JOHN D. MACARTHUR BEACH STATE PARK

UNIT MANAGEMENT PLAN

APPROVED

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Recreation and Parks

April 22, 2005

Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard, MS 140
Tallahassee, Florida 32399-3000
Phone: (850) 245-2784 Fax: (850) 245-2786

Colleen Castille
Secretary

August 8, 2005

Ms. BryAnne White
Office of Park Planning
Division of Recreation and Parks
3900 Commonwealth Blvd.; M.S. 525
Tallahassee, Florida 32399

Re: John D. MacArthur Beach State Park Lease #3205

Dear Ms. White:

On April 22, 2005, the Acquisition and Restoration Council recommended approval of the John D. MacArthur Beach State Park management plan. Therefore, the Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, approved the management plan for the John D. MacArthur Beach State Park. Pursuant to Sections 253.034 and 259.032, Florida Statutes, and Chapter 18-2, Florida Administrative Code this plan's ten-year update will be due on **April 22, 2015**.

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,

Paula L. Allen
Office of Environmental Services
Division of State Lands
Department of Environmental Protection

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John D. MacArthur Beach State Park is located in eastern Palm Beach County (see Vicinity Map). Access to the park is from State Road A-1-A on Singer Island. The vicinity map also reflects significant land and water resources existing near the park.

John D. MacArthur Beach State Park contains approximately 437.60 acres. The reference map depicts the current park boundary.

At John D. MacArthur Beach State Park, public outdoor recreation and conservation is the designated single use of the property. There are no legislative or executive directives that constrain the use of this property. The initial acquisition of the park was on July 7, 1981 using the Land Acquisition Trust Fund program (see Addendum 1).

The state park was acquired by the State of Florida and Palm Beach County to protect a unique cross section of coastal Florida landscape from development, allowing for the proper stewardship of irreplaceable natural and cultural resources providing opportunities for resource based outdoor recreation and environmental education in one of Florida's most populous regions.

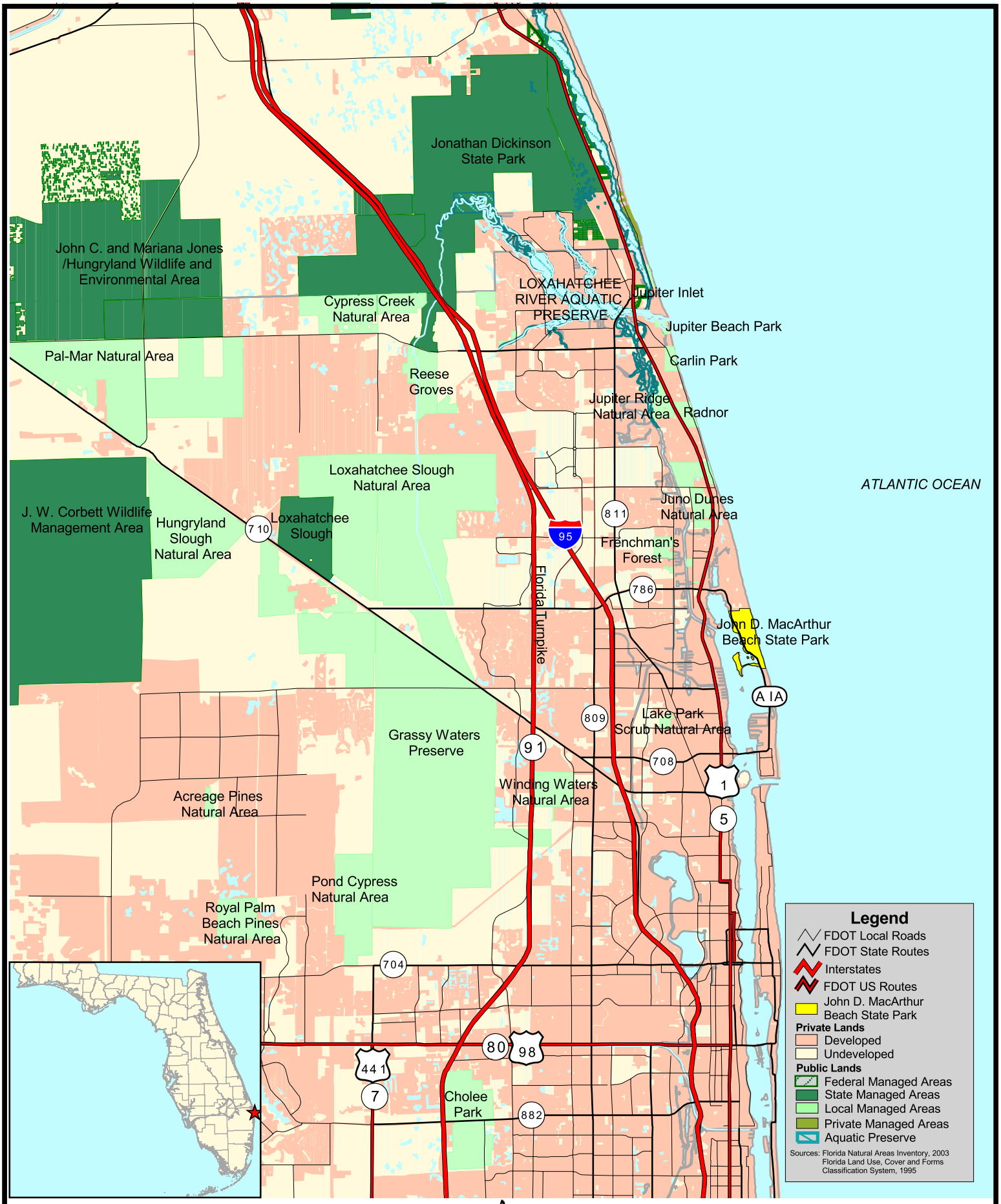
John D. MacArthur Beach State Park contains unique tropical Florida natural communities, including approximately 121 acres of high-quality tropical maritime hammock, the largest remaining example of this natural community in Palm Beach County. Nine designated plant species and 20 designated animals occupy or use the natural habitats preserved at this park. The 7,000-foot sand beach and healthy beach dune community attract the largest numbers of nesting loggerhead, green and leatherback sea turtles of any unit in Florida's state park system.

