on developing this imperiled species management plan to include specific strategies that can be implemented at state parks. The management plan should include monitoring protocols as well as suggested actions for increasing the resident population, such as supplementing plant stock or experimental burning. Additional plant stock may be available as a donation from Fairchild Tropical Botanical Gardens. This opportunity would augment the resident population and, if successful, there would be a net increase in the wild population of beach jacquemontia. Several factors such as suitable habitat, survival rate of transplants, accessibility for monitoring, and non-interference with visitor services will be taken into account. Reintroduction of an imperiled species into the park will adhere to the guidelines and protocols established by BNCR. The tropical hardwood hammock is not a fire dependent community. If experimental burning is recommended for the recovery of the beach jacquemontia, park and district staff will ensure that all burn plans are developed and implemented in compliance with the policies and requirements of DRP and FFS.

**Exotic Species Management**

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

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: Annually treat eight acres of exotic plant species in the park.***

Park staff and district biologists will conduct exotic removal treatment at the park for Category I and II invasive exotics. The goal will be to treat exotic species that either have resprouted or have recruited into natural communities following previous exotic removal treatments. All communities, including ruderal and developed, will be targeted. Continuous monitoring and maintenance activities to control regrowth and new infestations will be implemented by park staff. Vegetative surveys will continue to be conducted to ascertain the presence of new exotic species.

***Objective: Implement control measures on seven nuisance and exotic animal species in the park.***

Control measures will focus on maintaining predation levels on marine turtle nests at or below the required 10 percent that was established by the Florida Fish and Wildlife Conservation Commission for State Index Nesting Beaches. Raccoons and opossums are the primary predators that will be removed from the beach under a program contracted

by the USDA. The park occasionally has to remove feral or stray cats and dogs from the park. These animals should continue to be turned over to the county animal control facility.

When exotic reptiles: green iguanas, curly tailed lizards, and Cuban anoles, are observed in the park, they will be removed. Guidelines for removal methods will follow those outlined in the Florida Park Service Operations Manual. At this time, the populations of exotic reptile species are at acceptable management levels at the park; however, should the population increase, park staff will investigate the feasibility of adding exotic reptile control to the existing USDA contract.

## 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 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 reestablish old-growth characteristics to the degree practicable, with the exception of those communities specifically managed as early successional.

During the development of this plan, an analysis was made regarding the feasibility of timber management activities in the park. It was determined that the primary management objectives of the unit could be met without conducting timber management activities for this management plan cycle.

### Coastal/Beach Management

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 (e.g., 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 the particular projects. DRP staff need 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.

Port Everglades Inlet delineates the northern boundary of the park, and according to DEP, Bureau of Beaches and Coastal Systems, the 8.1 miles of Broward County beaches

south of this inlet is a critically eroded area that threatens recreational interests at the park. The 2.3 miles of sandy beach at John U. Lloyd Beach State Park are included in this designation. Following several record hurricane seasons, the beach and the jetty were severely damaged. These storm events led to a beach nourishment project by Broward County and the USACE in 2005 that included the construction of two T-groins, one spur groin and the placement of sand. A project to repair the jetty in an effort to minimize erosion has been completed. Park service staff will continue to work with the County or the Corps to fund and implement jetty stabilizing and sand tightening projects as determined most feasible to limit sand loss and reduce safety concerns.

The Trustees have granted management authority of certain sovereign submerged lands to DRP under Management Agreement MA 68-086 (as amended January 19, 1988). Management of John U. Lloyd Beach State Park includes certain management activities within the buffer zone of sovereign submerged land along the entire beach, beginning at the mean high water or ordinary high water line, or from the edge of emergent vegetation and extending waterward for 400 feet. This area comprises the marine consolidated and marine unconsolidated substrates of the park. The submerged resources within the buffer zone significantly increase the species diversity within the park and offers additional recreational opportunities for park visitors. Visitors are able to access this patchy hardbottom community either from the beach or from a boat. The park collaborates with other government agencies and educational institutions in the management of these submerged communities. Collaborative management actions include conducting resource inventories, monitoring, and assessing damage to natural resources resulting from vessel groundings. The park also conducts outreach programs designed to educate the public on the importance of these communities.

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 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.***

Broward County has proposed a sand bypass system for the Port Everglades Inlet. This project, known as the "Port Everglades Sand Bypass Project," would greatly offset the loss of sand that would have drifted southward from the Ft. Lauderdale beach area. In the existing condition, a volume of sand estimated to be approximately 37,000 cubic yards per year is lost to the system. This lost sand partly fills the navigation channels (creating more frequent dredging), creates unwanted shoals in the interior waters, and some of the sand jets offshore past the point during ebb tidal flow. As currently proposed, the bypass systems would improve function of the north jetty and create a basin just south of this north jetty to trap much of the sand that is currently lost. This sand would be high beach quality and not blended with other sediments that are

excavated during channel and shoal dredging events. As proposed, every three years or so, this basin would be dredged and the sand would typically be barged to nourish the park beach and the down-drift beaches. If determined necessary during particular basin dredging cycles, the collected sand may be "back-passed" to the northern Broward County beaches.

***Objective: Continue to collaborate with federal, state and local agencies to fund, design, permit, improve and maintain coastal and beach management programs consistent with the mission of DRP.***

In coordination with the sand bypass project, there are tentative plans to install a permanent pipe sleeve from the ICW (just north of the canal) under the main park drive to the vicinity of the beach. This will facilitate a low-impacting means of offloading sand from barges and hydraulically pumping it to the beach during sand bypassing and other beach renourishment events. Park staff are active participants on these projects. Pursuant to a "Certificate of Adoption" (May 13, 1999), DEP supports the implementation of the *Port Everglades Inlet Management Plan* that this project is conceptually intended to satisfy. It is possible that the state will be called upon to provide cost share for this project.

***Objective: Continue to assist federal, state and local agencies with monitoring and assessment of natural community responses following coastal projects.***

It is likely that John U. Lloyd Beach will need an interim project for beach renourishment prior to implementation of a bypassing project. The sand bypass project is currently under development. It is anticipated that the County will sponsor DRP to design and permit an interim beach renourishment project. This will require searching for and permitting a sand source that is very compatible with the native park beach. DRP staff will work with local, state and federal agencies to study and implement an interim beach nourishment project.

Much of the hardbottom nearshore to the park's beach has become exposed through the years by erosion processes, especially since the installation of the jetty systems. Beach nourishment and sand bypassing projects always carry risks of some coverage of exposed hardbottom by sand. In addition, construction of coastal structures is always a concern to these submerged communities. All such coastal project events requires careful study and planning with park staff to ensure that projects result in net positive benefits to the marine and coastal natural communities of the park.

There are three imperiled species of marine turtles that use the beach for nesting. Nesting mostly occurs on the southern beach where there are fewer facilities and less impact from visitors and erosion. The nearshore hardbottom community is used by adult marine turtles to forage and breed and by the hatchlings for refuge from predators when they first enter the ocean after emergence from nest cavities. Park and

DRP staff will work with FFWCC to ensure that protocols are implemented to minimize impacts to wildlife following beach renourishment projects.

**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, 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. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation. John U. Lloyd Beach State Park has an arthropod control plan dating from 1987, when the earliest plans were adopted. Because no amendment has been proposed by the local mosquito control district, this plan is considered to still be in effect.

**Potential Global Climate Change and Sea Level Rise**

Potential sea level rise resulting from global climate change is now under study and will be addressed by Florida's residents and governments in the future. As it has in the past, the DRP, in coordination with other DEP programs and federal, state and local agencies, will continue to monitor the natural and human-induced changes that occur to the park's shorelines and other natural features, its vegetation, imperiled species populations and habitats, and its cultural resources. The ongoing data collection and analysis will inform the Division's adaptive management response to future conditions, including the effects of sea level rise, as they develop.

Within the 10-year planning period of this management plan, however, sea level rise is not anticipated to directly affect the natural or cultural resources of John U. Lloyd Beach State Park or the recreation facilities and infrastructure of the park. The trend of accelerated erosion of Florida's beaches is considered by some to be an early indication of global climate change. The impacts of beach erosion on the park's sea turtle nesting habitat (and its primary recreational resource) will be addressed case-by-case with the FFWCC, the USFWS and coastal engineering agencies, as has been done for the past many years (see the Resource Inventory and Assessment, Resource Management Program and the Coastal/Beach Management sections of this plan).

## Cultural Resource Management

**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. DRP is

implementing the following goals, objectives and actions, as funding becomes available, to preserve the cultural resources found in John U. Lloyd Beach 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 and collections care 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 DHR for consultation and 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 DHR.

The FMSF lists one cultural resource for John U. Lloyd Beach State Park.

***Objective: Assess and evaluate one recorded cultural resource in the park.***

There is one recorded historic site at the park, a Florida Heritage Site relating to the Civil Right Movement. An evaluation of the site's significance is recommended. Since no historic structures exist at the park, no Historic Structures Reports are recommended. Cultural resource assessment needs will be reevaluated during the next revision of the management plan.

***Objective: Compile reliable documentation for one recorded cultural resource.***

Documentation, which could include photographs, historic accounts, interviews, articles and other reliable data, should be compiled for the Colored Beach site. At this time, there are no archaeological resources recorded at the park; however, park staff will update park data in the FMSF, if the need arises. It is recommended that the park complete a predictive model to determine areas of high, medium and low probability of locating archaeological sites within the park. To guide park staff in the collection of items, it is recommended that the park work with the Collections Administrator to develop and adopt a Scope of Collections Statement.

***Objective: Bring one recorded cultural resource into good condition.***

There is one recorded cultural resource within the park. At this time, no cultural resource restoration is needed. Cultural resource restoration needs will be reevaluated during the next revision of the management plan.

## 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 managing agency shall consider the findings and recommendations of the land management review team in finalizing the required update of its management plan.

John U. Lloyd Beach State Park was subject to a land management review on November 3, 1998. The review team made the following determinations:

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

# LAND USE COMPONENT

## INTRODUCTION

Land use planning and park development decisions for the state park system are based on the dual responsibilities of the Florida Department of Environmental Protection (FDEP), 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 to guide the location and extent of future park development. Input to the plan is provided by experts in environmental sciences, cultural resources, park operation and management, and through public workshops, and user groups. With this approach, the DRP objective is to provide quality development for resource-based recreation with a high level of sensitivity to the natural and cultural resources at each park throughout the state.

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 described and located 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.

The population of Broward County is largely made up of working age adults from diverse backgrounds. According to U.S. Census data (2010), more than two-thirds of county residents are of working age, and more than half identify as black, Hispanic or Latino, or another minority group. One-quarter of residents can be described as youth or elderly (U.S. Census 2010). In 2008, Broward ranked eleventh statewide in per capital personal income, at $41,974 (U.S. Bureau of Economic Analysis 2010).

The park is located in the Southeast Vacation Region, which includes Broward, Miami-Dade, Monroe, and Palm Beach counties (Visit Florida! 2010). According to the 2009 Florida Visitor Survey, this is the second most popular region in the state, attracting nearly one-fifth of the total travelers to and within Florida. Of the estimated 14.6 million people who visited this region in 2009, more than 80 percent traveled for leisure. The survey identified visiting the waterfront and shopping as the top activities for the visitors to the region. Visitors to the Southeast Vacation Region reported the highest average expenditures per person per day, approximately $170, and the highest percentage of visitors traveling by

air (69 percent) (Visit Florida! 2010). Visitors reported an average stay of 4.6 nights and nearly half reported household incomes over $100,000 (Visit Florida! 2010).

There are considerable resource-based recreation opportunities in proximity to the park. More then 50 outdoor attractions are located within 15 miles of the park boundary; approximately 20 are located within five miles. Nearby resource-based recreational areas include two state parks, a state trail and several municipal facilities.

Two state parks are located near the park. Oleta River State Park, located nine miles to the south, provides paved and off-road cycling trails, along with rustic cabins and a fishing pier. Hugh Taylor Birch State Park, located three miles north, offers primitive group and youth camping, shoreline fishing, and paved trails. Both nearby state parks provide opportunities for wildlife viewing, beach activities, hiking and walking trails, picnicking, canoeing and kayaking, youth group camping, and interpretive activities.

The Florida Circumnavigational Saltwater Paddling Trail, or the CT, spans 1,515 miles along Florida's coast, from Pensacola to Fort Clinch. Segment 17, a 16-mile link from Oleta River State Park to Hugh Taylor Birch State Park, runs adjacent to John U. Lloyd Beach State Park. Paddlers can travel through the Intracoastal Waterway (ICW) or along the Atlantic coast.

Many municipal facilities provide resource-based recreational activities in close proximity to the park. West Lake Park is located immediately southwest of the park, across the ICW. West Lake Park features a large natural mangrove estuary that is connected by water channels to the ecosystem at John U. Lloyd State Park. West Lake Park provides many resource-based recreation activities, such as shared-use trails, boardwalk fishing, canoeing and kayaking, wildlife observation and nature tours. It is also home to the Anne Kolb Nature Center, a state-of-the-art educational facility and conference center that features a saltwater aquarium and observation tower. Two nearby regional municipal parks, Tradewinds and Tree Tops, offer extensive equestrian trails and facilities. Tradewinds Park also includes a bird and butterfly interpretive garden called Butterfly World. The Bonnet House, located three miles north of John U. Lloyd State Park on Fort Lauderdale Beach, is a historic house and ornamental garden that was owned by Hugh Taylor Birch, the namesake of Hugh Taylor Birch State Park. Coontie Hatchee Park, Sailboat Bend Preserve, "Bill" Keith Preserve and Warbler Wetlands are a few of the neighboring municipal conservation areas, which are designed to protect natural resources and provide opportunities for passive recreation activities.

The Broward Urban River Trails, or BURT, consist of the myriad canals and waterways that snake through Broward County. Two urban river trails, Pond Apple Slough and North Fork Blueway, are located approximately five miles inland of the park. Both urban river trails are accessible from the New River Loop, a 25-mile blueway trail that traverses the ICW on the west side of John U. Lloyd State Park. The New River Loop is a component of the Broward County Greenway Network Master Plan, which was adopted in 2002 (Broward County 2002).

## Existing Use of Adjacent Lands

John U. Lloyd Beach State Park is located on the eastern coast of Broward County within the City of Hollywood, in Florida's most populous region. In 2009, more than 5.5 million people lived within 50 miles of the park (U.S. Census 2011).
The park is located on a barrier island peninsula between ICW and Atlantic Ocean. The northern park boundary ends at Port Everglades Inlet, the main entrance to Port Everglades. Access to the park is off A1A and East Dania Beach Boulevard.

Three municipal facilities are located on the northwest corner of the park peninsula: a U.S. Navy facility, a U.S. Coast Guard station and a NOVA Southeastern University (NSU) component campus, the NSU Oceanographic Center. This Center has an active graduate education program and research activities. Access to these facilities is a shared-use of the main park drive. The City of Dania operates Dania Beach Park to the south of John U. Lloyd Beach State Park. Extensive urban development occurs across the ICW, including high-density residential and commercial uses along with industrial uses, mainly associated with Port Everglades and Fort Lauderdale International Airport.

Boats unassociated with park uses, including recreational and port traffic, share the two waterways adjacent to the park. Large ships, such as cargo vessels and ocean liners, frequent the port and use the ICW as a turn basin. Numerous boats use the ICW and inlet for access to the nearshore reefs.

## Planned Use of Adjacent Lands

Out of Florida's 67 counties, Broward County ranks second in both total population and population density. According to the U.S. Census Bureau, more than 1.7 million people lived in the county in 2009, accounting for nearly 10 percent of Florida residents. Census information indicates that between 2000 and 2009, the population of Broward County grew by almost nine percent, or just over half the rate of growth statewide (16 percent). This is due in part to the fact that the county is nearing its development potential. The entire western portion of the county, approximately 797 square miles or 66 percent of the total land area, is protected land. The Everglades and Francis S. Taylor Wildlife Management Areas, the Miccosukee Indian Reservation off Alligator Alley, and the Big Cypress Seminole Indian Reservation are all located in protected areas of west Broward County. The dwindling number of developable parcels within the county is reflected in the population estimates projected for future years. The county is projected to grow conservatively in the next decade, at less than 11 percent, well below the nine to 19 percent growth projected statewide (BEBR 2011).

A review of proposed comprehensive plan amendments in Broward County showed no substantial development projects impacting the park. Most of the proposed amendments revealed a trend towards infill projects, conservation, multi-modal transportation linkages and transit-oriented development. Projects that can be expected to impact the park at least minimally are the proposed expansion of Port Everglades,planned construction at the NSU research facility, and the potential sand bypass project, a joint project by the County and other agencies, which is discussed in the Coastal/Beach Management section of the Resource Management Component.

Prior to 2001, the U.S. Army Corps of Engineers (USACE) initiated a study to evaluate the feasibility of enlarging Port Everglades to receive more and larger cruise ships and to receive post-Panamax cargo carriers. The study evaluated ten different expansion alternatives to handle the larger vessels, with potential impacts to the park ranging from zero to 29 acres (FDEP 2001). The alternative described in *The Port Everglades Master/Vision Plan*, adopted in 2007, proposes widening and deepening of the main entrance channel, just north of the park, as well as enhancement of the ICW. Mitigation of potential park impacts could include removal of exotic plants, planting of native species, wetland creation, and habitat restoration (DMIM/AECOM 2007). DRP should work with USACE to ensure that impacts from the port expansion project be minimized and adequately mitigated to yield a net positive benefit to the park.

Planned improvements at the NSU Oceanographic Center include construction of two new research buildings, expanded surface parking, visitor center, research aquarium and outdoor recreation area. Phase one of the project includes construction of a six-story, 87,000 square foot, graduate research building. Construction milestones for phase one are planned with project completion in December 2012. Part of the NSU improvements will take place on 2.34 acres of park property that was subleased to the university in 2010. The subleased area is located toward the north end of the park, adjacent to the existing research facility. It is a ruderal area that is separated from the recreational areas of the park by the main park drive. The planned use of the subleased property will included a landscaped entrance to the research facility and parking area (FDEP 2010).

As a term of the sublease agreement, NSU has implemented a number of energy-saving improvements to park facilities, which will reduce the park to net-zero energy consumption. NSU also agreed to operate a portion of the parking area as shared-use facility. Park visitors will be able to use the facility on some weekend days and during special events (FDEP 2010).

## 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.

### Recreation Resource Elements

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

## Land Area

The park protects a sizable contiguous natural area in a densely developed urban context. Seven natural communities are represented at the park, providing diverse wildlife habitat and wide-ranging natural experiences for park visitors. Park land provides significant area for many recreational amenities, including beach activities, shared-use trails, picnic areas, event pavilions and necessary support facilities.

## Water Area

The park provides access to two substantial bodies of water: the ICW and the Atlantic Ocean. Both provide significant opportunities for saltwater recreation, providing opportunities for swimming, fishing, motorized and non-motorized boating and other activities. SCUBA diving is a popular activity off the park's Atlantic coast. The water areas adjacent to the park include a segment of the state's circumnavigational paddling trail. Whiskey Creek, which runs through the park parallel to the ICW, offers an ideal setting for canoeing and kayaking. The creek is nearly a mile and a half long, and its calm shallow waters make it an enjoyable route for paddlers of all skill levels. Native mangroves make up the creek's edge, shielding the view of neighboring urban development. Many types of wildlife can be seen in Whiskey Creek, including manatees.

## Shoreline

The primary recreational resource of the park is its saltwater shoreline. The combined shoreline length of the park is approximately eight miles. An estimated half-million day-use visitors attend the park each year. Management of public use at this volume and its potential impact on the shoreline is an ongoing challenge for park staff. As one of the last remaining undeveloped barrier islands in southeast Florida, all undeveloped portions of the unit are significant for the plant and animal habitats they provide.

The eastern shoreline features more than two miles of sandy Atlantic beach, the park's primary recreational attraction. The ocean beach is suitable for many activities, including shoreline fishing, swimming, rafting and boating, sunbathing, surfing, snorkeling, and other pursuits. Natural beach communities, such as sand dune and coastal scrub, provide habitat for rare and endemic species, including sea turtles and shorebirds. Much of the western shoreline consists of dense mangrove vegetation. This area primarily provides opportunities for wildlife viewing and observation.

## Natural Scenery

The park's beaches provide visitors with an unobstructed view of the horizon over the Atlantic Ocean. Vegetation on the park peninsula acts as a visual buffer for users of the beach, shielding the view of heavy industry at Port Everglades and other development.

## Significant Wildlife Habitat

The beaches provide significant wildlife habitat for nesting sea turtles, with 200 to 300 nests occurring each year. The park provides a sea turtle awareness program for visitors during nesting season. This evening program includes a campfire discussion, informational presentation, question and answer session, and guided beach walk.

## Natural Features

The general topography of the park is flat. Sandy beaches and relict dunes occur along the shoreline of the island and their height is determined mainly by the strength and direction of the winds. The upland natural communities of this unit include beach dune, coastal strand and maritime hammock. The marine communities include estuarine tidal swamp, marine tidal swamp, estuarine unconsolidated substrate and marine consolidated substrate. These natural features and communities provide a broad array of recreational and educational opportunities for the visitors.

## Archaeological and Historical Features

There are several culturally significant features associated with the park's history, dating from the late nineteenth century. From 1886 to around the end of the century, the park's beaches were part of the original route traveled by the "Barefoot Mailman." Before roadway infrastructure existed in southeast Florida, the mail was carried down the beaches on foot from Hypoluxo to Miami (FDEP 2001, FDEP 2007). During the Prohibition Era of the 1920s, bootleggers used Whiskey Creek to evade the Coast Guard while smuggling liquor into Florida from the Bahamas (FDEP 2001, FDEP 2007). Perhaps, the best-documented culturally significant use of the park is its history as a "Colored Beach" during the 1960s. This history is discussed in the Cultural Resources section.

# 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

Before acquisition by the State, a large portion of the property was operated as a county park by Broward County. A detailed description of the area's background and history is contained in the Cultural Resources section.

## Future Land Use and Zoning

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 opportunities.

The park is identified as "Recreation and Open Space" in the Broward County future unincorporated area land use data. According to the Broward County Land Use Plan, recreation and open space uses are permitted without special restrictions in this land use designation (Broward County 2010).

The park falls under the City of Hollywood zoning designations and is zoned "Governmental Use District" (GU). This zoning allows for many types of government and municipal land uses, including state parks (City of Hollywood 2009). A GU district is intended to be developed as a whole, so that each use included within the district is consistent with the primary land use. To ensure that development of a GU district occurs in this fashion, a site plan review may be required. There are no expected conflicts between the GU zoning designation and typical state park land uses.

HARBOUR INLET

JETTY

BTIITF LEASE TO U.S NAVY

NSU OCEANOGRAPHIC CENTER

BEACH USE AREA

USCG

GROUND SOLAR ARRAY

OFFICE & SHOP AREA

BEACH USE AREA

ENVIRONMENTAL EDUCATION FACILITY

BEACH USE AREA

BOAT RAMP AREA

CONCESSION

Page 2

INTRACOSTAL WATERWAY

WHISKEY CREEK

ATLANTIC OCEAN

BARRIER ISLAND TRAIL

BATHHOUSE

DANIA CUTOFF CANAL

ENTRANCE STATION SOLAR ARRAY ON ROOF

RESIDENCE

FLORIDA ATLANTIC UNIVERSITY SEATECH CAMPUS

DANIA BEACH BLVD

## Legend

- Park Boundary
- County Road
- Park Road Paved
- Park Road Unpaved
- Structures
- Parking Lots
- Boardwalk
- Trails

N

0 500 1,000 2,000 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2009

JOHN U. LLOYD BEACH STATE PARK

BASE MAP
PAGE 1 OF 2


JOHN U. LLOYD BEACH
STATE PARK

N
0 125 250 500
Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of Aerial: 2009

BASE MAP
PAGE 2 OF 2

Development or renovation of structures within the City of Hollywood must conform to the standards of design outlined in the city code. Standards apply to exterior paint color, roof color and other features (City of Hollywood 2010). Park staff should ensure that redevelopment or construction complies with the city's expectations for park development.

## Current Recreational Use and Visitor Programs

Resource-based outdoor recreation in Florida continually increases in popularity. The growth of Florida's resident and tourist populations brings increasing pressure for access that is more widespread and for denser levels of public use in the natural areas available to the public. Consequently, one of the greatest challenges for public land management today is the balancing of reasonable levels of public access with the need to preserve and enhance the natural and cultural resources of the protected landscapes. John U. Lloyd Beach State Park serves the needs of residents and visitors to Broward County by providing a wide range of recreational activities, including swimming, sunbathing, surfing, picnicking, walking and hiking, cycling, fishing, wildlife viewing, and motorized and non-motorized boating. The wide array of activities offered at the park responds to the diversity of the neighboring population. The park's activities and programs serve users from many cultures, all ages and abilities, and varied economic circumstances.

The park offers interpretive and educational programming in numerous formats for park visitors. In-person presentations, guided walks, publications, self-guided tours and kiosks interpret the parks natural resources. Interpretive programming is presented in the park's educational facility and at strategic locations throughout the park. In addition, approximately 15 outside organizations provide environmental education programs within the park, such as master gardener workshops, master naturalist workshops, home school programs and others.

In fiscal year (FY) 2010/2011, approximately 508,375 people visited the park. Annual park attendance has been relatively steady over the past five fiscal years, ranging from 465,000 to 500,000 visitors per year. In the last year, park visitors contributed more than $22.8 million to the local economy, an additional $1.5 million in sales tax revenue, and approximately 457 jobs (FDEP 2011).

## Other Uses

Two areas, located at the end of the park peninsula and west of the park drive, are under sublease agreement to other organizations. Access to both subleased areas is via the park drive. The U.S. Navy has long held a sublease for approximately eight acres at the park's north end, while an additional two acres was recently subleased to NSU. Development of the newly subleased area will be in conjunction with the proposed expansion of the NSU research facility and will include net positive benefits to the park. As part of the NSU research lab expansion, the university will upgrade several park facilities to solar power. Sites identified for solar upgrades include the ranger station, shop and administration buildings, water heaters and park lights.

## 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 John U. Lloyd Beach State Park the maritime hammock community has been designated as a protected zone as delineated on the Conceptual Land Use Plan.

# Existing Facilities

## Recreation Facilities

Four recreational day-use areas are located at the park. The south beach day-use area is located east of the park drive, halfway between the ranger station and boating access area. It contains a nature trail, two interpretive kiosks and two boardwalks with adjoining ADA accessible walkways that provide access to the beach. The boating access area is located west of the park drive at the northern opening of Whiskey Creek to the ICW. The boating access area contains two boat ramps, a picnic pavilion and an overlook. The main swimming and picnic area is located just north of Whiskey Creek. It contains an education facility and observation deck, multiple pavilion and picnic areas, beach access boardwalks, and a shoreline launching area for canoes and kayaks. This area also features a concessionaire that offers food and rentals, including canoes and kayaks. The fishing area is located at the extreme north end of the park. It contains a picnic pavilion and boardwalk that provides access to the jetty.

## Support Facilities

The park has two primary maintenance and support areas. The entrance area is located at the south end of the park; it includes two residences, a ranger station, tollbooth and paved parking area. The shop area is located west of the park drive, adjacent to the main swimming and picnic area. The shop area contains a maintenance shop/administration office, equipment shelter, flammable storage shed, fenced vehicle storage area, mobile home site, plant nursery and staff residences. A county pollution-monitoring site is also located in the shop area. Additional support facilities are located at each of the day-use recreational areas. The south beach day-use area contains a paved parking area, unpaved overflow parking area, restroom and lift station. The boating access area contains a paved parking area, boat trailer parking, dock, restroom and lift station, and county aviation noise monitoring station. The main swimming and picnic area contains four paved parking areas, auxiliary parking area, restrooms and lift stations. The fishing area contains a paved parking area and restroom. The following is a listing of recreation and support facilities at the park:

**Entrance Area**
Residences (2)
Utility building
Ranger station
Tollbooth (1)
Paved parking (10 spaces)

**South Beach Day-use Area**
Nature trail
Interpretive kiosks (2)
Boardwalks (2)
Accessible beach access walkways (2)
Footbridges
Paved parking (102 spaces)
Stabilized overflow parking (70 spaces)
Restroom (1)

**Main Swimming and Picnic Area**
Environmental Education Facility
- Interpretive Center
- Observation deck
- Boardwalk
- Paved parking (19 spaces)

Picnic tables
Picnic pavilions (5)
Accessible walkway
Canoe and kayak launch (shoreline)
Concession building with restroom
Paved parking (977 total spaces)
Auxiliary parking area (up to 30 spaces)
Restrooms (5)

**Boating Access Area**
Boat ramps (2)
Picnic pavilion
Overlook
Boardwalk
Paved parking (51 standard spaces)
Paved boat trailer parking (97 spaces)
Dock
Restroom (1)
Lift station (1)

**Fishing Area**
Picnic pavilion
Boardwalk
Fishing jetty
Paved parking (57 spaces)
Restroom (1)

**Shop Area**
Maintenance shop/administration office
Equipment shelter
Flammable materials storage shed
Utility building (3)
Mobile home site
Plant nursery
Paved parking (18 spaces)
Residences (8)

Park drive (2.3 miles)

## CONCEPTUAL LAND USE PLAN

The following narrative represents the current conceptual land use proposal for this park. As new information is provided regarding the environment of the park, cultural resources, recreational use, and as new land is acquired, the conceptual land use plan may be amended to address the new conditions (see Conceptual Land Use Plan). A detailed development plan for the park and a site plan for specific facilities will be developed based on this conceptual land use plan, as funding becomes available.

The conceptual land use plan described here 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. The development plan will be reassessed during the next update of the park management plan, and modified to address new conditions, as needed.

During the development of the management plan, DRP assessed potential impacts of proposed uses or development on the park resources and applied that analysis to decisions on the future physical plan of the park as well as the scale and character of proposed development. Potential impacts are more thoroughly 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 more thoroughly investigated. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Stormwater management systems are designed to minimize impervious surfaces to the greatest extent feasible, and all facilities are designed and constructed using best management practices to avoid impacts and to mitigate those that cannot be avoided. Federal, state and local permit and regulatory requirements are met by the final design of the projects. 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, the 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 activities and programs are also recommended and discussed below.

***Objective: Maintain the park's current recreational carrying capacity of 11,032 users per day.***

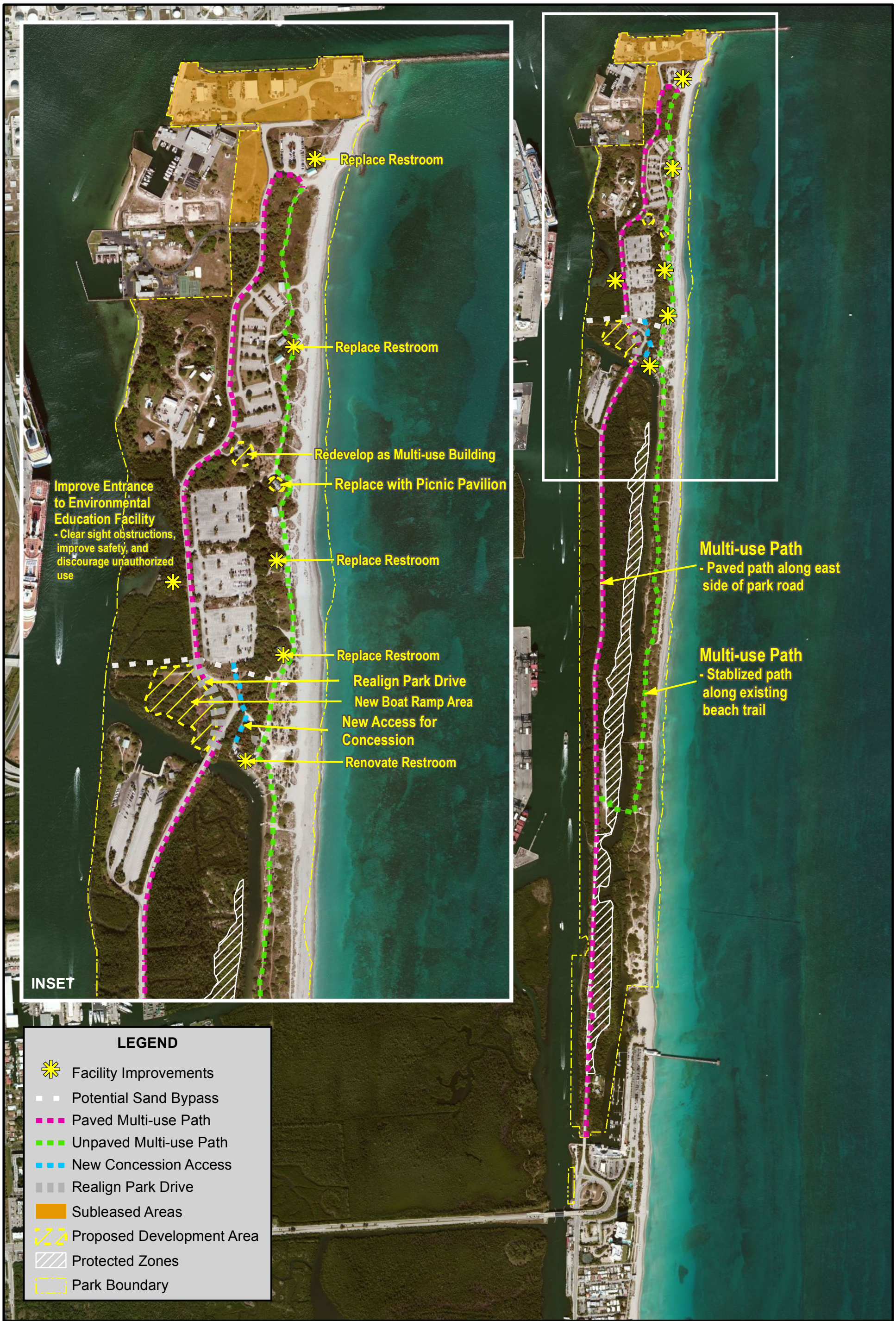
The current forms of outdoor recreation offered at the park provide a valuable resource for beach and water recreation, picnicking, hiking and nature study in the Broward County area.

***Objective: Expand the park's recreational carrying capacity by 420 users per day.***

Addition of the new boating access area and the bicycling trail will increase the current recreational carrying capacity and expand popular recreational activities at the park.

***Objective: Continue to provide the current repertoire of 14 interpretive, educational and recreational programs on a regular basis.***

Seven in-person presentations are offered at the park, covering a range of topics relevant to the park's issues and resources. Presentations offered include *Career Day, Sea Turtles: Saga or Eulogy, Vanishing Island, A Wilderness Within, Coral Reef, Park Senses* and *Manatees*. Guided walks and recreational programs that are offered include the barrier island trail walk, beach walk, canoe program and the Sea Turtle Awareness Program. The park's Sea Turtle




JOHN U. LLOYD BEACH STATE PARK

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0 0.125 0.25 0.5 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Office of Park Planning

CONCEPTUAL LAND USE PLAN

Awareness Program serves an interpretive and educational purpose and is well-attended by park visitors. It provides the public with valuable information that promotes preservation of these imperiled species. The program also provides visitors with a once-in-a-lifetime opportunity to observe the nesting habits of these animals in their native environment. Walks are also offered that educate visitors about park ecology, park history and "lethal litter." Self-guided interpretive signs and panels educate visitors about manatees, invasive plants and trees, seashells, rip tide currents and other issues. Publications cover an array of themes, including corals, manatees, sea turtles, mangroves, sea grasses, trails and park activities.

***Objective: Develop or update five interpretive, educational and recreational programs.***

Several of the park's interpretive presentations should be updated. Some of the programs contain older or outdated photographs and content, while other programs exist in irrelevant technological formats, such as photographic slides. The park should update these presentations to include timely content that is engaging and relevant to park visitors. Presentation materials should be updated to modern digital format, such as PowerPoint.

At least one new interpretive theme should be developed to interpret the solar improvements that are being installed at the park. The program could educate visitors about energy use reduction and renewable energy sources. New interpretive stations are also recommended at strategic locations throughout the park, where visitors gain access to natural or cultural resources. Interpretive content should be evocative of nearby resources; for example, the protection of aquatic fauna could be highlighted at the boating access area. Displays could also identify behaviors that are encouraged in the park, while discouraging perennial problem activities, such as littering. Up to four interpretive panels and one interpretive kiosk are proposed. Where possible, signs will be consolidated to decrease intrusions into park vistas.

## 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 park is in need of several infrastructure upgrades, including replacement of the restroom facilities, upgrade of septic facilities to municipal sewer, and upgrades to the park drive. In addition, several mitigation projects are proposed in conjunction with neighboring projects impacting park land. Proposed mitigation projects include those associated with the NSU research facility expansion and the expansion of Port Everglades.

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 that visitors enjoy while in the park, to improve the protection of park resources, and to streamline the efficiency of park operations. The following is a summary of facilities improvement and development needed to implement the conceptual land use plan for John U. Lloyd Beach State Park:

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

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

***Objective: Improve/repair ten existing facilities and 2.3 miles 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.

**Education Facility Improvements:** Unauthorized use of the park's education facility is an issue, and the building's design makes monitoring of the facility difficult for park staff. Renovation of the building's east-facing façade is recommended in order to provide clear lines-of-sight from the entrance boardwalk through to the back of the building. These improvements will enhance visitor safety and experience, while discouraging unauthorized use of the facility.