Significant cultural resources of the park include several prehistoric Indian middens, and historic sites, most notably, the foundation remains of Dr. Munyon's Hygeia Hotel, expanded from a residential structure to become a famous south Florida resort in about 1902. Finally, the personality of John D. MacArthur and his legacy embodied by the John D. and Catherine T. MacArthur Foundation provide significance to this state park that continues through the involvement of the Foundation's John D. MacArthur Park Conservation Corporation, Inc.

Recreational and educational activities of significance at the state park include nearly one-half mile of excellent swimming beach, snorkeling, canoeing and kayak access to the unique worm reef, the lagoon areas and grass beds, and outstanding fishing and bird watching opportunities. An active Kindergarten through sixth Grade in-park educational program and summer camps provide much-needed familiarization and learning experiences in a breathtaking natural setting for youngsters from the surrounding urban population.

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of John D. MacArthur Beach State Park as a unit of Florida's state park system. It identifies the objectives, criteria and standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the March 2, 1999, approved plan. All development and resource alteration encompassed 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.



JOHN D. MACARTHUR BEACH STATE PARK

Prepared by:
Florida Department Of Environmental Protection
Division Of Recreation And Parks
Office Of Park Planning

VICINITY MAP

JOHN D. MACARTHUR BEACH STATE PARK

N

0.25 0 0.25 Miles

PREPARED BY:
FL DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF RECREATION AND PARKS
OFFICE OF PARK PLANNING

REFERENCE MAP

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.

The plan consists of two interrelated components. Each component corresponds to a particular aspect of the administration of the park. The resource management component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management problems and needs are identified, and specific management objectives are established for each resource type. This component provides guidance on the application of such measures as prescribed burning, exotic species removal and restoration of natural conditions.

The land use component is the recreational resource allocation plan for the unit. Based on considerations such as access, population and adjacent land uses, an optimum allocation of the physical space of the park is made, locating use areas and proposing types of facilities and volume of use to be provided.

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

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 unit 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, the Division of Recreation and Parks (Division) 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 also granted management authority of certain sovereign submerged lands to the Division 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 impact public recreational uses.

Many operating procedures are standard system wide and are set by policy. These procedures are outlined in the Division's Operations Manual (OM) that covers such areas as personnel management, uniforms and personal appearance, training, signs, communications, fiscal procedures, interpretation, concessions, camping regulations, resource management, law enforcement, protection, safety and maintenance.

In the management of John D. MacArthur Beach State Park, a balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at management of natural systems. Development in the park is directed toward providing public access to and within the park, and to providing recreational facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation of the natural, aesthetic and educational attributes of the park.

John D. MacArthur Beach State Park came into the state park system with a conservation easement created by the John D. and Catherine T. MacArthur Foundation. The John D. MacArthur Park Corporation, Incorporated was created in 1980 to oversee the enforcement of the conservation easement and to assist Palm Beach County and the State of Florida in the creation and evolution of the state park. The Division of Recreation and Parks and the John D. MacArthur Park Conservation Corporation continue their collaborative relationship through quarterly meetings and a variety of special projects to benefit the park and its constituency.

The conservation easement consists of the following covenants:

1. The existing ecological relationships with terrestrial and acquit animal species indigenous to the property shall be fostered, preserved and enhanced by regulated public recreational usage not incompatible with the presently existing environment.
2. The development of the property will strictly conform to the approved conceptual plan

for the property.

3. The plan provides buffers and filters to protect the property from adverse environmental impacts, and future development of the property shall not infringe upon these buffers and filters.
4. Commercial operations on the property shall be limited to those consistent with the maintenance and use of the property as a park, improvements shall be for a defined list of public facilities (parking areas, walkways, operations and maintenance facilities, visitor center, etc.), and all activities shall be limited to those designated as "resource based activities", as opposed to "user-oriented activities."