**Infrastructure Improvements:** Several restroom and restroom facilities at the park need to be replaced, including those at the main beach day-use area and fishing area. The restroom attached to the concession building is also in poor condition, and needs to be renovated. Currently, the northernmost restroom facility, located in the fishing area, is scheduled for replacement.

Several areas of the park drive are in need of improvement. The park drive should be realigned to remove the sharp bend near the entrance to the existing concession. At times, visitors stack onto the roadway attempting to access the concession, which causes unsafe congestion on the park drive. In conjunction with the road realignment, the concession access should be rerouted through the southern beach day-use parking area, known as parking lot 2. When the project is completed, the former road alignment should be restored to natural area.

In other areas of the park drive, erosion is occurring along the road shoulders. An engineering assessment should be conducted to determine the full scope of needed improvements. Culverts along the park drive should be evaluated to determine whether they provide sufficient flow, and whether eventual replacement with bridges may be necessary. A traffic study is recommended to determine whether safety improvements or traffic calming devices may be needed along the park drive, particularly at the park entrance and approaching the tollbooth. If possible, upgrades to the park drive should be developed in conjunction with other projects, such as the new boating access area, potential sand bypass project, or proposed bicycling trail.

As part of the NSU research lab expansion, city sewer service on the park peninsula was expanded to encompass new university facilities. This enabled the park to turn over maintenance of sewer facilities to the city. In the future, the few remaining septic facilities at

the park, including the entrance buildings and shop compound, should be connected to city sewer.

***Objective: Construct three new facilities and 4.4 miles of trail.***

**Multi-use Building and Picnic Pavilion:** A large picnic pavilion near the park's beach day-use area will be redeveloped into a multi-use building that includes a concession and restrooms. The multi-use building will be designed to accommodate eat-in and walk-up food service for park visitors, while providing dine-in visitors with a view of the ocean. The proposed location has direct access off the park drive, and it is convenient to existing parking areas and beach. The restroom just south of this location will be replaced with a picnic pavilion. Due to its location seaward of the CCCL, the new picnic pavilion will be constructed within the footprint of the existing restroom. Turtle-safe lighting and design will be implemented at the onset of each project. Due to the intricacies of coastal construction and permitting, these buildings will be designed and constructed in consultation with relevant regulatory agencies.

**New Boating Access Area:** In 2006, FDEP produced recommendations for expanding boating access in state parks. The recommendation for John U. Lloyd Beach State Park included expanding boater access facilities on the north shore of Whiskey Creek (FDEP DRP 2006). The selected site is a disturbed area, located across from the current boat ramp and west of the park drive. Facilities proposed at this location would include a double-lane boat ramp, boat dock, parking area, and modest restroom. The parking area would include standard, oversize and universally accessible spaces.

**Bicycling Trail:** Bicycling is a popular activity with park visitors, and a looped bicycling trail is proposed for the park. The loop would consist of two main sections. The first section would be a paved multi-use path along the east side of the park drive, spanning approximately 2.6 miles from the park entrance to just south of the jetty parking area. The second section would be a stabilized path that follows the existing service roads that run along the beach. The stabilized path segment would run from the jetty parking area to the southern parking area, approximately 1.8 miles, where it would cross over the footbridge at Whiskey Creek, forming a shared-use loop trail. Currently, the Whiskey Creek footbridge is universally accessible, but it should be adapted to accommodate bicycle traffic and small park vehicles, such as a golf cart. The proposed loop trail would include linkages into the hiking trail east of Whiskey Creek and the local bikeway network. The proposed bicycling trail would expand recreational cycling opportunities while increasing the safety of riders by separating cyclists from vehicles traveling on the park road. Park and district staff should coordinate with the Office of Park Planning and the Bureau of Design and Construction in the design and planning of the path to ensure the project is completed with minimal impact to the park's resources.

## Facilities Development

Preliminary cost estimates for these recommended facilities and improvements are provided 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. The following is a

summary of facilities needed to implement the conceptual land use plan for John U. Lloyd Beach State Park:

**Beach Day-use Area**
Multi-use building
Picnic pavilion

**Education Facility Improvements**
Building improvements

**New Boating Access Area**
Boat ramp (double-lane)
Boat dock (up to 2 slips)
Restroom (small)
Parking (40 spaces)

**Infrastructure Improvements**
Restroom replacement (4)
Restroom renovation (1)
Park drive improvements
Connect septic facilities to city sewer

**Bicycling Trail**
Stabilized beach path (1.8 miles)
Paved path along park drive (2.6 miles)
Improve footbridge

Interpretive signs (4)
Interpretive kiosks (1)

## Recreational Carrying Capacity

Carrying capacity is an estimate of the number of users a recreation resource or facility can accommodate and still provide a high quality recreational experience and preserve the natural values of the site. The carrying capacity of a unit is determined by identifying the land and water requirements for each recreation activity at the unit, and then applying these requirements to the unit's land and water base. Next, guidelines are applied which estimate the physical capacity of the unit's natural communities to withstand recreational uses without significant degradation. This analysis identifies a range within which the carrying capacity most appropriate to the specific activity, the activity site and the unit's classification is selected (see Table 5).

**Table 5: Recreational Carrying Capacity**

| Activity/Facility | Existing Capacity* | | Proposed Additional Capacity | | Future Capacity | |
|---|---|---|---|---|---|---|
| | One Time | Daily | One Time | Daily | One Time | Daily |
| **Trails** | | | | | | |
| Nature trails** | 55 | 220 | | | 55 | 220 |
| Bicycling trail | | | 65 | 260 | 65 | 260 |
| **Picnicking*** ** | 1,060 | 2,120 | | | 1,060 | 2,120 |
| **Picnicking / Swimming**** ** | 3,250 | 6,500 | | | 3,250 | 6,500 |
| **Fishing** | | | | | | |
| Shoreline | 100 | 200 | | | 100 | 200 |
| Jetty | 200 | 400 | | | 200 | 400 |
| **Boating** | | | | | | |
| Canoeing / Kayaking | 96 | 192 | | | 96 | 192 |
| Boating | 400 | 800 | 160 | 160 | 560 | 960 |
| **Interpretive Center/Educational Facility** | 150 | 600 | | | 150 | 600 |
| **TOTAL** | **5,311** | **11,032** | **225** | **420** | **5,536** | **11,452** |

*Existing capacity has been revised to better reflect DRP guidelines
**Nature trails includes hiking trail and beach trail
***Picnicking refers to rental pavilions, which seat 100-150 each
****Surfing included in Picnicking / Swimming capacity

The recreational carrying capacity for this park is a preliminary estimate of the number of users the unit could accommodate after the current conceptual development program has been implemented. When developed, the proposed new facilities would approximately increase the unit's carrying capacity as shown in Table 5.

## Optimum Boundary

The optimum boundary map reflects lands that have been identified as desirable for direct management by DRP as part of the state park. These parcels may include public as well as privately owned lands that improve the continuity of existing park lands, provide the most efficient boundary configuration, improve management access to the park, provide additional natural and cultural resource protection or allow for future expansion of recreational activities. The map also identifies lands that are potentially surplus to the management needs of DRP.

As additional needs are identified through park use, development, research, and as changes to adjacent land uses on private properties occurs, modification of the park’s optimum boundary may be necessary. Reasons for optimum boundary modification could include the

enhancement of natural and cultural resources, the improvement of recreational values and management efficiency and the removal of parcels that are no longer desirable for state park management.

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. A property's identification on the optimum boundary map should not be used by any party or governmental entity to reduce or restrict the lawful rights of private landowners. Identification on the map does not empower or suggest that any government entity should impose additional or more restrictive environmental land use or zoning regulations. Identification should not be used as the basis for permit denial or the imposition of permit conditions.

Six parcels, totaling just over five acres, are identified within the optimum boundary. Two small parcels are located just inside the park boundary near the park's entrance. They encompass a small upland area and part of Whiskey Creek. Two parcels that are located northwest of the entrance station, include mostly submerged area. Acquisition of these parcels would complete the park boundary out to the adjacent waterways. Two large parcels are located on the beachfront, just south of the park boundary. These parcels are zoned for high-density residential land uses. Trespassing and littering have been an issue on these parcels, and people have been known to venture into the park from this area. Occasionally, individuals who entered the park from this area have made bonfires on parkland. Australian pine also occurs on these parcels, which are adjacent to the park's beach communities. By acquiring this additional beachfront area, park staff would be able to manage this area as part of the larger park property through continued exotic species management, natural resource protection and restoration, and monitoring of visitor activities and impacts.

In addition, this plan recommends that the park boundary be extended off the east side of the park to include the designated swimming area. The leased area should be extended by 150 feet from the existing surveyed boundary into the Atlantic Ocean. Extending the park boundary would give DRP the authority to manage the designated swimming area in accordance with Chapter 258, Florida Statutes and Chapter 62D-2, Florida Administrative Code, for the purposes of visitor safety and resource protection.

An area less than one-acre has been identified as surplus to the needs of John U. Lloyd Beach State Park. This area is a highly disturbed ruderal zone that is discontinuous to the main park property. The surplus area is located outside of the gated boundary, flanking an FDOT right-of-way.


JOHN U. LLOYD BEACH
STATE PARK

OPTIMUM BOUNDARY
MAP

## IMPLEMENTATION COMPONENT

The resource management and land use components of this management plan provide a thorough inventory of the park's natural, cultural and recreational resources. They outline the park's management needs and problems, and recommend both short and long-term objectives and actions to meet those needs. The implementation component addresses the administrative goal for the park and reports on the Florida Department of Environmental Protection (FDEP), 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 John U. Lloyd Beach State Park in 2001, significant work has been accomplished and progress made towards meeting the DRP's management objectives for the park. These accomplishments fall within three of the five general categories that encompass the mission of the park and the DRP.

### Park Administration and Operations

- Volunteer hours have increased by approximately 30 percent over the past five fiscal years. Since 2003, more than 88,000 volunteer hours have been logged at the park.
- The park worked closely with Broward County to ensure protection of our resources during the beach renourishment process in 2005/2006. The park is also working with Broward County and other agencies regarding the proposed sand bypass, which will minimize the impact of future beach renourishment projects on the park's natural and cultural resources.
- Park staff developed and secured funding to implement a comprehensive exotic removal project that also included restoration. This effort resulted in the removal of more than 85 acres of exotics from the park and the restoration of nearly 70 acres to natural area.
- The park is one of 33 beach indexing sites in the state that provide data for researchers worldwide as it relates to sea turtle survival, contributing to the preservation of these unique species.
- The park has been closely involved in providing necessary feedback on numerous expansion projects to limit adverse impacts to natural and cultural resources. Some of these have been expansions to Port Everglades, Fort Lauderdale Airport and NOVA Southeastern University (NSU).
- Park staff work in conjunction with National Oceanic and Atmospheric Administration (NOAA) to set management and protection goals for the Florida Coral Reef Tract.

### Resource Management

**Natural Resources**

- A countywide beach restoration project was undertaken by Broward County in 2005. The project included the placement of sand and the installation of two T-groins and one spur on the north end of the park, which was completed in 2006.

- Native vegetation, including sea oats, was planted along the upper beach to stabilize the sediment, prevent erosion and create a primary dune system.
- Restoration of the spoil sites located on the west side adjacent to the Intracoastal Waterway has been completed through mitigation projects. The Australian pines have been removed, material excavated and mangroves were planted to restore the area to estuarine swamp. A riprap breakwater was constructed to protect the mangrove plantings from wave erosion caused by boat traffic in the Intracoastal Waterway (ICW).
- Two dune crossovers were constructed to reduce impacts from foot traffic and provide accessible routes to the beach at the south end of the park.
- Two kiosks were installed near the southern beach access area that provide educational opportunities dealing with the resources of the park.
- Exotic removal has been ongoing since John U Lloyd Beach State Park became a State Park in 1973. A major restoration effort began in August of 2003 and ended in august of 2005. The entire project encompassed 85.4 acres at a cost of $500,000. Funding sources included FFWCC, FDEP and USFWC.
- A re-vegetation plan has been developed to guide planting of native species. Since 2003, there has been an ongoing effort to plant and restore the park's plant communities to a native/natural ecosystem. Twenty acres of beach dune and 50 acres of coastal strand were established in areas that were once overcome with invasive exotic vegetation. The park's wetlands were also enhanced after spoil areas were scraped in the final phases of mitigation projects. Enhancements to the coastal strand, beach dune and mangrove communities are ongoing.
- More than 2,500 native trees and plants have been planted during restoration projects, including 1,107 native trees that were planted in the park's coastal strand by a private contractor, and 1,500 additional plants that were donated and planted by park volunteers and staff.
- The park's plant nursery, which was constructed by park staff, will provide planting material for future projects and will offer eco-friendly interpretive activities for visiting school groups.
- Beach jacquemontia (*Jacquemontia reclinata*) was discovered at the park. In January of 2010, it was confirmed that John U. Lloyd Beach State Park supports about 30 percent of the entire known population of the species in South Florida.
- A major project to remove Australian pine and other invasive plants from the park was completed in 2005.
- Volunteers have completed a fish and invertebrate inventory for the nearshore marine environment.
- Through coordination with Port Everglades, park staff has reduced light pollution on the beach at night for nesting marine turtles. Park staff invited representatives from Port Everglades to visit the park's beaches at night to experience for themselves how the Port's lights illuminated the nesting beach. These efforts by the park prompted Port Everglades to install shields around lights where appropriate and draft a light management plan.

**Cultural Resources**

- In a recent ceremony, the park beach was designated as a Florida Heritage Site. A plaque was erected that recognizes the area's historical significance and the accomplishments of

**Recreation and Visitor Services**

- The concessionaire continued to provide food and rental services for the enjoyment of park visitors.
- The main interpretive program given by the park is the "Sea Turtle Awareness/Saga or Eulogy" and is scheduled with required reservation. In addition, several programs are offered by park staff and other groups to educate the public of the fragile resource as well as the history of the area. An estimated 2,500 visitors participated in interpretive programs within the park in the last fiscal year.
- The park serves as host to many weddings, private events and family gatherings. Nearly 300 planned events are scheduled on park grounds each year.
- The park maintains partnerships with local schools and governments to educate and share information for the overall understanding and protection of the resources.
- The park hosted the first ever "Mangrove Day" as designated in a proclamation by former Governor Crist.
- The park was recognized by the TV show *Good Morning America* as being one of the unique parks in the nation as aired on July 13th, 2008, where the park was showcased nationwide.
- The park is listed as a site on the Great Florida Birding Trail.

**Park Facilities**

- The park has replaced and repaired structures that were damaged during numerous hurricanes that occurred between 2003 and 2005.
- The park has made many modifications to facilities to enhance compliance with the Americans with Disabilities Act (ADA), thus increasing accessibility of park's facilities and use areas.
- Five additional pavilions have been built in the park, as well as an observation deck at the marina.
- All park lift stations were upgraded.
- The sewage force main has been turned over to the City of Hollywood for future maintenance.
- Solar panels have been installed at several locations throughout the park, reducing the park to net-zero energy consumption.
- Repairs to the fishing jetty are underway/complete, and the jetty is anticipated to be open for public recreation in late 2012.

## 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 7) summarize the management goals, objectives and actions that are recommended for implementation over this period, and beyond. Measures are identified for assessing progress toward completing each objective and action. A time frame for completing each objective and action is provided. Preliminary cost estimates for each action are provided and the estimated total costs to complete each objective are computed. Finally, all costs are consolidated under the

following five standard land management categories: Resource Management, Administration and Support, Capital Improvements, Recreation Visitor Services and Law Enforcement.

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

Statewide priorities for all aspects of land management are evaluated each year as part of the process for developing the DRP's annual legislative budget requests. When preparing these annual requests, the DRP considers the needs and priorities of the entire state park system and the projected availability of funding from all sources during the upcoming fiscal year. In addition to annual legislative appropriations, the DRP pursues supplemental sources of funds and staff resources wherever possible, including grants, volunteers and partnerships with other entities. The DRP's ability to accomplish the specific actions identified in the plan will be determined largely by the availability of funds and staff for these purposes, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Table 6 may need to be adjusted during the ten-year management planning cycle.

**Table 6**
**John U. Lloyd Beach State Park Ten-Year Implementation Schedule and Cost Estimates**


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

| **Goal I: Provide administrative support for all park functions.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
|---|---|---|---|---|
| **Objective A** | **Continue day-to-day administrative support at current levels.** | Administrative support ongoing | C | **$2,660,000** |
| **Objective B** | **Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.** | Administrative support expanded | C | **$110,000** |
| **Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Conduct/obtain an assessment of the park's hydrological needs.** | Assessments conducted | C | **$30,000** |
| **Objective B** | **Restore natural hydrological conditions and function to approximately 1 acre of maritime hammock natural community.** | # Acres restored or with restoration underway | LT | **$500** |
| Action 1 | Continue to monitor and assess filling of the remaining mosquito ditches through natural processes. | # Acres w/ monitoring underway | C | $500 |
| **Objective C** | **Monitor and analyze the quality of water resources at the park.** | Monitoring implemented | C | **$13,100** |
| Action 1 | Continue coordination with state and county agencies regarding water quality testing in recreational waters of the park. | Testing implemented | C | $5,100 |
| Action 2 | Monitor and coordinate response to oil spill incidents as they occur. | Response completed | C | $8,000 |

* 2011 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 6**
**John U. Lloyd Beach State Park Ten-Year Implementation Schedule and Cost Estimates**


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

| Goal III: Restore and maintain the natural communities/habitats of the park. | | Measure | Planning Period | Estimated Manpower and Expense Cost* (10-years) |
|---|---|---|---|---|
| **Objective A** | **Conduct habitat/natural community restoration activities on 1.7 acres of coastal strand community.** | # Acres improved or with improvements underway | UFN | **$125,000** |
| Action 1 | Develop and implement site specific restoration plan. | # Acres with restoration underway | UFN | $125,000 |
| **Objective B** | **Conduct habitat/natural community improvement activities on 1 acre of ruderal and 1 acre of developed communities.** | # Acres improved or with improvements underway | ST | **$4,500** |
| Action 1 | Remove existing invasive exotic vegetation. | # Acres removed | LT | $1,500 |
| Action 2 | Plant native vegetation. | # Acres planted | LT | $1,000 |
| Action 3 | Monitor area for regrowth of invasive exotics. | # Acres w/ monitoring underway | C | $1,500 |
| Action 4 | Assess the feasibility of shoreline stabilization project using riprap and red mangroves for reducing erosion on the park drive. | Assessment conducted | ST | $500 |
| **Objective C** | **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.** | Coordinated monitoring in place | C | **$2,600** |
| **Objective D** | **Continue to partner with federal, state and local agencies to fund, design, permit, improve and maintain coastal and beach management programs consistent with the mission of the DRP.** | Coordinated program in place | C | **$175,500** |
| Action 1 | Assess feasibility of sand trap, sand bypass, or other project to combat accelerated beach erosion. | Assessment conducted | LT | $15,500 |
| Action 2 | Continue coordination with other agencies to stabilize and sand tighten the jetty and restore public access to the jetty walkway. | Project completed | ST | $160,000 |
| **Objective E** | **Continue to assist federal, state and local agencies with monitoring and assessment of natural community responses following coastal projects.** | Coordinated assessment conducted following each event | C | **$5,000** |
| **Goal IV: Maintain, improve or restore imperiled species populations and habitats in the park.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Update baseline imperiled species occurrence inventory lists for plants and animals, as needed.** | List updated | C | **$300** |
| **Objective B** | **Monitor and document 3 selected imperiled animal species in the park.** | # Species monitored | C | **$160,000** |
| Action 1 | Implement FFWCC monitoring protocols for 3 imperiled animal species including loggerhead, green, and leatherback marine turtles. | # Species monitored | C | $160,000 |
| **Objective C** | **Maintain predation levels of marine turtle hatchlings at or below 10 percent.** | Predation level maintained | C | **$16,500** |
| **Objective D** | **Reduce the level and intensity of artificial lighting from outside sources on the beach.** | Lighting reduced | C | **$1,900** |
| **Objective E** | **Minimize coastal armament and other impediments to nesting by working closely with regulatory and coastal engineering agencies.** | Lighting reduced | C | **$6,000** |
| **Objective F** | **Monitor and document 1 selected imperiled plant species in the park.** | # Species monitored | C | **$9,600** |

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| Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control. | | Measure | Planning Period | Estimated Manpower and Expense Cost* (10-years) |
|---|---|---|---|---|
| **Objective A** | **Annually treat 8 acres of exotic plant species in the park.** | # Acres treated | C | **$96,000** |
| Action 1 | Annually update exotic plant management work plan. | Plan updated | C | $16,000 |
| Action 2 | Implement annual work plan by treating 8 acres in park, annually, and continuing maintenance and follow-up treatments, as needed. | Plan implemented | | $80,000 |
| **Objective B** | **Implement control measures on 7 exotic and nuisance animal species in the park.** | # Species for which control measures implemented | C | **$7,000** |
| Action 1 | Continue removal of stray and feral cats and dogs to county animal control facility. | # Animals removed | C | $6,300 |
| Action 2 | Continue removal of exotic reptiles, including green iguanas, curly tailed lizards, and Cuban anoles. | # Animals removed | C | $700 |
| **Goal VI: Protect, preserve and maintain the cultural resources of the park.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Assess and evaluate all recorded cultural resources in the park.** | Documentation complete | ST | **$100** |
| Action 1 | Conduct an evaluation of 1 historic site, including the Colored Beach site. | Assessment conducted | ST | $100 |
| **Objective B** | **Compile reliable documentation for one recorded historic resource.** | Documentation complete | LT | **$17,800** |
| Action 1 | Ensure all known sites are recorded or updated in the Florida Master Site File. | # Sites recorded or updated | ST | $200 |
| Action 2 | Complete a predictive model for high, medium and low probability of locating archaeological sites within the park. | Probability Map completed | LT | $6,000 |
| Action 3 | Develop and adopt a Scope of Collections Statement. | Document completed | ST | $2,300 |
| Action 4 | Conduct oral history interviews. | Interviews complete | LT | $5,500 |
| Action 5 | Compile a park administrative history. | Report completed | ST | $3,800 |
| **Objective C** | **Bring one recorded cultural resource into good condition.** | # Sites in good condition | LT | **$100** |

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UFN = currently unfunded need

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

| Goal VII: Provide public access and recreational opportunities in the park. | | Measure | Planning Period | Estimated Manpower and Expense Cost* (10-years) |
|---|---|---|---|---|
| **Objective A** | **Maintain the park's current recreational carrying capacity of 11,032 users per day.** | # Recreation/visitor | C | **$2,660,000** |
| **Objective B** | **Expand the park's recreational carrying capacity by 420 users per day.** | # Recreation/visitor | LT | **$110,000** |
| Action 1 | Develop 3 new opportunities for boating, bicycling and fishing. | # Recreation/visitor opportunities per day | LT | $110,000 |
| **Objective C** | **Continue to provide the current repertoire of 14 interpretive, educational and recreational programs on a regular basis.** | # Interpretive/education programs | C | **$31,000** |
| **Objective D** | **Develop and/or update 5 new interpretive, educational and recreational programs.** | # Interpretive/education programs | C | **$30,000** |
| **Goal VIII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Maintain all public and support facilities in the park.** | Facilities maintained | C | **$2,980,000** |
| **Objective B** | **Expand maintenance activities as existing facilities are improved and new facilities are developed.** | Facilities maintained | C | **$120,000** |
| **Objective C** | **Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.** | Plan implemented | LT | **$140,000** |
| **Objective D** | **Improve and/or repair 10 existing facilites and 2.3 miles of road as identified in the Land Use Component.** | # Facilities/Miles of Road | UFN | **$2,510,000** |
| **Objective E** | **Construct 2 new facilites and 4.4 miles of trail as identified in the Land Use Component.** | # Facilities/Miles of Trail | UFN | **$1,910,000** |

**Summary of Estimated Costs**

| **Management Categories** | **Total Estimated Cost* (10-years)** |
|---|---|
| Resource Management | $671,500 |
| Administration and Support | $2,770,000 |
| Capital Improvements | $4,560,000 |
| Recreation Visitor Services | $5,931,000 |
| Law Enforcement Activities** | **Law enforcement activities in Florida State Parks are conducted by the DEP Division of Law Enforcement and by local law enforcement agencies. |

* 2011 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

# Addendum 1 — Acquisition History

**Sequence of Acquisition:**

On August 23, 1973, the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida ("Trustees") acquired title to a 117-acre property that later became John U. Lloyd Beach State Park. The Trustees purchased the property from Trustees Under the Will of Samuel A. Horvitz for $4,480,000. This purchase was funded under the Land Acquisition Trust Fund ("LATF") Program. Since this initial purchase, the Trustees has acquired several individual parcels through a donation and under the Environmentally Endangered Lands ("EEL") and the Preservation 2000 ("P2000") programs and added them to John U. Lloyd Beach State Park. Presently the park has approximately 313 acres.

**Management Leases:**

On July 5, 1974, the Trustees leased John U. Lloyd Beach State Park to the State of Florida Department of Natural Resources, predecessor in interest to the State of Florida Department of Environmental Protection, Division of Recreation and Parks ("DRP") under a ninety-nine (99) year lease, Lease No. 2787.

On August 17, 1983, the Trustees amended Lease No. 2787 through Amendment No. 4 and changed the term of the lease to fifty (50) years, which would expire on August 17, 2033. However, the Trustees extended the term of the lease for another fifty (50) years under Amendment No. 10. This new term will expire on February 20, 2061.

According to Lease No. 2787, DRP has leased John U. Lloyd Beach State Park for the purpose of preserving, developing, operating and maintaining the property for outdoor recreational, park, conservation and related purposes.

**Title Interest:**

The Trustees holds fee simple title to John U. Lloyd Beach State Park.

**Special Conditions on Use:**

John U. Lloyd Beach State Park is designated single-use to provide resource-based public outdoor recreation and other park related uses. Uses such as water resource development projects, water supply projects, storm-water management projects, and linear facilities and sustainable agriculture and forestry, other than those forest management activities specifically identified in this plan, are not consistent with this plan or the management purposes of the park and will be discouraged.

**Outstanding Reservations:**

DRP management lease from the Trustees stipulates that all the property be utilized for public outdoor recreation and related purposes. Following is a listing of encumbrances that apply to John U. Lloyd Beach State Park.

**Type of Instrument:**……Sublease, Sublease No. 2787-001
**Grantor (Sublessor):**……..DRP
**Grantee (Sublessee):**……..NOVA Southeastern University ("NOVA")
**Beginning Date:**……..February 21, 2011
**Ending Date:**……February 20, 2061
**Encumbrance:**……This sublease allows NOVA to use a certain portion of John U. Lloyd Beach State Park as part of or in conjunction with the operation of its oceanographic Center, along with other related uses necessary for the accomplishment of this purpose.

**Type of Instrument:**……Acknowledgement and Agreement
**Grantor: :**……..Broward County Board of County Commissioners
**Grantee:**…… Trustees, DRP and NOVA
**Beginning Date:**……..February 8, 2011
**Ending Date:**……February 20, 2061 and 180 days of waiting period after the current sublease expires on February 20, 2061, so that NOVA will have enough time to arrange to enter into another agreement with the Trustees or any non-for-profit designee of the Trustees to continue managing this portion of John U. Lloyd Beach State Park under the same terms and conditions.
**Encumbrance:**……The Acknowledgement and Agreement waives the restriction that Broward County placed on the Trustees when it donated a portion of John U. Lloyd Beach State Park to the Trustees on August 27, 1974. According to this restriction, the Trustees use the property for recreational purposes. If the Trustees abandon or cease to use the property for recreational purposes for a period of one year, title interest in the property will revert to the county.

**Type of Instrument:**……..Modification No. 2 to Lease Noy (R) - 65259
**Grantor:**…… Trustees
**Grantee:**…… The United States Department of the Navy
**Beginning Date:**……..July 1, 1996
**Ending Date:**……June 30, 2024
**Restrictions:**……..The initial lease dated September 18, 1957, enables the United States Department of Navy to operate a Naval Ordnance Laboratory Test Facility on approximately 9.5 acres of land within the boundaries of John U. Lloyd Beach State Park. Modification No. 2 extends the term of this lease until June 30, 2024.

**Type of Instrument:**……..Corrective Special Warranty Deed
**Grantor:**…… Port Everglades Authority
**Grantee:**…… Trustees
**Beginning Date:**……..July 25, 1977
**Ending Date:** ……..Perpetuity
**Encumbrance:**……..This corrective Special Warranty Deed accomplishes two purposes: (1) it adds legal description to the November 12, 1974, Special Warranty Deed, which did not have any legal description and (2) it re-states the conditions of the November 12, 1974, Special Warranty Deed which says that the property shall be used only for a public park purpose. If the property is not developed and used for public park purpose within five (5) years from July 25, 1977, or once the property is developed and used for public park purpose, if is abandoned or disallowed, or if the property is ever be used for anything other than public park purpose, the title to the property shall immediately revert to grantor, its successors or assigns.

**Type of Instrument:**……Warranty Deed
**Grantor:**…… Broward County
**Grantee:**…… Trustees
**Beginning Date:**……August 27, 1974
**Ending Date:**……Perpetuity
**Restrictions:**……The deed was subject to two conditions: (1) NOVA, United States Navy and United States Coast Guard get unrestricted ingress and egress access across subject property to their respective areas, and (2) the grantee uses the property only for recreational purposes. Should the grantee ceases using the property for recreational purposes for a period of one year, title interest in the property will revert to the grantor.

**Type of Instrument:**……..Modification Agreement No. 1
**Grantor:**…… Broward County
**Grantee:**…… The United States of America
**Beginning Date:** ……December 27, 1967
**Ending Date:**……June 30, 2024
**Restrictions:**……The modification corrects the description of the demised premises as stated in Lease No. NOY (R) – 62559 dated September 18, 1957. This modification deletes paragraph 4 of said lease and substitute it by a new legal description. It also provides a 30-foot access route along southern boundary of the demised premises to provide an access route, pending completion of the proposed county road.

# Addendum 2—Advisory Group Members and Report

**Local Government Representatives**

The Honorable John E. Rodstrom, Jr., Mayor
Broward County Board of County Commissioners, District 7
Broward Governmental Center
115 South Andrews Avenue, Room 416
Fort Lauderdale, Florida 33301

The Honorable Patricia A. Flury, Mayor
City of Dania Beach
100 West Dania Beach Boulevard
Dania Beach, Florida 33004

The Honorable Richard Blattner, Commissioner
City of Hollywood/City Commission
2600 Hollywood Boulevard
Hollywood, Florida 33020-4807

**Agency Representatives**

Sid Leve, Park Manager
John U. Lloyd Beach State Park
6503 North Ocean Drive
Dania Beach, Florida 33004

Mark Torok, Senior Forester
Department of Agriculture and Consumer Services
Florida Forest Service
3315 S.W. College Avenue
Davie, Florida 33314

Russell M. Setti, District Administrator
Broward Soil and Water Conservation District
6191 Orange Drive, Room 6181-P
Davie, Florida 33314

Ricardo Zambrano, Regional Biologist
Regional Biologist
Florida Fish and Wildlife Conservation Commission
8535 Northlake Boulevard
West Palm Beach, FL 33412

**Tourist Development Council Representative**

Nicki Grossman, President
Greater Fort Lauderdale Convention & Visitors Bureau
100 East Broward Boulevard, Suite 200
Fort Lauderdale, Florida 33301

**Environmental and Conservation Representatives**

Mara Shlackman, Executive Committee Chair
Broward Sierra Club
P.O. Box 550561
Davie, Florida 33355

Doug Young, President
Broward County Audubon Society
P.O. Box 9644
Fort Lauderdale, Florida 33310

Lee Gottlieb, Director of Community Outreach
Youth Environmental Alliance
6001 North Ocean Drive, Apt. 1
Hollywood, FL. 33019

**Recreational User Representatives**

Frank Gernert, Chairman
Professional Standards Committee for the South Florida Marine Industries;
Scuba Diving Industry Representative, FFWCC Boating Advisory Council
2601 Marion Drive
Fort Lauderdale, Florida 33316

Laurel Person, Park Manager
Anne Kolb Nature Center at West Lake Park
751 Sheridan Street
Hollywood, Florida 33019

Adrian Winchell
(Regular park visitor and exerciser;
appointed on 2001 committee)
2635 Harding Street
Hollywood, Florida 33020

**Adjacent Landowner**

Chief Kenneth Pady
Engineering Chief Petty Officer
USCG STA. Ft. Lauderdale
7000 North Ocean Drive
Dania Beach, Florida 33004

Steven Cernak, Port Director
Port Everglades
1850 Eller Drive
Fort Lauderdale, Florida 33316

Dr. Richard Dodge, Professor and Dean
NSU Oceanographic Center
Executive Director, National Coral Reef
Institute
8000 North Ocean Drive
Dania Beach, Florida 33004

William Venezia, Senior Technical
Representative
US Navy
8010 North Ocean Drive
Dania Beach, Florida 33004

The Advisory Group meeting to review the proposed land management plan for John U. Lloyd Beach State Park was held at NOVA Southeastern University (NSU) Oceanographic Center on Wednesday, August 1, 2012, at 9:00 AM.

Susan Smith represented Mayor John E. Rodstrom, Jr. (Broward County). Kristin Dion represented Mayor Patricia A. Flury (Dania Beach). Thaddeus Hamilton represented Russell M. Setti. Kristin Hoss represented Lee Gottlieb. Bob Musser represented Steven Cernak. Nick Ritter represented William Venezia. Nicki Grossman (Greater Fort Lauderdale Convention & Visitors Bureau), Mara Shlackman (Broward Sierra Club), Doug Young (Broward County Audubon Society), , and Adrian Winchell (regular park visitor) were not in attendance. Richard Dodge (NSU Oceanographic Center) and Frank Gernert (Boating Advisory Council and Marine Industries Association of South Florida) did not attend but sent in written comments by email. All other appointed Advisory Group members were present as well as Franz Armstrong (US Coast Guard) and David Fleshler (Sun-Sentinel). Attending staff were Sid Leve, Paul Rice, Ernie Cowan, Charlie Jabaly, Carmelo Duesler, Lew Scruggs and Jennifer Carver.

Mr. Scruggs began the meeting by explaining the purpose of the Advisory Group and reviewing the meeting agenda. He provided a brief overview of the Division of Recreation and Parks' (DRP) planning process. He then asked each member of the Advisory Group to express his or her comments on the draft plan.

## Summary of Advisory Group Comments

**Mr. Hamilton** (Broward Soil and Water Conservation District (BSWCD)) reiterated the comments he made at the Public Workshop regarding the importance of dune revegetation in creating and restoring the natural beach dunes and habitat, especially through volunteer programs such as those sponsored by BSWCD. He suggested that DRP conduct a survey of the present coastline/dunes to determine the impact and habitat value of the sand captured as a result of revegetation. A record of how much the beach/dunes have been raised and how much sand is captured, lost and/or gained over time would be useful. He suggested that the plan include a goal to elevate the beach through revegetation. He also mentioned the need to collaborate with the US Army Corps of Engineers (ACE) to include dune vegetation in their plans and projects. He suggested that beach renourishment projects should include sea oat planting to help preserve the life of the beach and dunes over time. Mr. Hamilton suggested that the park visitation and counts related to program participation include persons who participate in programs offered in the park by outside organizations. These numbers are important to report, because the environmental education programs would not be offered if the park did not exist. Mr. Hamilton inquired whether the junior ranger program still exists. Staff indicated that they accommodate requests for junior ranger activities. Mr. Hamilton commended the park staff for their outstanding job and mentioned a need for increased staff.

**Mr. Zambrano** (Florida Fish and Wildlife Conservation Commission (FWC)) commented on several specific items in the draft plan. Mr. Zambrano asked if page 30 should refer to wading birds nesting on mangrove islands (rather than shorebirds). He asked what species are nesting and where. He asked how DRP is controlling green iguanas in the park (page 42), including how often and whether the program was similar to aggressive control programs at other state parks (such as Bill Baggs Cape Florida State Park/Bahia Honda State Park). He also indicated that the budget of $700 (page 94) seemed low and asked what impact green iguanas are having on native vegetation in the park. DRP staff indicated that iguana control is part of the management program for nuisance control (similar to that in Bahia Honda SP), and iguana control is handled on an as-needed basis. Mr. Zambrano asked if there is a current survey for butterflies in the park, as Addendum 5 lists the Florida leaf wing as an invertebrate species in the park. He indicated that the Florida leaf wing is mostly restricted to Everglades National Park, and it would be quite significant if its presence were confirmed at John U. Lloyd Beach State Park. He suggested adding the need for a more recent survey to the plan and stated that the North American Butterfly Association often conducts such surveys free of charge upon request. DRP staff indicated that Addendum 5 is a historical record of species present in the park and that a footnote could be added to the table to state that it is a historical reference. Mr. Zambrano asked if crocodiles were present in the park. DRP staff stated that there had been one unconfirmed sighting 10 years ago. Mr. Zambrano complimented the park's sea turtle management program. He asked if there was any consideration of trying to attract least terns back to beaches in the park, especially in the wide open beach area at the southern end of the park. There is a large least tern population at Port Everglades, and any beach areas that are not heavily used or less accessible to the public could be considered. DRP staff indicated that beach areas are heavily used, and while they have not seen least terns, if they did nest, the area would be roped off and protected. In response to a comment made by Kristin Hoss (Youth Environmental Alliance) regarding a sea grape monoculture (see below) and use of prescribed burning to manage the vegetation, Mr. Zambrano mentioned that prescribed burning is not appropriate in this location, and hurricanes are a natural occurrence that manage vegetation. Staff also indicated that their resource management efforts have replaced an exotic monoculture with native vegetation, and in addition to the many sea grapes planted, there were numerous other plantings of native vegetation that will, in time, strike more of a balance. Finally, sea grapes provide shade previously provided by invasive Australian pines.