Park Goals and Objectives

The following park goals and objectives express the Division long-term intent in managing the state park. At the beginning of the process to update this management plan, the Division reviewed the goals and objectives of the previous plan to determine if they remain meaningful and practical and should be included in the updated plan. This process ensures that the goals and objectives for the park remain relevant over time.

Estimates are developed for the funding and staff resources needed to implement the management plan based on these goals, objectives and priority management activities. Funding priorities for all state park management and development activities are reviewed each year as part of the Division legislative budget process. The Division prepares an annual legislative budget request based on the priorities established for the entire state park system. The Division also aggressively pursues a wide range of other funds and staffing resources, such as grants, volunteers and partnerships with agencies, local governments and the private sector, for supplementing normal legislative appropriations to address unmet needs. The ability of the Division to implement the specific goals, objectives and priority actions identified in this plan will be determined by the availability of funding resources for these purposes.

Natural and Cultural Resources

1. Continue to protect, improve and effectively manage the natural resources of the park.
- **A.** Continue protecting and monitoring sea turtle nesting sites and giving public turtle walks.
- **B.** Expand existing exotic plant removal efforts.
- **C.** Continue maintenance of Munyon Island Restoration Project.
- **D.** Continue restoration of beach dune community
- **E.** Control visitor access to remote and sensitive areas
- **F.** Continue updating the plant and animal inventories
- **G.** Ephemeral sand spits/shorebird habitat protection
- **H.** Motorized exclusion zones in seagrass areas and reduced speed/no wake zones adjacent to park
- **I.** Continue to facilitate research in the park that will provide information beneficial to preservation and the natural resources, especially as related to sea turtles
- **J.** Improve the mapping, monitoring and management of designated species.
- **K.** Work with the South Florida Water Management District to monitor the quality of surface water entering the park.

2. Continue to identify, preserve and actively manage cultural resources of the park.
- **A.** Conduct a Level I archaeological survey to determine the extent and location of prehistoric and historical sites.
- **B.** Protect existing archaeological sites and their associated artifact assemblage from vandalism, erosion and other forms of encroachment.
- **C.** Conduct all ground-disturbing activities in accordance with DHR policy.

D. Establish a Cultural Resource Management File for the park, using the Guidelines for Cultural Resources Management Files, Chapter 15, OM.

Recreational and Interpretive Goals

3. Continue to provide quality resource based recreational and interpretive programs and facilities at the State Park.
- **A.** Continue to provide controlled access for beach recreation.
- **B.** Continue to provide visitor education through interpretive programs at the education center and through kayak tours, turtle walks and outdoor displays.
- **C.** Continue to provide a well-maintained self-guided nature trail.
- **D.** Provide a self-guided interpretive trail on Munyon Island
- **E.** Continue to provide and enhance programs offered to the community by working with local schools.

4. Seek funding to expand recreational and interpretive opportunities through the improvement of programs and the development of new use areas and facilities, as outlined in this management plan.
- **A.** Develop a statement of interpretation.
- **B.** Seek funding to redesign and replace education center interpretive exhibits.
- **C.** Expand and improve existing education center and associated programs to improve educational opportunities for park visitors.
- **D.** Extend electrical service across lagoon to beach facilities and electric and water to kayak launch at southern end of park off State Road A-1-A.
- **E.** Redesign park entrance appearance and road sign.
- **F.** Work with FL Department of Transportation to improve fishing access to Lake Worth and the lagoon from the established parking facilities on SR A1A.
- **G.** Construct dock facilities at Munyon Island to provide boating access.
- **H.** Construct boardwalk to Munyon Island to provide pedestrian or tram access.
- **I.** Develop picnicking and group camp facilities on Munyon Island.
- **J.** Stabilize and improve north beach access road for improved security, emergency response and turtle work.

Park Administration/Operations

5. Seek funding, staffing and other resources to meet park operational need such as corrective maintenance, visitor protection, resource management and visitor services.
- **A.** Obtain three park ranger positions to manage new facilities, as they are placed in operation, at the education center and on Munyon Island.
- **B.** Redevelop park ranger and intern housing to better suit current needs of park staff.
- **C.** Provide equivalent recreation and interpretive opportunities for all abilities.
- **D.** Continue to promote volunteer participation (CSO membership) to assist with park operation, resource management and interpretation.

Management Coordination

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

The Department of Agriculture and Consumer Services, Division of Forestry (DOF), assists Division 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 park boundaries. In addition, the FFWCC aids the Division with wildlife management programs, including the development and management of Watchable

Wildlife programs. The Department of State, Division of Historical Resources (DHR) assists staff to assure protection of archaeological and historical sites. The Department of Environmental Protection (DEP), Office of Coastal and Aquatic Managed Areas (CAMA) aids staff in aquatic preserves management programs. The DEP, Bureau of Beaches and Wetland Resources aids staff in planning and construction activities seaward of the Coastal Construction Line. In addition, the Bureau of Beaches and Wetland Resources aid the staff in the development of erosion control projects. Emphasis is placed on protection of existing resources as well as the promotion of compatible outdoor recreational uses.