**Kristin Hoss** (Youth Environmental Alliance (YEA)) indicated that she had emailed comments to DRP staff and had several additional comments. She stated that the butterfly survey might be a nice project for the Florida Master Naturalist Program that YEA coordinates. She suggested that park visitors are less likely to trample on dunes revegetated with sand spurs and other native vegetation. She discussed the importance of tracking the true volume of educational programs, including participation in programs that various groups like YEA hold in the park. She stated that YEA and the Kids Ecology Corps have done a great deal of work in the park, and partnerships between the park and outside organizations are important. She suggested that the plan promote partnering with non-profits to conduct educational activities, restore habitat, seek grants, and other activities. Ms. Hoss suggested that a Citizen Support Organization (CSO) be established, but in the meantime, other partnerships could be sought. She suggested DRP consider capturing fees from school groups for interpretive programs and using a portion of those fees to hire a contractor to run interpretive programs. She suggested that DRP also reach

out to corporate partners for donations, projects such as adopt-a-park programs. Ms. Hoss was concerned about the potential for development of a sea grape monoculture in the northern area of the island and inquired about the desirability of sea grape removal. She stated that there are likely remnant archaeological sites on the island and recommended the plan include the need for an archaeological survey of the park and future interpretive exhibits/programs based on the results. Ms. Hoss asked what methods are being used for arthropod control. Her concern related to whether the substance was also affecting other organisms using the mangroves, such as crabs, lobsters, and shrimp, and whether zooplankton/larvae would be affected by runoff. She suggested including a research need in the plan related to this issue. DRP staff responded that there is an arthropod control plan for the park that is consistent with requirements and best management practices. Ms. Hoss also suggested that DRP consider other measures to protect the beach, such as staghorn replanting, if the T-groins are not successful. She recommended that maps in the plan include figure numbers for ease of reading.

**Mark Torok** (Department of Agriculture and Consumer Services, Florida Forest Service (DACS)) commended DRP staff on their work removing invasive exotics. He asked whether there is more removal work to be completed or just maintenance. DRP staff indicated they are in maintenance mode, and the DRP District's exotics team will continue to work with volunteer groups, the US Coast Guard, and the US Navy. Mr. Torok stated that in the past DACS has placed traps for invasive exotic beetles along closed park trails and asked if those trails are being reopened. DRP staff indicated that areas that were closed off during the exotic species removal project are being restored and reopened as nature trails. DRP staff will work with DACS on future placement of the traps. Mr. Torok suggested that the green buttonwood be considered for planting as a potential shade tree near the picnic areas; however, the staff's past experience has shown that buttonwood in heavy use areas, such as picnic areas, creates a potential safety hazard for visitors from broken branches due to its brittle nature and lack of resistance to strong winds.

**Richard Blattner** (City of Hollywood Commissioner) indicated that the City's main concern is sustainable beach restoration. The City supports the planned sand bypass project and dune maintenance and restoration projects.

**Bob Musser** (Port Everglades) suggested that the discussion of the history of shoreline restoration (page 30) include a table that lists all the projects that have been done by various entities, including the Port. He will provide information on the Port's projects. Mr. Musser asked if prescribed burning is used as a management tool in the park, as it is mentioned in several places. DRP staff stated that prescribed burning is not used in the park, but the text to which he refers is standard language included in all unit management plans. Mr. Musser recommended that the reference (page 30) to shoreline erosion along the roadway adjacent to Dania cut-off canal be revised to indicate that flow from the canal causes a portion of the erosion (rather than Port activity alone). Mr. Musser pointed out that the jetty pier and walkway restoration is not mentioned in the plan. He stated that this is a great project where several funding entities (Florida Inland Navigation District, Broward County, Port Everglades, DRP, etc.) came together to complete the project. Mr. Musser recommended that this project be incorporated in the plan to illustrate how to overcome funding limitations and that there needs to be a concerted effort by a number of different agencies to get projects done. He asked if there was a specific process for FWC approval of the light management plan under development by Port Everglades (mentioned

on pages 35 and 54). He commended DRP's restoration/mitigation projects, and Australian pine removal work, although these management activities have opened up the beach to lighting from the west. While Port Everglades has already done a great deal to shield lighting, they are working a voluntary management plan that will address federal and state requirements for 24/7 lighting at the Port while also addressing resource management needs of the park. He recommended that the language be modified to clarify the voluntary nature of the plan. Mr. Musser asked if the number of visitors that participate in interpretive programs was accurate, as 1,500 seems very low. He suggested that if it is accurate, DRP consider ways to increase participation. DRP staff stated that the number did seem low and only included programs which park staff attend (lead or participate). (Note: This item led to a larger group discussion about ways to track visitation and participation, and comments of various Advisory Group members are listed with their other comments). Mr. Musser asked if a CSO should be established for John U. Lloyd Beach State Park. He also recommended that the plan text reference the sections and map numbers for ease of reading. Mr. Musser recommended continued dialogue with ACE on disposition of sand from their dredging operations to avoid loss of potential source of beach quality sand. He recommended that DRP staff discuss various programs with ACE to address restoration needs. Out of personal interest, Mr. Musser asked if DRP had considered primitive camping for the park, such group camping for scouting. DRP staff indicated that the urban nature of the park and the significant resources limited opportunities for camping.

**Susan Smith** (Broward County Commission Aide) expressed concern that the plan does not mention sea level rise, which has been documented and has been identified as a threat by Florida Atlantic University. Ms. Smith stated that sea level rise needed to be addressed in the plan. DRP staff responded that the Department of Environmental Protection is considering how to address global sea level rise in state land management plans. DRP staff also indicated that there are a number of efforts underway to reduce the park's carbon footprint, including hybrid vehicles, solar power, mangrove restoration, and others. Ms. Smith pointed out that Broward County's beach renourishment efforts began long before the hurricanes of 2004 and 2005 (page 25). She recommended that text on page 28 be revised to strongly state that exotic removal is a high priority for this park, including follow-up maintenance. Ms. Smith mentioned that the beach immediately south of Port Everglades Inlet is highly erosive and requested that DRP consider some structure or other method to reduce erosion and continue to provide accessibility to sea turtles. DRP staff responded that T-groins have been installed to address this issue, in conjunction with the sand tightening component of the new jetty. Ms. Smith stated that page 59 should be revised to indicate that the sand bypass is not stalled and will use alternatives to blasting. Eric Myers (Broward County Natural Resources Planning/Management) is handling this project. Ms. Smith stated that it is very crucial that this plan reflect the park's support for the sand bypass project, and that County staff is moving forward to seek County Commission approval for the project. DRP staff indicated that they will have Mr. Marshall Flake, who is handling DRP coastal engineering projects, contact Eric Myers. Ms. Smith asked why costs in Table 6 do not reflect revenues or funding possibilities and whether the projects in the table are prioritized. DRP staff explained that all funds taken in by the park are deposited into the State Parks Trust Fund and are combined with other revenues to support the entire State Park system, which is 70% self-sufficient. DRP staff explained that funding allocations change from year to year and that a prioritization process is currently being developed for the entire State Park system. Ms. Smith noted that the aerial photograph on the map (page 4) does not reflect the

expanded NOVA facility and refurbished fishing area. She asked if expansion of the runway to accommodate larger planes at the Fort Lauderdale International Airport would impact the park's wildlife. DRP staff stated comments on waste, noise, and vibration were submitted for the Environmental Impact Statement, but there has been no specific study conducted. DRP staff mentioned that one study conducted for a natural area in Greece indicated there would be an effect but the extent was unknown.

**Kristin Dion** (City of Dania Beach) stated that the City is developing a waterfront revitalization plan, partially funded by DEP/Florida Coastal Management Program, for the Dania Beach Park (adjacent to the park's southern boundary). The City's plan will encompass some of the area included in the park's optimum boundary area at southern end. She also stated that, as part of the waterfront revitalization plan process, the City Attorney is looking at the deeds to address the conflict between the City's mapping of the park boundary and the DRP's boundary map.

**Laurel Person** (Broward County Parks and Recreation) asked if the canoe and kayak concession mentioned on page 75 was still in operation. DRP staff stated that a new concession operator is under contract and will start operations on August 10.

## Summary of Written Comments

**Dr. Richard Dodge** (Nova Southeastern University Oceanographic Center) was unable to attend the meeting and provided written comments to DRP staff. Dr. Dodge commended the plan authors for a fine job, provided editorial corrections, and offered several comments regarding coral reefs and their importance to the park. He commented on the extensive coral reef ecosystems directly offshore and suggested that the plan be modified to reflect their importance and ensure their protection and management. He suggested that the park boundaries include those reefs and associated organisms, as there are no State underwater protected areas in this region, and a designation would be wise for conservation and for enhanced park usage. Incorporating the offshore reef communities in the park boundary would also allow for better management of visitor activity (such as SCUBA diving) and control of erosion, as these reefs are under no direct federal or state management or protection. He identified corrections needed to the Reference Map in the plan. Dr. Dodge suggested that Table 1 be modified to include more information on what characterizes each management zone. He suggested mentioning that the shape and composition of the barrier island has been significantly influenced by man through dredging of the Port entrance channel and has been maintained by beach renourishment. He also suggested mentioning how many times beach renourishment has been accomplished and discussing the consequences of no renourishment. He asked what contingency plans are in place if the erosion near the jetty and groins continues or accelerates, and no beach renourishment is conducted. Dr. Dodge stated that it would be good to mention the potential effects of global climate change on park resources, such as the fact that rising sea level will have potentially severe consequences for the park. He suggested clarifying that State law requires turtle-friendly lighting. Dr. Dodge asked if the new airport runway extension would significantly affect noise in the Park.

**Kristin Hoss** (Youth Environmental Alliance) provided written comments to DRP staff in addition to her comments at the meeting. Her written comments focused on editorial corrections. She also provided several publications related to mangroves and their importance.

**Frank Gernert** (FFWCC Boating Advisory Council and Marine Industries Association of South Florida) was unable to attend the meeting and provided written comments to DRP staff after reviewing the draft meeting summary. He stated that the Plan looks comprehensive and thorough. He is very supportive of increased waterway access for paddle boarders, kayaks and boats. He also encouraged reef protection on the eastern boundary of the park as noted by Dr. Dodge. He stated that the FFWCC (of which he sits on the Boating Advisory Council) has initiated an anchoring and mooring program (not necessarily aimed at reef protection), and some type of protection for the three reefs off the park is necessary. He stated that SCUBA diving boats (commercial and private) anchor in these zones daily, and an expanded mooring system should be considered.

## Staff Recommendations

The staff recommends approval of the proposed management plans for John U. Lloyd Beach State Park as presented, with the following significant changes:

- The information on park visitation and programs will be reviewed and expanded as appropriate to better reflect the true volume of participation.
- Clarify the need for surveys and research to address butterfly species and archaeological resources in the park.
- The discussion of shoreline/dune restoration and erosion will be modified to add information regarding causes of erosion, past restoration and beach renourishment activities, appropriate objectives for restoration, and importance of the sand bypass project.
- Modify the text indicating the voluntary nature of the light management plan under development by Port Everglades.

Several Advisory Group members mentioned the possibility of establishing a Citizen Support Organization (CSO) for the park. While the unit management plan does not generally include such recommendations, the Division is open to the possibility of exploring options for creating a CSO. The Division has partnered with numerous organizations throughout the State to promote state parks and jointly fund and implement many projects and programs.

A recommendation was made to amend the park boundary to include the offshore reef. While DRP recognizes that the reef is a significant natural resource, the Division is primarily responsible for upland management and typically limits management of submerged resources to those that are integral to the successful management and provision of recreational opportunities for the upland areas of the park. The Division will continue to work with its partner agencies on all levels to ensure the long-term cooperative management of submerged resources outside the park boundary.

One Advisory Group member suggested surveys and monitoring of the shoreline and dune characteristics over time. The plan includes assessments and management measures for each of the park's natural communities, including the beach dune community. As the shoreline and dune systems vary from year to year, long-term trends will be monitored through the management

plan update process, which occurs every ten years, and no specific survey requirements have been added to the plan.

An additional concern was voiced about the impacts of arthropod control and the possible need for further research. State law implies that parks should be treated for mosquitoes. The treatment allowed at John U. Lloyd Beach State Park per the arthropod control plan generally imposes the least environmental hazard to non-target organisms.

Additional revisions were made throughout the document to address editorial corrections, consistency of spellings and notations, labeling of maps and tables, and other minor corrections.

## Notes on Composition of the Advisory Group

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

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

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

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# Addendum 4—Soil Descriptions

(**3) Arent, Organic Substratum-Urban Land Complex, 0 to 5 percent slopes** - This is a highly permeable, nearly level to gently sloping soil on open areas and of urban land, or areas covered by concrete and buildings.

The surface, layer extending to approximately 38 inches, is comprised of a very pale brown sand that has pockets, streaks and lenses of gray and brown sand. Between depths of 38 and 52 inches is black muck that contains lenses and pockets of dark reddish brown, fibrous muck. Dark grayish brown sand that has light gray and very pale brown mottles extends below the muck to a depth of 72 inches or more.

Included with this soil in mapping are small areas of soils that have a higher percentage of limestone fragments in the overburden materials and scattered areas of soils that do not have organic layers in the underlying natural soil. Also included are scattered open areas that have not been developed for urban use at this time.

Depth to the water table depends on the established drainage in the area but in most areas it is between 24 and 50 inches and averages about 40 inches. Permeability is rapid throughout these soils, though in some places the weight of the overburden has compressed the organic layer and reduced its permeability. Available water capacity is generally low in the overburden and very high in the underlying organic materials. The natural fertility is low.

**(6) Beaches, 0 to 8 percent slopes** - This is a nearly level to sloping, narrow, sandy strip along the Atlantic Ocean. Seawater regularly overwashes the larger part of the beaches at high tide, and these areas are barren. The slightly higher areas away from normal wave action are inundated only during seasonal and storm tides. These areas normally have only sparse vegetation that is fragile and easily destroyed. Some beaches change in width and scope every time a major storm occurs.

Beaches are fine to coarse sand mixed with multicolored shells and shell fragments. This material is constantly reworked by wave action. Soil reaction is moderately alkaline, and shell fragments are calcareous.

Most beaches remain in their natural condition, but many especially those near urban developments, have been altered. Groins, jetties, and seawalls have been constructed to protect the beaches from erosion. Rocks and sandy fill material have been brought onto the beaches to control erosion or to extend the higher land on the beach ridge to nearer the water's edge, thus protection homes or other buildings there.

**(7) Canaveral-Urban Land Complex, 0 to 5 percent slopes** - This nearly level to gently sloping complex consists of 50 to 70 percent Canaveral soils and 30 to 50 percent urban land. These moderately drained to poorly drained soils are found on the barrier islands along the coast. These soils formed in thick deposits of marine sands and shell fragments and are on gentle lower slopes on the western side of the narrow dunelike ridge. Under natural conditions, the water table is between depths of 12 and 36 inches most of each year, though in dry seasons it may drop to 60 inches. In the lowest areas adjacent to the Intracoastal Waterway, the height of the water table depends on tidal fluctuations.

Typically, the surface layer is very dark grayish brown sand about 6 inches thick. Between 6 and 50 inches is brown sand. Below this is light olive sand that extends to a depth of 80 inches or more. About 5 to 50 percent of the sand is derived from shell. Permeability is very rapid in all layers of these soils. The available water capacity is very low. Natural fertility and organic matter content are also very low. Most areas of the Canaveral soils have been modified by grading or shaping or have been otherwise altered for community development.

**(24) Palm Beach Sand, 0 to 8 percent slopes -** This complex consists of nearly level to sloping, excessively drained soils on long, narrow ridges adjacent to the coast. These soils formed in thick deposits of marine sand and shell fragments. The water table is below a depth of 80 inches.

Typically, the surface layer is sand and fragments of shell. The upper 3 inches is black, and the lower 4 inches is very dark grayish brown. Below this mixed sand and fragments of shell extend to a depth of 80 inches or more. The sand grains are colorless quartz grains, but multicolored fragments of shell give this layer a color of light yellowish brown or very pale brown. Permeability is very rapid in all layers. The available water capacity is very low. Natural fertility and organic matter content are also very low.

Palm Beach Sands are geographically associated with Beaches and Canaveral soils. Beaches are on the shoreline and are flooded by wave action. Canaveral soils are similar to Palm Beach soils, but are at lower elevations and have a water table within a depth of 40 inches most of the time.

**(32) Perrine Variant Silt Loam, 0 to 5 percent slopes** – The Perrine Variant series consists of nearly level, poorly drained soil in flatlands and swamps near the coast that has 18 to 48 inches of calcareous silt loam (marl) over well decomposed organic materials. These soils formed in loamy marine sediment deposited over thick beds of decomposed, hydrophytic plant remains. Under natural conditions, these soils are flooded by shallow water for long periods. The water table is within 10 inches of the surface for 2 to 6 months in most years. The level is probably highest from June to November. The water table is at a depth of 10 to 30 inches for most of the rest of each year.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. Between depths of 8 and 26 inches are layers of grayish brown and very dark grayish brown silt loam. Below this, to a depth of 80 inches or more, are layers of black and dark reddish brown, well decomposed organic materials.

Permeability is moderate to moderately slow in the surface layer, moderate to moderately rapid between depths of 8 and 26 inches, and rapid in the organic layers. The available water capacity is high to very high. Natural fertility is moderate. Some of these soils have a light to moderate salinity.

**(35) Terra Ceia Muck, Tidal, 0 to 5 percent slopes** - This is a nearly level, very poorly drained organic soil in tidal mangrove swamps near the coast. This soil has organic materials more than 51 inches thick and is subject to daily or periodic tidal flooding.

Typically, the surface layer is black muck about 12 inches thick. Between depths of 12 and 66 inches is dark reddish brown muck that has more fibrous material and in which the sand contend increases in the lower few inches. Below this is grayish brown sand to a depth of 80 inches or more.

Permeability is rapid in these areas. Available water capacity is high. Natural fertility is moderate, but the soil is affected by salinity.

**(40) Urban Land** - This designation consists of areas that are more than 70 percent covered by airports, shopping centers, parking lots, large buildings' streets and sidewalks, and other structures, so that the natural soil is not readily observable.

Unoccupied areas of this land type, mostly lawns, parks, vacant lots, and playgrounds, consist of soils in the Hallandale, Margate, Immokalee, and Basinger series that have been altered by fill material spread on the surface to an average thickness of about 12 inches. The fill is mostly sandy material, some of which contains limestone and shell fragments.

# Addendum 5—Plant and Animal List

**John U. Lloyd Beach State Park Plants**

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|

## PTERIDOPHYTES

| | | |
|---|---|---|
| Golden leather fern | *Acrostichum aureum* | MAH |
| Giant leather fern | *Acrostichum danaeifolium* | |
| Tuberous sword fern * | *Nephrolepis cordifolia* | |
| Adder's tongue fern | *Ophioglossum petiolatum* | |
| Golden polypody | *Phlebodium aureum* | |
| Whisk fern | *Psilotum nudum* | |
| Bracken fern | *Pteridium aquilinum var. caudatum* | |
| Bahama ladder brake | *Pteris bahamensis* | MAH |
| China brake* | *Pteris vittata* | |
| Southern shield fern | *Thelypteris kunthii* | |

## GYMNOSPERMS

| | | |
|---|---|---|
| Red cedar * | *Juniperus virginiana* | |
| Coontie, Florida arrowroot | *Zamia integrifolia* | MAH |

## ANGIOSPERMS

### MONOCOTS

**Agavacaeae**

| | | |
|---|---|---|
| False sisal | *Agave decipiens* | |
| Red-edged dracaena * | *Draceana marginata* | |
| Mother-in-law's tongue * | *Sansevieria hyacinthoides* | |
| Spanish bayonet | *Yucca aloifolia* | |
| Spineless yucca * | *Yucca elephantipes* | |

**Amaryllidaceae**

| | | |
|---|---|---|
| Mangrove spiderlily | *Hymenocallis latifolia* | |

**Araceae**

| | | |
|---|---|---|
| Golden pothos | *Epipremnum pinnatum* | |
| Arrowhead vine * | *Syngonium podophyllum* | |

**Arecaceae**

| | | |
|---|---|---|
| Coconut palm * | *Cocos nucifera* | |
| Solitaire palm * | *Ptychosperma elegans* | |
| Royal palm | *Roystonea elata* | |
| Cabbage palm | *Sabal palmetto* | |
| Saw palmetto | *Serenoa repens* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| Washington palm * | *Washingtonia robusta* | |
| **Bromeliaceae** | | |
| Cardinal airplant | *Tillandsia fasciculata* var. *densispica* | MAH |
| Ball moss | *Tillandsia recurvata* | |
| Giant airplant | *Tillandsia utriculata* | MAH |
| **Commelinaceae** | | |
| Dayflower* | *Commelina diffusa* | |
| Oysterplant* | *Tradescantia spathacea* | |
| Wandering jew * | *Tradescantia zebrina* | |
| **Cyperaceae** | | |
| Poorland flatsedge | *Cyperus compressus* | |
| Yellow nutgrass * | *Cyperus esculentus* | |
| Umbrella sedge | *Cyperus globulosus* | |
| False sawgrass | *Cyperus ligularis* | |
| Beach star | *Cyperus pedunculatus* | BD, CS |
| Umbrella sedge | *Cyperus planifolius* | |
| Umbrella sedge | *Cyperus polystachyos* | |
| Nutgrass* | *Cyperus rotundus* | |
| Tropical flatsedge | *Cyperus surinamensis* | |
| Beach jacquemontia | *Jacquemontia reclinata* | MAH |
| Spike rush | *Eleocharis geniculata* | |
| Fringe rush * | *Fimbristylis annua* | |
| Hurricane grass * | *Fimbristylis cymosa* | |
| Shortleaf spikesedge | *Kyllinga brevifolius* | |
| White-tops | *Rhynchospora colorata* | |
| **Dioscoreaceae** | | |
| Air potato * | *Dioscorea bulbifera* | |
| **Liliaceae** | | |
| Aloe * | *Aloe barbadensis* | |
| Common asparagus-fern* | *Asparagus setaceus* | |
| Spider plant * | *Chlorophytum capense* | |
| Big blue lilyturf* | *Liriope muscari* | |
| **Orchidaceae** | | |
| Ground orchid * | *Oeceoclades maculata* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|

**Poaceae**

| | |
|---|---|
| Bushy bluestem | *Andropogon glomeratus var. pumilus* |
| Broom-sedge | *Andropogon virginicus* |
| Arrowfeather | *Aristida purpurascens* |
| Carpet grass | *Axonopus compressus* |
| Para grass * | *Brachiaria mutica* |
| Signal grass * | *Brachiaria subquadripara* |
| Southern sandbur | *Cenchrus enchinatus* |
| Coastal sandbur | *Cenchrus spinifex* |
| Sanddune sandbur | *Cenchrus tribuloides* |
| Bermuda grass * | *Cynodon dactylon* |
| Egyptian grass * | *Dactyloctenium aegyptium* |
| Southern crabgrass | *Digitaria ciliaris* |
| Shaggy crabgrass | *Digitaria villosa* |
| Saltgrass | *Distichlis spicata* |
| Goosegrass * | *Eleusine indica* |
| Gophertail lovegrass | *Eragrostis ciliaris* |
| Elliot lovegrass | *Eragrostis elliottii* |
| Centipede grass * | *Eremochloa ophinroides* |
| Fingergrass | *Eustachys petraea* |
| Burma red * | *Neyraudia reynaudiana* |
| Beach grass | *Panicum amarum* |
| Fall panicum | *Panicum dichotomiflorum var. bartowense* |
| Torpedo grass * | *Panicum repens* |
| Seashore paspalum | *Paspalum distichum* |
| Bahia grass * | *Paspalum notatum* |
| Salt joint grass | *Paspalum setaceum* |
| Seashore paspalum | *Paspalum vaginatum* |
| Napier grass* | *Pennisetum purpureum* |
| Natal grass * | *Rhynchelytrum repens* |
| Wire bluestem | *Schizachyrium gracile* |
| Crimson bluestem | *Schizachyrium sanguineum* |
| Yellow bristlegrass | *Setaria parviflora* |
| Grain sorghum * | *Sorghum bicolor* |
| Johnson grass * | *Sorghum halepense* |
| Smooth cordgrass | *Spartina alterniflora* |
| Sand cordgrass | *Spartina bakeri* |
| Saltmeadow cordgrass | *Spartina patens* |
| Domingan dropseed grass | *Sporobolus domingensis* |
| Dropseed * | *Sporobolus indicus var. indicus* |
| Dropseed * | *Sporobolus indicus var. pyramidalis* |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| Coastal dropseed | *Sporobolus virginicus* | |
| St. Augustine grass * | *Stenotaphrum secundatum* | |
| Fakahatcheegrass | *Tripsacum dactyloides* | |
| Seaoats | *Uniola paniculata* | |
| Turf grass * | *Zoysia matrella* | |
| **Smilacaceae** | | |
| Greenbriar | *Smilax auriculata* | |
| **DICOTS** | | |
| **Acanthaceae** | | |
| Green shrimp plant * | *Blechum brownei* | |
| Clock vine * | *Thunbergia fragrans* | |
| **Aizoaceae** | | |
| Sea purslane | *Sesuvium portulacastrum* | |
| **Amaranthaceae** | | |
| Yellow joyweed | *Alternanthera flavescens* | |
| Seaside joyweed | *Alternanthera maritima* | |
| Spiny amaranth | *Amaranthus spinosus* | |
| Purple amaranth | *Amaranthus blitum* | |
| Samphire | *Blutaparon vermiculare* | |
| Bloodleaf | *Iresine canescens* | |
| **Anacardiaceae** | | |
| Poisonwood | *Metopium toxiferum* | |
| Brazilian pepper * | *Schinus terebinthifolius* | |
| Poison ivy | *Toxicodendron radicans* | |
| **Annonaceae** | | |
| Pond apple | *Annona glabra* | |
| **Apiaceae** | | |
| Coinwort | *Centella asiatica* | |
| **Apocynaceae** | | |
| Madagascar periwinkle * | *Catharanthus roseus* | |
| Devil's potato | *Echites umbellata* | |
| Oleander * | *Nerium oleander* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| **Araliaceae** | | |
| Umbrella tree * | *Schefflera actinophylla* | |
| **Araucariaceae** | | |
| Norfolk Island pine * | *Araucaria excelsa* | |
| **Asclepiadaceae** | | |
| Scarlet milkweed * | *Asclepias curassavica* | |
| Leafless cynanchum | *Cynanchum scoparium* | |
| White twinevine | *Sarcostemma clausum* | |
| **Asteraceae** | | |
| Common ragweed | *Ambrosia artemisiifolia* | |
| Aster | *Aster subulatus* | |
| Falsewillow | *Baccharis angustifolia* | |
| Salt bush | *Baccharis halimifolia* | |
| Spanish needle | *Bidens alba var. radiata* | |
| Sea oxeye | *Borrichia frutescens* | |
| Sea daisy * | *Calyptocarpus vialis* | |
| Bitter bush | *Chromolaena odorata* | |
| Blue mist flower | *Conoclinium coelestinum* | |
| Dwarf horseweed | *Conyza canadensis var. pusilla* | |
| Tassel flower * | *Emilia fosbergii* | |
| Lilac tassleflower* | *Emilia sonchifolia* | |
| Fireweed | *Erechtites hieracifolia* | |
| Southern fleabane | *Erigeron quercifolius* | |
| Dog fennel | *Eupatorium capillifolium* | |
| Lateflowering thoroughwort | *Eupatorium serotinum* | |
| Beach sunflower | *Helianthus debilis var. debilis* | |
| Camphor weed | *Heterotheca subaxillaris* | |
| Marsh elder | *Iva frutescens* | |
| Beach elder | *Iva imbricata* | |
| Wild lettuce | *Lactuca graminifolia* | |
| Marsh elder | *Melanthera nivea* | |
| Hemp vine | *Mikania scandens* | |
| Tea-blinkum | *Pectis leptocephala* | |
| Ckicken weed | *Pectis prostrata* | |
| Bushy fleabane | *Pluchea carolinensis* | |
| Marsh fleabane | *Pluchea odorata* | |
| Fleabane | *Pluchea rosea* | |
| Spiny sowthistle | *Sonchus asper* | |



* Non-native Species

Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| Common sowthistle * | *Sonchus oleraceus* | |
| Mexican daisy * | *Tridax procumbens* | |
| Frostweed | *Verbesina virginica* | |
| Ironweed * | *Vernonia cinerea* | |
| Wedelia * | *Sphagneticola trilobata* | |
| Oriental false hawksbeard * | *Youngia japonica* | |
| **Avicenniaceae** | | |
| Black mangrove | *Avicennia germinans* | |
| **Bignoniaceae** | | |
| Yellow elder * | *Tecoma stans* | |
| **Boraginaceae** | | |
| Sea lavender | *Argusia gnaphalodes* | CS |
| Scorpion's tail | *Heliotropium angiospermum* | |
| Salt heliotrope | *Heliotropium curassavicum* | |
| Pineland heliotrope | *Heliotropium polyphyllum* | |
| **Brassicaceae** | | |
| Pepper grass | *Lepidium virginicum* | |
| **Buddlejaceae** | | |
| Rustweed | *Polypremum procumbens* | |
| **Burseraceae** | | |
| Gumbo limbo | *Bursera simaruba* | |
| **Cactaceae** | | |
| Cochineal nopal cactus * | *Opuntia cochenillifera* | |
| Prickly pear cactus | *Opuntia humifusa* | |
| **Caprifoliaceae** | | |
| Southern elderberry | *Sambucus canadensis* | |
| **Caricaceae** | | |
| Papaya * | *Carica papaya* | |
| **Casuarinaceae** | | |
| Australian pine * | *Casuarina equisetifolia* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|

**Chenopodiaceae**
Beach orach .....*Atriplex pentandra*
Mexican tea .....*Chenopodium ambrosioides*
Woody glasswort .....*Salicornia perennis*

**Chrysobalanaceae**
Coco plum.....*Chrysobalanus icaco*

**Combretaceae**
Buttonwood .....*Conocarpus erectus*
White mangrove.....*Laguncularia racemosa*
Tropical almond *.....*Terminalia catappa*

**Convovulaceae**
Carolina ponysfoot .....*Dichondra carolinensis*
Creeping morning glory .....*Evolvulus alsinoides*
Moon-flower .....*Ipomoea alba*
Morning glory.....*Ipomoea imperati*
Morning glory.....*Ipomoea indica var. acuminata*
Railroad vine.....*Ipomoea pes-caprae ssp. brasiliensis*
Morning glory *.....*Ipomoea triloba*
Moonvine .....*Ipomoea violaceae*

**Crassulaceae**
Devil's-backbone*.....*Kalanchoe daigremontiana*
Lavender scallops *.....*Kalanchoe fedtschenkoi*
Life plant *.....*Kalanchoe pinnata*

**Cucurbitaceae**
Creeping cucumber.....*Melothria pendula*
Wild balsam apple *.....*Momordica charantia*

**Euphorbitaceae**
Bishopwood *.....*Bischofia javanica*
Blodgett's spurge.....*Chamaesyce blodgettii*
Sand dune spruge .....*Chamaesyce bombensis*
Hairy spruge.....*Chamaesyce hirta*
Spurge.....*Chamaesyce hypericifolia*
Milk purslane.....*Chamaesyce maculata*
Spurge.....*Chamaesyce mendezii*
Seaside spurge.....*Chamaesyce mesembryanthemifolia*



* Non-native Species

Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| Gulf sandmat | *Chamaesyce thymifolia* | |
| Stinging nettle | *Cnidoscolus stimulosus* | |
| Vente conmigo | *Croton glandulosus* | |
| Lobed croton | *Croton lobatus* | |
| Beach croton | *Croton punctatus* | |
| Grassleaf spurge* | *Euphorbia graminea* | |
| Sanddune Spurge | *Euphorbia trichotoma* | |
| Drummond's leaf-flower | *Phyllanthus abnormis* | |
| Mascarene Island leaf-flower | *Phyllanthus tenellus* | |
| Wild poinsettia | *Poinsettia cyathophora* | |
| Wild poinsettia | *Poinsettia heterophylla* | |
| Castor bean * | *Ricinus communis* | |
| **Fabaceae** | | |
| White moneywort * | *Alysicarpus vaginalis* | |
| Yellow nicker bean | *Caesalpinia bonduc* | |
| Bay-bean | *Canavalia rosea* | |
| Hairy partridge-pea | *Chamaecrista nictitans* var. *aspera* | |
| Rattlebox | *Crotalaria pumila* | |
| Rabbit bells | *Crotalaria rotundifolia* | |
| Coin vine | *Dalbergia brownei* | |
| Beggar's-ticks | *Desmodium incanum* | |
| Dixie ticktrefoil* | *Desmodium tortuosum* | |
| Threeflower ticktrefoil* | *Desmodium triflorum* | |
| Florida hammock milkpea | *Galactia striata* | |
| Downy milkpea | *Galactia volubilis* | |
| Creeping indigo* | *Indigofera spicata* | |
| Lead tree * | *Leucaena leucocephala* | |
| False tamarind | *Lysiloma latisiliquum* | |
| Red jumbie bean * | *Macroptilium lathyroides* | |
| Sensitive plant | *Neptunia pubescens var. pubescens* | |
| Blackbead | *Pithecellobium keyense* | CS |
| Karum tree* | *Pongamia pinnata* | |
| Necklace-pod | *Sophora tomentosa* | |
| Pencil flower | *Stylosanthes hamata* | |
| Sand vetch | *Vicia acutifolia* | |
| Cow-pea | *Vigna luteola* | |
| **Fagaceae** | | |
| Live oak | *Quercus virginiana* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| **Gentianaceae** | | |
| Catchfly prairie gentian | *Eustoma exaltatum* | |
| **Goodeniaceae** | | |
| Inkberry | *Scaevola plumieri* | CS |
| Beach naupaka * | *Scaevola taccada* | |
| **Lamiaceae** | | |
| Florida scrub bluecurls | *Trichostema suffrutescens* | |
| **Loasaceae** | | |
| Poorman's patches | *Mentzelia floridana* | |
| **Lythraceae** | | |
| Toothcups | *Ammannia latifolia* | |
| **Malvaceae** | | |
| Hibiscus * | *Hibiscus rosa-sinensis* | |
| Sea hibiscus * | *Hibiscus tiliaceus* | |
| Broomweed | *Sida acuta* | |
| Bracted fanpetals | *Sida ciliaris* | |
| Ilima* | *Sida cordifolia* | |
| Indian hemp | *Sida rhombifolia* | |
| Seaside mahoe * | *Thespesia populnea* | |
| Caesar weed * | *Urena lobata* | |
| **Meliaceae** | | |
| West Indian Mahogany | *Swietenia mahagoni* | |
| **Moraceae** | | |
| Strangler fig | *Ficus aurea* | |
| **Myrsinaceae** | | |
| Marlberry | *Ardisia escallonioides* | |
| **Myrtaceae** | | |
| Spanish stopper | *Eugenia foetida* | |
| Surinam cherry * | *Eugenia uniflora* | |
| Melaleuca * | *Melaleuca quinquenervia* | |
| Simpson stopper | *Myrcianthes fragrans* | |
| Guava * | *Psidium guajava* | |



* Non-native Species

Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| Rose-apple* | *Syzygium jambos* | |
| **Nyctaginacaea** | | |
| Red spiderling | *Boerhavia diffusa* | |
| Beeftree | *Guapira discolor* | |
| Burrowing four o'clock | *Okenia hypogaea* | BD, CS |
| **Oleaceae** | | |
| Florida swampprivet | *Forestiera segregata* | |
| Corky-stemmed jasmine* | *Jasminum fluminense* | |
| **Onagraceae** | | |
| Southern beeblossom | *Gaura angustifolia* | |
| Mexican primrose-willow | *Ludwigia octovalvis* | |
| Seaside evening primrose | *Oenothera humifusa* | |
| **Oxalidaceae** | | |
| Creeping woodsorrel * | *Oxalis corniculata* | |
| Common yellow oxalis | *Oxalis stricta* | |
| **Passifloraceae** | | |
| Corkystem passionflower | *Passiflora suberosa* | |
| **Phytolaccaceae** | | |
| American pokeweed | *Phytolacca americana* | |
| Rougeberry | *Rivina humilis* | |
| **Polygalaceae** | | |
| Milkwort | *Polygala grandiflora* | |
| **Polygonaceae** | | |
| Pigeon plum | *Coccoloba diversifolia* | |
| Sea grape | *Coccoloba uvifera* | |
| **Portulacaceae** | | |
| Paraguayan purslane* | *Portulaca amilis* | |
| Little hogweed | *Portulaca oleracea* | |
| **Primulaceae** | | |
| Water pimpernel | *Samolus ebracteatus* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|