Public Participation

The Division provided an opportunity for public input by conducting a public workshop and an advisory group meeting. A public workshop was held on February 1, 2005. The purpose of this meeting was to present this draft management plan to the public. An Advisory Group meeting was held on February 2, 2005. The purpose of this meeting was to provide the Advisory Group members the opportunity to discuss this draft management plan.

Other Designations

John D. MacArthur Beach State Park is not within an Area of Critical State Concern as defined in section 380.05, Florida Statutes. Currently it is not under study for such designation. The park is a component of the Florida Greenways and Trails System.

All waters within the unit have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302 Florida Administrative Code. Surface waters in this unit are also classified as Class III waters by DEP. This unit is not within or adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (section 258.35, Florida Statutes). The unit is part of the Lake Worth Ecosystem Management Area.

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

The Division of Recreation and Parks 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. The stated management measures in this plan are consistent with the Department's overall mission in ecosystem management. Cited references are contained in Addendum 2.

The Division's philosophy of resource management is natural systems management. Primary emphasis is on restoring and maintaining, to the degree practicable, the natural processes that shape the structure, function and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management may be implemented when the recovery or persistence of a species is problematic provided it is compatible with natural systems management.

The management goal of cultural resources is to preserve sites and objects that represent all of Florida's cultural periods as well as significant historic events or persons. This goal may entail 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 is often affected by conditions and occurrences beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program (to assess resource conditions, evaluate management activities and refine management actions), review of local comprehensive plans and review of permit applications for park/ecosystem impacts.

RESOURCE DESCRIPTION AND ASSESSMENT

Natural Resources

Topography

The physiographic landforms found today reflect the geologic history of the area. Puri and Vernon (1964) identified the area occupied by the park as part of the Atlantic coastal lowlands, which extend the entire length of the peninsula along the eastern shore from the Georgia/Florida line to the Homestead area. The subzone of this physiographic division is the Atlantic beach ridge and barrier chain that makes up the present day shoreline.

From Jupiter Inlet to Lake Worth Inlet, the barrier island (Singer Island) is 11.7 miles long. In different sections, the island width varies from 600 feet to about 1 mile. The natural dunes are particularly well developed on the northern half of the island with a maximum height in the park of about 20 feet. In the southern three-mile section of the island, dune height only averages 10 feet- above the low tide mark (Pilkey et al. 1984).

The topography of the park is dominated by a series of dune ridges running north to south. Although not as high, the area west of Lake Worth Cove contains an old dune ridge (approx. 5 ft. high) that extends south, divides into two fingers around Lake Worth Lagoon and then drops to sea level (Duever et al. 1981).

Presumably, both the former large-scale erosion of the dune system and the drop in topography near the present main access trail may have been the results of amphibious maneuvers conducted by the military during the 1960s (Duever et al. 1981). The original name applied to this section of beach, Air Force Beach, did not have anything to do with these maneuvers. The name came from use by West Palm Beach Air Force Base personnel between the early 1940s and 1956 when the base was closed.

In conjunction with the topographic relief of the property, there are also exposed rocks from the Anastasia formation that appear at low tide along the northern and southern ends of the beach. In addition to these geological outcrops, there are sabellarid worm reefs offshore.

The original topographic surface of Munyon Island was significantly enlarged by dredge-spoil operations to improve the Intracoastal Waterway. Much of the spoil deposited from these improvements was placed during the 1930s and 1959-60s. Some of this spoil has been removed during the Munyon Island restoration project and surface elevations were lowered to support red mangroves.

In general, the trend of the park's topography will be affected by general sea level rise, northeastern winter storms and hurricanes.

Geology

Dominant geographic features along much of Florida's coastline are its many barrier islands. Shaped by past geological changes, wind, waves and tidal action barrier islands often occur in long chains, separated from the mainland by estuaries and salt-water wetlands.

The formation of Singer Island took place as part of the series of events, which shaped Florida. This peninsula began with sediment deposition in northern Florida from rivers draining the Appalachian Mountains and in places south of this area from sediments of marine carbonates, shell fragments and microscopic organisms being deposited under a shallow sea. During the Pleistocene epoch, four great ice ages brought peninsular exposure with the glacial advances, and flooding during each retreat. Each cycle was marked by a different thickness and composition of sediments lay down during inundation and the subsequent consolidation during regression. During several events in the Pleistocene, the consolidated coquinoid limestone of the Anastasia Formation was formed as the base rock. The Pamlico Sand, surface formation of the island, merely represents the latest of the marine repository episodes. Thus, the sands of this area are covering the Anastasia Formation.

This rock formation is found along the east coast of Florida from its type locality on Anastasia Island to Broward County, where it merges with the Miami Limestone. The lithology of this unit varies from coarse rock composed of whole coquina shells and quartz sands, to a sandstone composed of carbonate and quartz sand particles. The cementing agents can be calcium carbonate or iron oxide.