**Rhamnaceae**
Latherleaf * ..... *Colubrina asiatica*
Black ironwood ..... *Krugiodendron ferreum*

**Rhizophoraceae**
Red mangrove ..... *Rhizophora mangle*

**Rubiaceae**
Snowberry ..... *Chiococca alba*
Pineland snowberry ..... *Chiococca parviflora*
Virginia buttonweed ..... *Diodia virginiana*
Beach-creeper ..... *Ernodea littoralis*
Sevenyear apple ..... *Genipa clusiifolia*
Firebush ..... *Hamelia patens*
Wild coffee ..... *Psychotria nervosa*
White Indigo-berry ..... *Randia aculeata*
Largeflower Mexicn clover * ..... *Richardia grandiflora*
Rough Mexican clover * ..... *Richardia scabra*
Woodland false buttonweed ..... *Spermacoce assurgens*
Shrubby false buttonweed ..... *Spermacoce verticillata*

**Sapindaceae**
Carrotwood * ..... *Cupaniopsis anacardiopsis*
Varnish leaf ..... *Dodonaea viscosa*
Soapberry ..... *Sapindus saponaria*

**Sapotaceae**
Kanapalei * ..... *Mimusops roxburghiana*
False mastic ..... *Sideroxylon foetidissimum*

**Scrophulariaceae**
Herb of grace ..... *Bacopa monnieri*
American bluehearts ..... *Buchnera americana*
Goatweed ..... *Capraria biflora*
Licorice weed ..... *Scoparia dulcis*

**Simaroubaceae**
Paradisetree ..... *Simarouba glauca*

**Solanaceae**
Day jessamine * ..... *Cestrum diurnum*

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|
| Cutleaf groundcherry | *Physalis angulata* | |
| Smallflower groundcherry | *Physalis viscosa* | |
| American black nightshade | *Solanum americanum* | |
| Bahama nightshade | *Solanum bahamense* | |
| **Sterculiaceae** | | |
| Sleepy morning | *Waltheria indica* | |
| **Surianaceae** | | |
| Bay-cedar | *Suriana maritima* | |
| **Ulmaceae** | | |
| Jamaican nettletree | *Trema micrantha* | |
| **Urticaceae** | | |
| Smallspike false nettle | *Boehmeria cylindrica* | |
| Florida pellitory | *Parietaria floridana* | |
| Rockweed* | *Pilea microphylla* | |
| **Verbenaceae** | | |
| Wild lantana | *Lantana involucrata* | |
| Southern fogfruit | *Lippia stoechadifolia* | |
| Turkey tangle fogfruit | *Phyla nodiflora* | |
| Sandpaper vervain | *Verbena scabra* | |
| **Vitaceae** | | |
| Virginia creeper | *Parthenocissus quinquefolia* | |
| **Zygophyllaceae** | | |
| Jamaican feverplant * | *Tribulus cistoides* | |
| **MARINE PLANTS** | | |
| **Seagrass** | | |
| Shoal grass | *Halodule wrightii* | |
| Manatee grass | *Syringodium filiforme* | |
| Turtle grass | *Thalassia testudinum* | |
| **Brown Algae** | | |
| Y-branched algae | *Dictyota* spp. | |
| White acroll alga | *Padina jamaicensis* | |

| Common Name | *Scientific Name* | Primary Habitat Codes (for designated species) |
|---|---|---|

Sargassum seaweed .....*Sargassum fluitans*
Sargasso weed .....*Sargassum natans*

**Green Algae**
Green grape alga .....*Caulerpa racemosa*
Green feather alga..... *Caulerpa sertularioides*
Large leaf watercress alga.....*Halimeda discoidea*
Three-finger leaf alga.....*Halimeda incrassata*
Stalked lettuce leaf alga.....*Halimeda tuna*
Sea peral .....*Ventricaria ventricosa*



*** Non-native Species**

**Note: This is a historical list of species for the park.**

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|

## INVERTEBRATES

## INSECTS

| | | |
|---|---|---|
| House cricket | *Acheta domestica* | MTC |
| Green Stink Bug | *Acrosternum hilare* | MTC |
| Two-spotted ladybug beetle | *Adalia bipunctata* | MTC |
| Black saltmarsh mosquito | *Aedes taeniorhynchus* | MTC |
| Gulf fritillary | *Agraulis vanillae nigrior* | MTC |
| White peacock | *Anartia jatrophea* | MTC |
| Green darner | *Anax junius* | MTC |
| Florida leaf wing | *Anoea floridalis* | MTC |
| Aphid | *Aphis* sp. | MTC |
| Statira | *Aphrissa statira floridensis* | MTC |
| Florida white | *Appias Drusilla* | MTC |
| Sow bug | *Armadillidium vulgare* | MTC |
| Great southern white | *Ascia monuste* | MTC |
| Io moth | *Automeris io* | MTC |
| Eastern sand wasp | *Bembix Americana* | MTC |
| Carpenter ant | *Camponotus* sp. | MTC |
| Mastic psylla | *Ceropsylla sideroxyli* | MTC |
| Deer fly | *Chrysops* sp. | MTC |
| Australian spittlebug | *Clastoptera undulate* | MTC |
| Spotless nine-spotted ladybug | *Coccinella novemnotata franciscana* | MTC |
| Mosquito | *Culex* sp. | MTC |
| Biting midges (no-see-ums) | *Culicoides* | MTC |
| Three-spot skipper | *Cymaenes tripuncta* | MTC |
| Queen butterfly | *Danaus gilippus berenice* | MTC |
| Monarch butterfly | *Danaus plexippus* | MTC |
| Cow killer | *Dasymutilla occidentalis* | MTC |
| Spinyback orbweaver | *Gasteracantha elipsoides* | MTC |
| Crab spider | *Gasteracantha tetracantha* | MTC |
| Harvestman spider | *Leiobunum* sp. | MTC |
| Earthworm | *Lumbricus* sp. | MTC |
| Millipede | *Narceus Americana* | MTC |
| Golden-silk spider | *Nephila clavipes* | MTC |
| Banana spider | *Olios antiguansis* | MTC |
| Brown daddy longlegs | *Phalangium opilio* | MTC |
| Jumping spider | *Phidippus* sp. | MTC |
| Cloudless sulphur butterfly | *Phoebis sennae* | MTC |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|

## CORALS

| | | |
|---|---|---|
| Corky sea finger | *Briareum asbestinum* | MCNS |
| Knobby brain coral | *Diploria clivosa* | MCNS |
| Symmetrical brain coral | *Diplora strigosa* | MCNS |
| Warty sea rod | *Eunicea calyculata* | MCNS |
| Shelf-knob sea rod | *Eunicea succinea* | MCNS |
| Golfball coral | *Favia fragum* | MCNS |
| Common Sea Fan | *Gorgonia ventalina* | MCNS |
| Branching fire coral | *Millepora alcicomis* | MCNS |
| Rough sea plume | *Muriceopsis flavida* | MCNS |
| Smooth star coral | *Oculina diffusa* | MCNS |
| Bent sea rod | *Plexaura flexuosa* | MCNS |
| Black sea rod | *Plexaura homomalla* | MCNS |
| Porous sea rod | *Pseudoplexaura* spp. | MCNS |
| Sea plumes | *Pseudopterogorgia* spp. | MCNS |
| Angular sea whip | *Pterogorgia anceps* | MCNS |
| Yellow sea whip | *Pterogorgia citrine* | MCNS |
| Lesser starlet coral | *Siderastrea radians* | MCNS |
| Smooth star coral | *Solenastrea bournoni* | MCNS |

## MOLLUSKS

| | | |
|---|---|---|
| Greedy dove shell | *Anachis avara* | MCNS |
| Well-ribbed dove shell | *Anachis lafresnayi* | MCNS |
| Atlantic sundial | *Architectonica nobilis* | MCNS |
| Common Atlantic bubble shell | *Bulla striata* | MCNS |
| Adele's top shell | *Calliostoma adelae* | MCNS |
| Mottled top shell | *Calliostoma jujubinum* | MCNS |
| Beautiful top shell | *Calliostoma pulchrum* | MCNS |
| Common nutmeg | *Cancellaria reticulate* | MCNS |
| Florida cerith | *Cerithium atratum* | MCNS |
| Lettered horn shell | *Cerithium literatum* | MCNS |
| Dotted horn shell | *Cerithium muscarum* | MCNS |
| Lace murex | *Chicoreus florifer* | MCNS |
| Common dove shell | *Columbella mercatoria* | MCNS |
| Florida cone | *Conus floridanus* | MCNS |
| Jasper cone | *Conus jaspideus* | MCNS |
| Alphabet cone | *Conus spurious* | MCNS |
| Eastern oyster | *Crassostrea virginica* | EUS |
| Spiny slipper | *Crepidula aculeate* | MCNS |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| Atlantic slipper | *Crepidula fornicate* | MCNS |
| Eastern white slipper | *Crepidula plana* | MCNS |
| Flamingo tongue | *Cyphoma gibbosum* | MCNS |
| Gray cowry | *Cypraea cinerea* | MCNS |
| Deer cowry | *Cypraea cervus* | MCNS |
| Measled cowry | *Cypraea zebra* | MCNS |
| Little Keyhole Limpet | *Diodora cayenensis* | MCNS |
| Land snail | *Englandina rosea* | MTC |
| Thick-lipped oyster drill | *Eupleura caudata* | MCNS |
| Banded tulip | *Fasciolaria lillium* | MCNS |
| True tulip | *Fasciolaria tulipa* | MCNS |
| Barbados Keyhole Limpet | *Fissurella barbadensis* | MCNS |
| Shiny Atlantic auger | *Hastula hastate* | MCNS |
| Chestnut latirus | *Leucozonia nassa* | EUS, MCNS |
| Southern periwinkle | *Littorina angulifera* | MS, EUS |
| Atlantic marginella | *Marginella apicina* | MCNS |
| White-spotted marginella | *Marginella guttata* | MCNS |
| Coffeebean snail | *Melampus coffeus* | MTC |
| Crown conch | *Melongena corona* | MS, EUS |
| Atlantic modulus | *Modulus modulus* | MCNS |
| Cabrit's murex | *Murex cabritii* | MCNS |
| Red murex | *Murex recurvirostris* | MCNS |
| Variable nassa mud snail | *Nassarius albus* | MCNS |
| Eastern nassa mud snail | *Nassarius vibex* | MCNS |
| Gaudy natica | *Natica canrena* | MCNS |
| Livid natica | *Natica livida* | MCNS |
| Bleeding tooth nerite | *Nerita peloronta* | MCNS |
| Four-toothed nerite | *Nerita versicolor* | MCNS |
| Netted Olive | *Oliva reticularis* | MCNS |
| Lettered olive | *Oliva sayana* | MCNS |
| West Indian dwarf olive | *Olivella nivea* | MCNS |
| Apple murex | *Phyllonotus pomum* | MCNS |
| Florida horse conch | *Pleuroploca gigantea* | MCNS |
| Shark's eye moon shell | *Polinices duplicatus* | MCNS |
| Milk moon snail | *Polinices lacteus* | MCNS |
| Atlantic baby's ear moon shell | *Sinum perspectivum* | MCNS |
| Florida fighting conch | *Strombus alatus* | EUS, MCNS |
| Queen conch | *Stombus gigas* | EUS, MCNS |
| Hawk-winged conch | *Stombus raninus* | MCNS |
| Beaded periwinkle | *Tectarius muricatus* | MCNS |
| American auger | *Terebra dislocate* | MCNS |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| Florida auger | *Terebra floridana* | MCNS |
| Checkered pheasant shell | *Tricolia affins* | MCNS |
| Umbilicate pheasant shell | *Tricolia thalassicola* | MCNS |

**CRUSTACEANS**

| | | |
|---|---|---|
| Mangrove tree crab | *Aratus pisionii* | MS |
| Sessile barnacle | *Balanus trigonus* | MCNS |
| Blue crab | *Callinectes sapidus* | MS, EUS |
| Land crab | *Cardisoma guanlumii* | MAH, MS |
| Horseshoe crab | *Limulus polyphemus* | EUS |
| Reef mantis | *Lysiosquilla glabriuscula* | MCNS |
| Florida stone crab | *Menippe mercenaria* | MS, EUS |
| Nimble spray crab | *Percnon gibbesi* | MCNS |
| Caribbean spiny lobster | *Panulirus argus* | MCNS |
| Sargassum swimming crab | *Portunus sayi* | MCNS |
| Banded coral shrimp | *Stenopus hispidus* | MCNS |
| Yellowline arrow crab | *Stenorhynchus seticornis* | MCNS |
| Fidler crab | *Uca* sp. | MS |

**ECHINODERMS**

| | | |
|---|---|---|
| Long-spined urchin | *Diadema antillarum* | MCNS |
| Rock-boring urchin | *Echinometra lucunter* | MCNS |
| Reef urchin | *Echinometra viridis* | MCNS |
| Slate-pencil urchin | *Eucidaris tribuloides* | MCNS |
| Six-keyhole sand dollar | *Mellita sexiesperforata* | EUS, MCNS |
| Cushion sea star | *Oreaster reticulates* | MCNS |
| West Indian sea egg | *Tripneustes ventricosus* | MCNS |

**MARINE SEGMENTED WORMS**

| | | |
|---|---|---|
| Split-crowned feather duster | *Anamobaea orstedii* | MCNS |
| Ghost feather duster | *Anamobaea* sp | MCNS |
| Lug worm | *Capitella capitata* | EUS |
| Parchment tubeworm | *Chaetopterus variopedatus* | EUS |
| Bearded fireworm | *Hermodice carunculata* | MCNS |
| Sphagetti worm | *Eupolymnia crassicornis* | MCNS |
| Brown fanworm | *Notaulax nudicollis* | MCNS |
| Christmas tree worm | *Spirobranchus giganteus* | MCNS |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|

## JELLYFISH AND ANEMONES

| | | |
|---|---|---|
| Moon jelly | *Aurelia aurita* | MCNS |
| Corkscrew anemone | *Bartholomea annualata* | MCNS |
| Thimble jelly (sea lice) | *Linuche unguiculata* | MCNS |
| Portuguese man-of-war | *Physalia physalis* | MCNS |
| Cannonball jelly | *Stomophus meleagris* | MCNS |

## SPONGES

| | | |
|---|---|---|
| Branching vase sponge | *Callyspongia* sp | MCNS |
| Red boring sponge | *Cliona delitrix* | MCNS |
| Green finger sponge | *Iotrochota birotulata* | MCNS |
| Black-ball sponge | *Ircinia strobilina* | MCNS |
| Brown variable sponge | *Plakoritis angulospiculatus* | MCNS |
| Loggerhead Sponge | *Spheciospongia vesparium* | MCNS |
| Fire Sponge | *Tedania ignis* | MCNS |

## VERTEBRATES

## FISH

| | | |
|---|---|---|
| Sargent major | *Abudefduf sazatilis* | MCNS |
| Ocean surgeonfish | *Acanthurus bahaianus* | MCNS |
| Blue tang | *Acanthurus chirurgus* | MCNS |
| Spotted eagle ray | *Aetobatus narinari* | EUS, MCNS, MAH |
| African pompano | *Alectis ciliaris* | MCNS, MAH |
| Black margate | *Anisotremus surinamensis* | MCNS |
| Porkfish | *Anisotremus virgincus* | MCNS |
| Flamefish | *Apogon maculates* | MCNS |
| Sheepshead | *Archosargus probatocephalus* | EUS, MCNS |
| Sea bream | *Archosargus rhomboidialis* | MCNS |
| Trumpetfish | *Autostomus masculatus* | MCNS |
| Gray triggerfish | *Balistes capriscus* | MCNS |
| Spanish hogfish | *Bodianus rufus* | MCNS |
| Sheepshead porgy | *Calamus penna* | MCNS |
| Orange spotted filefish | *Cantherhines pullus* | MCNS |
| Ocean triggerfish | *Canthidermis sufflamen* | MCNS |
| Sharpnosed puffer | *Canthigaster rostrata* | EUS, MCNS |
| Yellow jack | *Caranx barthotomaei* | MCNS |
| Blue runner | *Caranx crysos* | MCNS |



* Non-native Species

Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| Bar jack | *Caranx ruber* | MCNS |
| Blacktip shark | *Carcharhinus limbatus* | MCNS |
| Common snook | *Centropomus undecimalis* | EUS, MCNS |
| Atlantic spadefish | *Chaetodipterus faber* | EUS, MCNS |
| Four-eyed butterfly fish | *Chaetodon capistratus* | MCNS |
| Reef butterfly fish | *Chaetodon sedentarius* | MCNS |
| Bridled goby | *Coryphopterus glaucofraenum* | MCNS |
| Southern stingray | *Dasyatis Americana* | EUS, MCNS |
| Balloonfish | *Diodon holocanthus* | EUS, MCNS |
| Porcupine fish | *Diodon hystrix* | EUS, MCNS |
| Spottail pinfish | *Diplodus holbrooki* | EUS, MCNS |
| Graysby | *Epinephelus cruentatus* | MCNS |
| Red grouper | *Epinephelus morio* | MCNS |
| Highhat | *Equetus acuminatus* | MCNS |
| Jackknife fish | *Equetus lanceolatus* | MCNS |
| Yellowfin mojarra | *Gerres cinereus* | EUS, MCNS |
| Nurse shark | *Ginglymostoma cirratum* | EUS, MCNS |
| Goldspot goby | *Gnatholepis thompsoni* | MCNS |
| Neon goby | *Gobiosoma oceanops* | MCNS |
| Dash goby | *Gobionellus saipepallens* | MCNS |
| Spotted moray | *Gymnothorax moringa* | MCNS |
| Tomtate | *Haemulon aurolineatu* | MCNS |
| French grunt | *Haemulon flavolineatu* | MCNS |
| Cottonwick | *Haemulon melanurum* | MCNS |
| White grunt | *Haemulon plumieri* | EUS, MCNS |
| Bluestriped grunt | *Haemulon sciurus* | MCNS |
| Slippery dick | *Halichoeres bivittatus* | MCNS |
| Puddingwife | *Halichoeres radiatus* | MCNS |
| Clown wrasse | *Halichoeres maculipinna* | MCNS |
| Green razorfish | *Hemipteronotus splendens* | MCNS |
| Balao | *Hemiramphus balao* | MCNS |
| Sargassumfish | *Histrio histrio* | MCNS |
| Blue angelfish | *Holacanthus bermudensis* | MCNS |
| Queen angelfish | *Holacanthus culuaris* | MCNS |
| Squirrelfish | *Holocentrus adscensionis* | MCNS |
| Barred hamlet | *Hypoplectrus puella* | MCNS |
| Blue goby | *Ioglossus calliurus* | MCNS |
| Hovering goby | *Ioglossus helenae* | MCNS |
| Yellow chub | *Kyphosus incisor* | MCNS |
| Bermuda chub | *Kyphosus sectatrix* | EUS, MCNS |
| Hogfish | *Lachnolaimus maximus* | MCNS |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| Spotted trunkfish | *Lactophrys bicaudalis* | MCNS |
| Scrawled cowfish | *Lactophrys quadricornis* | MCNS |
| Smooth trunkfish | *Lactophrys triqueter* | MCNS |
| Tripletail | *Lobotes surinamensis* | MCNS |
| Mutton snapper | *Lutjanus analis* | MS, MCNS |
| Grey snapper | *Lutjanus griseus* | MCNS |
| Rosy blenny | *Malacoctenus macropus* | MCNS |
| Tarpon | *Megalops atlanticus* | MS, MCNS |
| White mullet | *Mugil curema* | MS, MCNS |
| Yellow goatfish | *Mulloidichthys martinicus* | MCNS |
| Scamp | *Mycteroperca phenax* | MCNS |
| Lesser electric ray | *Narcine brasiliensis* | MCNS |
| Yellowtail snapper | *Ocyurus chrysurus* | MCNS |
| Glassy sweeper | *Pempheris schomburgki* | MCNS |
| Gray angelfish | *Pomacanthus arcuatus* | MCNS |
| French angelfish | *Pomacanthus paru* | MCNS |
| Red lionfish* | *Pterois volitans* | MCNS |
| Bluefish | *Pomatomus saltatrix* | MCNS |
| Spotted goatfish | *Pseudupeneus maculatus* | MCNS |
| Rivulus | *Rivulus marmoratus* | MS |
| Striped parrotfish | *Scarus croicensis* | MCNS |
| Princess parrotfish | *Scarus taeniopterus* | MCNS |
| Spotted scorpionfish | *Scorpaena plumieri* | MCNS |
| Lookdown | *Selene vomer* | MCNS |
| Redband parrotfish | *Sparisoma aurofrenatum* | MCNS |
| Stoplight parrotfish | *Sparisoma viride* | MCNS |
| Great barracuda | *Sphyraena barracuda* | MS, MCNS |
| Dusky damselfish | *Stegastes fuscus* | MCNS |
| Beaugregory | *Stegastes leucostictus* | MCNS |
| Bicolor damselfish | *Stegastes partitus* | MCNS |
| Threespot damselfish | *Stegastes planifrons* | MCNS |
| Cocoa damselfish | *Stegastes variabilis* | MCNS |
| Hammerhead shark | *Sphyma lewini* | MCNS |
| Redfin needlefish | *Strongylura timucu* | MS, MCNS |
| Bluehead | *Thalassoma bifasciatum* | MCNS |
| Yellow stringray | *Urolophus jamaicensis* | MCNS |

* Non-native Species



**Note: This is a historical list of species for the park.**

## John U. Lloyd Beach State Park Animals

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| **AMPHIBIANS** | | |
| Giant toad* | *Bufo marinus* | MTC |
| Southern toad | *Bufo terrestris* | MAH |
| Greenhouse frog* | *Eleutherodactylus planirostris* | MTC |
| Cuban tree frog* | *Osteopilus septentrionalis* | MTC |
| Southern leopard frog | *Rana sphenocephala* | MAH |
| **REPTILES** | | |
| Green Anole | *Anolis carolinesis* | MTC |
| Cuban brown anole* | *Anolis sagrei* | MTC |
| Loggerhead marine turtle | *Caretta caretta* | MCNS, MAHMAH |
| Green marine turtle | *Chelonia mydas* | MCNS, MAHMAH |
| Southern black racer | *Coluber constrictor* | MTC |
| Leatherback marine turtle | *Dermochelys coriacea* | MCNS, MAHMAH |
| Southern ring snake | *Diadophis punctatus* | MAH, DV |
| Corn snake | *Elaphe guttata guttata* | CS, MAH, DV |
| Yellow rat snake | *Elaphe obsoleta quadrivittata* | CS, MAH, DV |
| Southeastern five-lined skink | *Eumeces inexpectatus* | CS |
| Indigo-pacific gecko* | *Hemidactylus garnoti* | DV |
| Green iguana* | *Iguana iguana* | MTC |
| Florida kingsnake | *Lampropeltis getula* | MAH |
| Northern curlytail lizard | *Leiocephalus carinatus* | MTC |
| Eastern coachwhip | *Masticophis flagellum flagellum* | MTC |
| Rough green snake | *Opheodrys aestivus* | MAH |
| Florida reef gecko | *Sphaerodactylus notatus* | MAH, DV |
| Florida brown snake | *Storeria dekayi* | MAH, DV |
| Eastern ribbon snake | *Thamnophis sauritus* | MAH, DV |
| Eastern garter snake | *Thamnophis sirtalis sirtalis* | MAH, DV |
| **BIRDS** | | |
| **Loons** | | |
| Common loon | *Gavia immer* | MCNS |
| **Pelicaniformes** | | |
| Anhinga | *Anhinga anhinga* | MS, MCNS |
| Magnificent frigate bird | *Fregata magnificens* | OF |
| Northern gannet | *Morus bassanus* | BD, OF |
| Brown pelican | *Pelecanus occidentalis* | MS, MAH, OF |
| Double-crested cormorant | *Phalocrocorax auritus* | EUS, MS, OF |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| **Wading Birds** | | |
| Roseate spoonbill | *Ajaia ajaja* | MS, EUS |
| Great egret | *Ardea alba* | MS |
| Great blue heron | *Ardea herodias* | MS |
| Cattle egret | *Bubulcus ibis* | MTC |
| Green heron | *Butorides virescens* | MS |
| Little blue heron | *Egretta caerulea* | MS |
| Snowy egret | *Egretta thula* | MS |
| Tricolored heron | *Egretta tricolor* | MS |
| White ibis | *Eudocimus* albus | MS, EUS, DV |
| Wood stork | *Mycteria americana* | MS, EUS |
| Black-crowned night heron | *Nycticorax nycticorax* | MS |
| Yellow-crowned night heron | *Nycticorax violacea* | MS |
| **Ducks** | | |
| Blue-winged teal | *Anas discors* | MCNS |
| Red-breasted merganser | *Lophodytes cucullatus* | MCNS |
| **Hawks, Eagles and Kites** | | |
| Cooper's hawk | *Accipiter cooperii* | OF |
| Sharp-shinned hawk | *Accipiter striatus* | MTC, OF |
| Short-tail hawk | *Buteo brachyrus* | OF |
| Red-tailed hawk | *Buteo jamaicensis* | CS, MAH, DV, OF |
| Red-shouldered hawk | *Buteo lineatus* | CS, MAH, DV, OF |
| Broad-winged hawk | *Buteo platypterus* | OF |
| Northern harrier | *Circus cyaneus* | OF |
| Swallow-tailed kite | *Elanoides forficatus* | OF |
| American kestrel | *Falco sparverius* | CS, MAH, DV, OF |
| Merlin | *Falco columbarius* | CS, MAH, DV, OF |
| Osprey | *Pandion haliaetus* | MTC |
| **Vultures** | | |
| Turkey vulture | *Cathartes aura* | MAH, DV |
| Black vulture | *Coragyps atratus* | MAH, DV |
| **Shorebirds** | | |
| Spotted sandpiper | *Actitis macularia* | BD, MAH |
| Ruddy turnstone | *Arenaria interpres* | BD, MAH |
| Sanderling | *Calidris alba* | BD, MAH |
| Least sandpiper | *Calidris minutilla* | BD, MAH |
| Semipalmated sandpiper | *Calidris pusilla* | BD, MAH |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| Willet | *Catoptrophorus semipalmatus* | BD, MAH |
| Piping plover | *Charadrius melodus* | BD, MAH |
| Semipalmated plover | *Charadrius semipalmatus* | BD, MAH |
| Killdeer | *Charadrius vociferous* | BD, MAH |
| Black-bellied plover | *Pluvialis squatarola* | BD, MAH |
| **Gulls, Terns and Skimmers** | | |
| Herring gull | *Larus argentatus* | BD, EUS, MCNS, MAH |
| Laughing gull | *Larus atricilla* | BD, EUS, MCNS, MAH |
| Ring-billed gull | *Larus delawarensis* | BD, EUS, MCNS, MAH |
| Black skimmer | *Rynchops niger* | BD, EUS, MCNS, MAH |
| Royal tern | *Sterna maxima* | BD, EUS, MCNS, MAH |
| Sandwhich tern | *Sterna sandvicensis* | BD, EUS, MCNS, MAH |
| Least tern | *Sterna antillarum* | BD, EUS, MCNS, MAH |
| **Doves** | | |
| Rock dove* | *Columba livia* | MTC |
| Common ground-dove | *Columbina passerina* | DV |
| Monk parakeet* | *Myiopsitta monachus* | MTC |
| Mourning dove | *Zenaida macroura* | MTC |
| Eurasian collared-dove* | *Strptopelia decaocto* | MTC |
| **Cuckoos** | | |
| Yellow-billed cuckoo | *Coccyzus americanus* | MAH, MS |
| **Owls** | | |
| Eastern screech owl | *Otus asio* | CS, MAH |
| **Goatsuckers** | | |
| Chuck-will's-willow | *Caprimulgus carolinensis* | DV |
| Common nighthawk | *Chordeiles minor* | MAH, DV |
| **Kingfishers** | | |
| Belted kingfisher | *Ceryle alcyon* | MS, EUS |
| **Woodpeckers** | | |
| Northern flicker | *Colaptes auratus* | MAH, DV |
| Pileated woodpecker | *Dryocopus pileatus* | MAH |
| Red-bellied woodpecker | *Melanerpes carolinus* | MTC |
| Yellow-bellied sapsucker | *Sphyrapicus varius* | MAH, DV |

* Non-native Species



Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| **Flycatchers** | | |
| Eastern wood-pewee | *Contopus virens* | MAH |
| Great crested flycatcher | *Myiarchus crinitus* | MAH |
| Gray kingbird | *Tyrannus dominicensis* | MAH |
| Eastern kingbird | *Tyrannus tyrannus* | MAH |
| **Vireos** | | |
| Yellow-throated vireo | *Vireo flavifrons* | MAH |
| Red-eyed vireo | *Vireo olivaceus* | MAH |
| Blue-headed Vireo | *Vireo solitarius* | MAH |
| **Jays and Crows** | | |
| American crow | *Corvus brachyrhynchos* | MTC |
| Fish crow | *Corvus ossifragus* | MTC |
| Blue jay | *Cyanocitta cristata* | MTC |
| **Swallows** | | |
| Barn swallow | *Hirundo rustica* | MTC |
| Northern rough-wing swallow | *Stelgidopteryx serripennis* | DV |
| Tree swallow | *Tachycineta bicolor* | DV |
| **Wrens** | | |
| Carolina wren | *Thryothorus ludovicianus* | MAH |
| House wren | *Troglodytes aedon* | DV |
| **Gnatcatchers** | | |
| Blue-gray gnatcatcher | *Polioptila caerulea* | MAH |
| **Thrushes** | | |
| Veery | *Catharus fuscescens* | MAH |
| Swainson's thrush | *Catharus ustulatus* | MAH |
| **Thrashers** | | |
| Gray catbird | *Dumetella carolinensis* | MAH, DV |
| Northern mockingbird | *Mimus polyglottos* | MTC |
| Brown thrasher | *Toxostoma rufum* | MAH, DV |
| **Starlings** | | |
| European starling * | *Sturnus vulgaris* | DV |



* Non-native Species

Note: This is a historical list of species for the park.

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| **Waxwings** | | |
| Cedar Waxwing | *Bombycilla cedrorum* | BD, CS, MAH |
| **Warblers** | | |
| Black-throated blue warbler | *Dendroica caerulescens* | MAH |
| Yellow-rumped warbler | *Dendroica coronata* | MAH |
| Prairie warbler | *Dendroica discolor* | CS, DV |
| Yellow-throated warbler | *Dendroica dominica* | MAH |
| Palm warbler | *Dendroica palmarum* | CS, DV |
| Chestnut-sided warbler | *Dendroica pensylvanica* | MAH |
| Pine warbler | *Dendroica pinus* | MAH |
| Blackpoll warbler | *Dendroica striata* | MAH |
| Cape may warbler | *Dendroica tigrina* | MAH |
| Common yellowthroat | *Geothlypis trichas* | MAH |
| Worm-eating warbler | *Helmitheros vermivorus* | MAH |
| Black-and-white warbler | *Mniotilta varia* | MAH |
| Connecticut warbler | *Oporornis agilis* | MAH |
| Northern parula | *Parula americana* | MAH |
| Prothonotary warbler | *Protonotaria citrea* | MAH |
| Ovenbird | *Seiurus aurocapillus* | MAH |
| Northern waterthrush | *Seiurus noveboracensis* | MAH |
| American redstart | *Setophaga ruticilla* | MAH |
| Orange-crowned warbler | *Vermivora celata* | MAH |
| Hooded warbler | *Wilsonia citrina* | MAH |
| **Tanagers** | | |
| Scarlet tanager | *Piranga olivacea* | MAH |
| **Sparrows** | | |
| House sparrow * | *Passer domesticus* | DV |
| **Meadowlarks, Blackbirds and Orioles** | | |
| Red-winged blackbird | *Agelaius phoeniceus* | MS |
| Bobolink | *Dolichonyx oryzivorus* | MAH |
| Common grackle | *Quiscalus quiscula* | MTC |
| Boat-tailed grackle | *Quiscalus major* | MTC |
| **Cardinals and Buntings** | | |
| Northern cardinal | *Cardinalis cardinalis* | MTC |
| Painted bunting | *Passerina ciris* | MAH |



* Non-native Species

Note: This is a historical list of species for the park.

## John U. Lloyd Beach State Park Animals

| Common Name | *Scientific Name* | Primary Habitat Codes (for all species) |
|---|---|---|
| **MAMMALS** | | |
| Virginia opossum | *Didelphis virginiana* | MTC |
| House cat* | *Felis catus* | MTC |
| House mouse* | *Mus musculus* | DV |
| Raccoon | *Procyon lotor* | MTC |
| Black rat* | *Rattus rattus* | MAH, DV |
| Gray squirrel | *Sciurus carolinensis* | MAH |
| Hispid cotton rat | *Sigmidon hispidus* | MAH, DV |
| Eastern cottontail | *Sylvilagus floridanus* | MTC |
| Marsh rabbit | *Sylvilagus palustris* | MTC |
| Florida manatee | *Trichechus manatus latirostris* | EUS, MCNS |
| Gray fox | *Urocyon cinereoargenteus* | MAH, DV |



* Non-native Species

Note: This is a historical list of species for the park.

**TERRESTRIAL**

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

**PALUSTRINE**

Alluvial Forest ..... AF
Basin Marsh ..... BM
Basin Swamp ..... BS
Baygall ..... BG
Bottomland Forest ..... BF
Coastal Interdunal Swale ..... CIS
Depression Marsh ..... DM
Dome Swamp ..... DS
Floodplain Marsh ..... FM
Floodplain Swamp ..... FS
Glades Marsh ..... GM
Hydric Hammock ..... HH
Keys Tidal Rock Barren ..... KTRB
Mangrove Swamp ..... MS

Marl Prairie ..... MP
Salt Marsh ..... SAM
Seepage Slope ..... SSL
Shrub Bog ..... SHB
Slough ..... SLO
Slough Marsh ..... SLM
Strand Swamp ..... STS
Wet Prairie ..... WP

**LACUSTRINE**

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

**RIVERINE**

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

**SUBTERRANEAN**

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

**ESTUARINE**

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

Unconsolidated Substrate ..... EUS
Worm Reef ..... EWR

**MARINE**

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

**ALTERED LANDCOVER TYPES**

Abandoned field ..... 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

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 Game and Freshwater Fish Commission (animals), and the Florida Department of Agriculture and Consumer Services (plants), respectively.

## FNAI GLOBAL RANK DEFINITIONS

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

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

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

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

G5.....Demonstrably secure globally

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

GX.....Believed to be extinct throughout range

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

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

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

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

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

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

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

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

S1 .....Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2 .....Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3 .....Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
S4 .....Apparently secure in Florida (may be rare in parts of range)
S5 .....Demonstrably secure in Florida
SH .....Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
SX .....Believed to be extinct throughout range
SA .....Accidental in Florida, i.e., not part of the established biota
SE.....An exotic species established in Florida may be native elsewhere in North America
SN .....Regularly occurring but widely and unreliably distributed; sites for conservation hard to determine
SU .....Due to lack of information, no rank or range can be assigned (e.g., SUT2).
S? .....Not yet ranked (temporary)
N .....Not currently listed, nor currently being considered for listing, by state or federal agencies.

## LEGAL STATUS

### FEDERAL

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

LE.....Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.
PE.....Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.
LT.....Listed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.
PT.....Proposed for listing as Threatened Species.
C .....Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.
E(S/A) .....Endangered due to similarity of appearance.
T(S/A) .....Threatened due to similarity of appearance.

## STATE

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

LE.....Listed as Endangered Species by the FFWCC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.

LT.....Listed as Threatened Species by the FFWCC. 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.

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

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

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

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

# Addendum 7—Cultural Information

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

## A. General Discussion

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

## B. Agency Responsibilities

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

State agencies shall preserve the historic resources that 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 in the following:

**Chapter 253, F.S. –** State Lands

**Chapter 267, F.S. –** Historical Resources

**Chapter 872, F.S. –** Offenses Concerning Dead Bodies and Graves

Other helpful citations and references:

Chapter 1A-32, F.A.C. – Archaeological Research

Other helpful citations and references:

Chapter 1A-44, F.A.C. – Procedures for Reporting and Determining Jurisdiction Over Unmarked Human Burials

Chapter 1A-46, F.A C. – Archaeological and Historical Report Standards and Guidelines

The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings

## D. Management Implementation

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

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, 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 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 prepare 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, the following information, at a minimum, must be submitted for comments and recommendations.

**Project Description –** A detailed description of the proposed project including all related activities. For land clearing or ground disturbing activities, the depth and extent of the disturbance, use of heavy equipment, location of lay down yard, etc. For historic structures, specific details regarding rehabilitation, demolition, etc.

**Project Location –** The exact location of the project indicated on a USGS Quadrangle map, is preferable. A management base map may be acceptable. Aerial photos indicating the exact project area as supplemental information are helpful.

**Photographs –** Photographs of the project area are always useful. Photographs of structures are required.

**Description of Project Area –** Note the acreage of the project; describe the present condition of project area, and any past land uses or disturbances.

**Description of Structures –** Describe the condition and setting of each building within project area if approximately fifty years of age or older.

**Recorded Archaeological Sites or Historic Structures –** Provide Florida Master Site File numbers for all recorded historic resources within or adjacent to the project area. This information should be in the current management plan; however, it can be obtained by contacting the Florida Master Site File at (850) 245-6440 or Suncom 205-6440.

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

Susan M. Harp
Historic Preservation Planner
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) 245-6333
Fax: (850) 245-6438

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

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

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

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

- **a)** a religious property deriving its primary significance from architectural or artistic distinction or historical importance; or
- **b)** a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- **c)** a birthplace or grave of an historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or
- **d)** a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, distinctive design features, or association with historic events; or

**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

**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.