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 the time, the climate was windy, cool, and dry—conducive to forming large dune formations along the coast.
From about 15,000 to 6,000 years ago, Singer Island became more than just a large sandbar. Sea level rose relatively rapid at more than three feet per century. Near the end of this period, modern vegetation and climate became better established, and the rise in sea level slowed.

Soils

For many years, biologists and soil scientists have recognized the relationship that exists between soil types and plant distribution, and often vegetation can provide clues regarding dominant soil types. A complete description of the five soil types found in the park, as recorded in the Soil Survey of Palm Beach County Area, Florida (USDA 1978), is contained in Addendum 3.

With the recession of each glacier stage, the sand left behind changed due to the influence of climatic conditions and vegetation, thus bringing about the development of distinct soil profiles (see Soils Map). The soils of the park are geologically immature because of the relatively recent formation of the barrier island and the action of wind and rainfall on the soils.

At this time, John D. MacArthur Beach State Park has no major soil conservation issues. Former beach dune erosion due to human foot traffic now is minimal, due to a series of dune crossovers for beach access. There were several old dune blowouts at the southern end of the property, which have been largely repaired and are filling with native vegetation. Some of the larger dunes have been eroded by wave action during storms. The park plans to plant sea oats when the beach is building to help prevent further dune loss.

Minerals

The dominant mineral in much of East Florida's beach sand is quartz, a very stable form of silicon dioxide. The nearest sources of quartz are the rivers of Georgia and over millions of years; the quartz has been pushed south along our beaches. The beaches in South Florida also contain a lot of shell fragment, composed of mainly calcium carbonate and some aragonite. In addition, deposits of the heavy mineral, ilmenite may be recognized by the black color present in beach sands of Palm Beach County. No known mineral deposits of commercial value exist in the park.

Hydrology

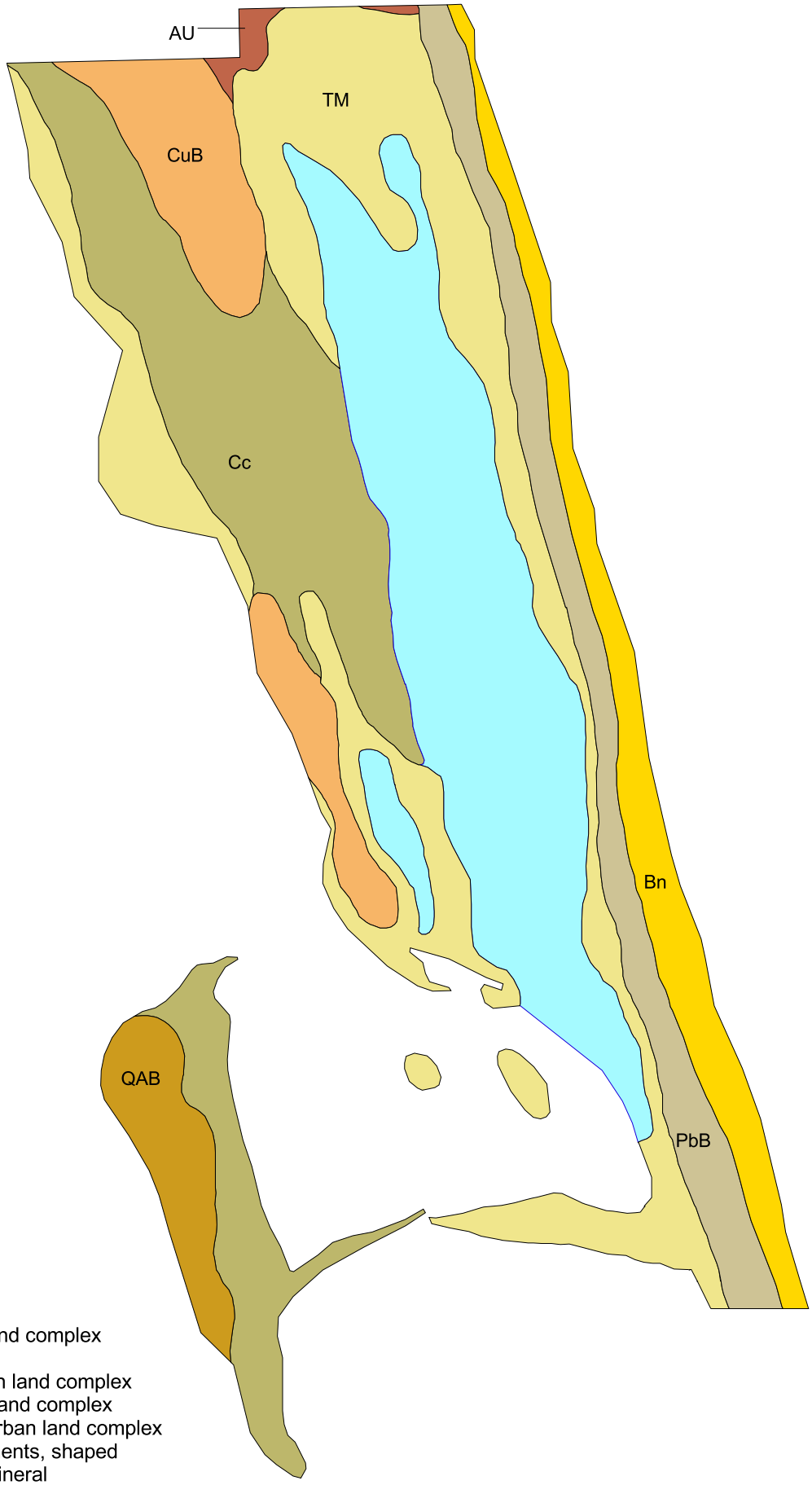
Ground water. There are two major aquifers in Palm Beach County: 1) the shallow (non-artesian) surficial aquifer of undifferentiated sediments that is approximately 300 feet below the land surface, and, 2) the Floridan (artesian) Aquifer, approximately 850 feet and further below the land surface consisting mostly of limestone and dolomite. The two aquifers are separated by the Hawthorne Formation, a thick section of impermeable clay and marls of low permeability (Fernald et al. 1984).

This state park does not plan to use the Floridan Aquifer because of the high level of dissolved solids; however, a neighboring development (Lost Tree Village) uses the shallow surficial (rainwater fed) aquifer for their golf course. Presently, the park and other nearby residents use potable water from utilities that have well fields on the mainland.

The South Florida Water Management District conducts monitoring of ground water quality and quantity in our region.

Surface water. The park's hydrological surface features include the Atlantic Ocean, Lake Worth, Lake Worth Cove and Mangrove Lagoon. Drainage in the park is to the west into the Lake Worth Cove and Mangrove Lagoon. The mean range of the semi-diurnal tide along the beach is about 3 feet, 9 inches (Van de Kreeke and Wang 1978).

Seasonal flooding can be a problem at this park. In the past, high spring tides and strong easterly winds have stacked up water along the seashore and in the Intracoastal Waterway, resulting in



LEGEND

- AU- Arents-Urban land complex
- Bn- Beaches
- Cc- Canaveral-Urban land complex
- CuB- Cocoa-Urban land complex
- PbB- Palm Beach-Urban land complex
- QAB- Quartzipsamments, shaped
- TM- Tidal swamp, mineral
- Water

N

500 0 500 1000 Feet

JOHN D. MACARTHUR BEACH STATE PARK

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

SOILS MAP

localized flooding.

In general, there is good tidal exchange surrounding the park, but both Lake Worth Cove and Mangrove Lagoon have reduced tidal exchange because of restricted flow under the A-1-A bridge regarding the former, and through culverts at the latter. If the Department of Transportation (DOT) decides to improve the current bridge, the division should work closely with DOT to ensure that our environmental and recreational objectives are met.
All the waters within the park have been designated as "Outstanding Florida Waters."

Since the massive cleanup of Lake Worth during the 1960s and 1970s, there have been few water quality problems along the beach. Prior to that time, polluted water sometimes flowed out of Lake Worth Inlet and along the beach (Rogers 1972). Monitoring of surface water quality and quantity in John D. MacArthur Beach State Park is conducted by the South Florida Water Management District, DEP's "Surface Water Ambient Monitoring Program" (PSL field office), and the FWCC Division of Marine Resources.

There is a small outfall on the northern boundary of the park. The Park should work with neighbors to establish proper storm water management for this water.

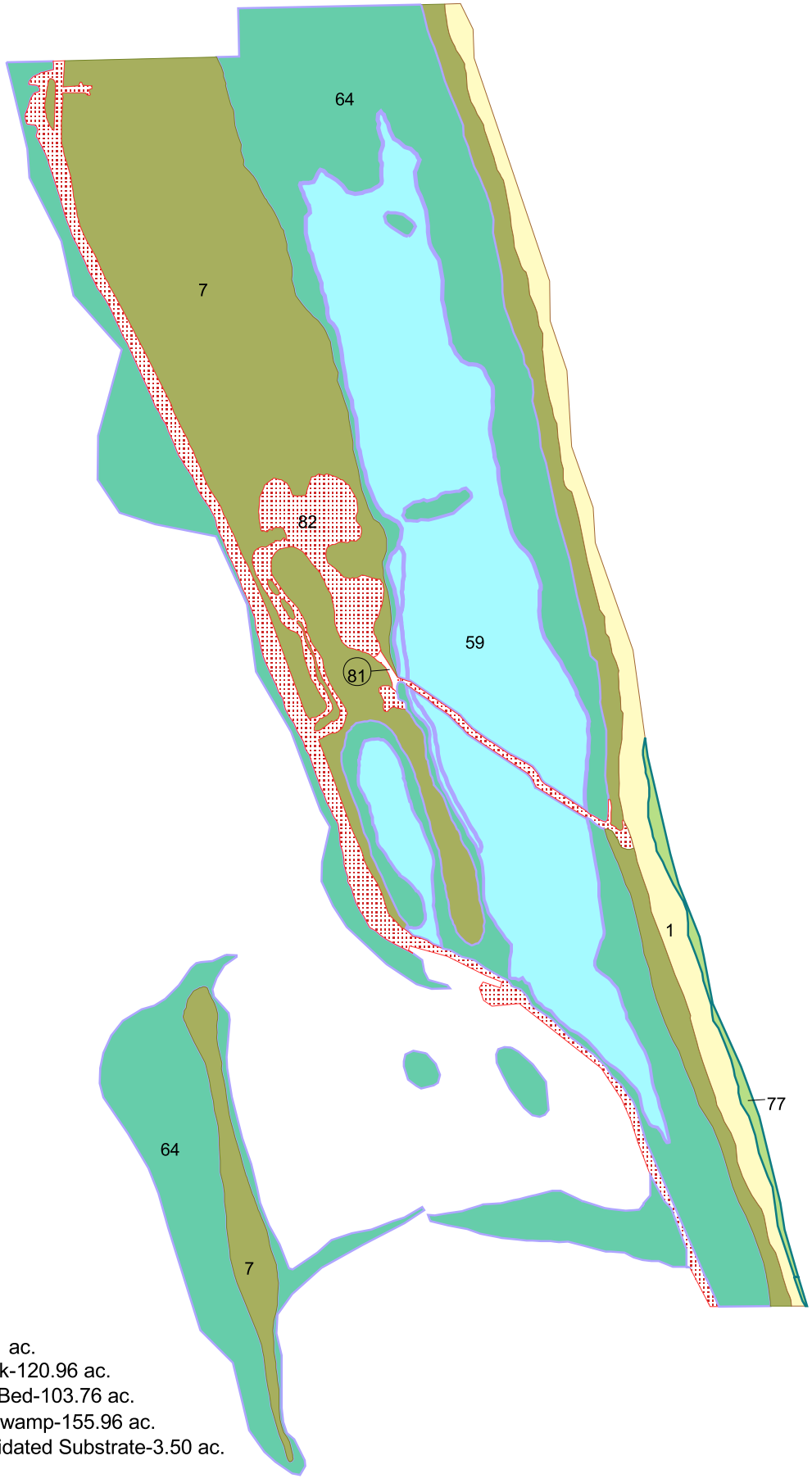
Natural Communities

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 which are similar with respect to these factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur, 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.

The park contains five distinct natural communities (see Natural Communities Map) in addition to ruderal and developed areas. Park specific assessments of the existing natural communities are provided in the narrative below. A list of plants and animals occurring in the unit is contained in Addendum 4.

Beach dune. This community is narrower, steeper at the north end of the park, wider, and flatter at the southern end. The tall, extensive dunes represent one of the best examples of this community in south Florida. Former dune blowouts have been repaired over time, but beach erosion threatens this community. The planting of sea oats to capture sand may help alleviate some of this threat.

Maritime hammock. The maritime hammock includes a thin, intermittent strip of vegetation behind the beach dune and a mature hammock between A-1-A and Lake Worth Cove. The main portion of the hammock includes many large tropical trees like mastic (*Sideroxylon foetidissimum*) and some temperate ones like live oak (*Quercus virginiana*). The are also some large satin leaf (*Chrysophyllum oliviforme*) trees, a small fresh water depression with pond apple (*Annona glabra*) and a few scattered remnant slash pines (*Pinus elliottii*). The hammock contains numerous species of exotic invasive plants, with Brazilian pepper being the biggest threat. There is also a strip of restored maritime hammock on Munyon Island. Many plants that were planted as part of the restoration project are still small. This section of hammock is still highly susceptible to exotic plant invasion.



LEGEND

- 1 - Beach Dune-23.11 ac.
- 7 - Maritime Hammock-120.96 ac.
- 59 - Estuarine Grass Bed-103.76 ac.
- 64 - Estuarine Tidal Swamp-155.96 ac.
- 77 - Marine Unconsolidated Substrate-3.50 ac.
- 81 - Ruderal-0.23 ac.
- 82 - Developed-30.08 ac.

N

500 0 500 1000 Feet

JOHN D. MACARTHUR BEACH STATE PARK

NATURAL COMMUNITIES MAP

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

Estuarine grass beds. Estuarine grass beds are located within Lake Worth Cove and along the eastern shore of Lake Worth. Like mangroves, they are a "new" community that appeared after the historical salinity changes of Lake Worth.

Estuarine tidal swamp. Mangroves border most of the shoreline of Lake Worth, Lake Worth Cove and Mangrove Lagoon. There are also large areas of mangroves north and south of the Lake Worth Cove. Part of Munyon Island was restored to mangrove elevations and those areas are continuing to mature.

Marine unconsolidated substrate. This community is largely unvegetated, but because of its capacity to absorb and dissipate wave energy, it stabilizes the coastline. Acreage of this habitat varies with tides and storms.

Marine consolidated substrate (Not Mapped). Offshore of the park within the submerged land lease lays an extensive outcrop of Anastasia Formation, which is dotted with worm reef. This outcrop is home to a multitude of fish, invertebrate and plant species. Sponges are evident, as are several species of corals. Fish are abundant; these include snappers, grunts, angelfish and other common reef-inhabiting species. There are many different species of algae, including calcareous forms. Most areas of Anastasia Rock have some signs of worm reef growth.

Potential park visitor impacts to the reef are difficult to assess and manage. As park attendance increases, so will the number of divers and snorkelers. Although spear fishing and the removal of reef-dwelling organisms are prohibited, the large number of recreational divers, which contact the reef, can cause cumulative, adverse impacts. A very strong effort by the park staff, particularly through interpretation, is needed to protect these resources.

Ruderal and Developed. The ruderal and developed areas for the park include ranger housing, a small shop area, office, the visitor center, a boardwalk over Lake Worth Cove, roads, parking and other disturbed areas. There are now picnic shelters and a boardwalk on Munyon Island.

Designated Species

Designated species are those that are listed by the Florida Natural Areas Inventory (FNAI), U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FFWCC), and the Florida Department of Agriculture and Consumer Services (FDA) as endangered, threatened or of special concern. Addendum 6 contains a list of the designated species and their designated status for this park. Management measures will be addressed later in this plan.

For several species of listed and migratory birds, John D. MacArthur Beach State Park and the surrounding waters are much needed areas for feeding, lofting, and roosting. Regardless, the number of aquatic and terrestrial species associated with the park is great and niches vary from stopovers during migration to providing breeding habitats and primary foraging areas.

In addition, the relatively undeveloped portion of beach within the park is an important nesting site for three species of federally listed marine sea turtles (*Caretta caretta*, *Chelonia mydas* and *Dermochelys coriacea*); additionally two other sea turtle species have been observed in park waters (*Eremochelys imbricate* and *Lepidochelys kempi*). Over the past three years (1997-1999), the total number of sea turtle nests has ranged from 188 to 224. The endangered Florida manatee is also commonly observed in park waters.

Most of the endangered plants are located in the beach dune community, demonstrating the need

for protection of this community.

Special Natural Features

The tropical maritime hammock at John D. MacArthur Beach State Park represents one of the best examples of this community in Palm Beach County. The hammock has a diverse assemblage of tropical trees and understory.

Cultural Resources

Evaluating the condition of cultural resources is accomplished using a three part evaluative scale, expressed as good, fair, and poor. These terms describe the present state of affairs, rather than comparing what exists against the ideal, a newly constructed component. 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 judgment is cause for concern. Poor describe 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

The Florida Master Site File (FMSF) lists four sites within the park. In 1983, Henry Baker, Division of Historical Resources (DHR), evaluated the property and located an aboriginal midden, Glades III (8Pb214) on the west face of the primary dune. Card (1991) also investigated this site 8Pb214. This site is threatened by the ongoing beach erosion of the primary dune. A second site, Singer Island Midden 3 (8Pb6298) was located by David Dickel (DHR) in 1988. It is closely associated with 8Pb214 and contains oyster shells. Site 8Pb215 contains fragments of 19th century bottle and glass ceramics. These two sites are not in areas where any activities or erosion is taking place.

Munyon Island (8Pb79) was once referred to by the Seminoles as “Nuctsachoo” meaning “pelican.” This was the largest colonial waterbird rookery in the area. In 1874, plume hunters killed or frightened the birds away and they never returned.

Munyon Island (Pelican Island) was acquired from the State in 1889 by a couple named Pitts, and was renamed Pitts Island. They built a large house at the south end of the island and a seawall filled with muck. The Pitts also planted many exotic, ornamental shrubs and fruit trees. The island was the subject of many articles in national magazines and reported to be “the most picturesque spot in Florida.”

In approximately 1901, Dr. James M. Munyon acquired the island from the Pitts. Dr. Munyon had made his fortune selling patent medicines in the northeast. He added to the landscaping, put in shell roads and enlarged the Pitts’ house to five stories renaming it the “Hygeia Hotel.” He catered to many ailing, wealthy northerners, who came for the scenery, healthful sulfur water, and fermented papaya juice called “Munyon Paw-Paw” tonic.

The hotel and some of the grounds burned in 1915. The island then remained largely uninhabited, and the ornamental garden and shrubs languished from storms and neglect. In 1936, and again in 1959-60, spoil material dredged from Lake Worth was placed along the western edge of the island almost tripling its original size.

The next owner of the island and the remainder of the park property was John D. MacArthur, for whom the park is named. He was a billionaire when he passed away in 1978. MacArthur made

his fortune in insurance and real estate, and passed on the bulk of his fortune to the John D. and Catherine T. MacArthur Foundation, from which the state received the park property in 1981.

In 1992, the (extensive) ecological restoration of Munyon Island was initiated with primary partner Palm Beach County. The Archaeological and Historical Conservancy completed archaeological monitoring reports for plant community restoration on Munyon Island (Heinz et. al., 1994 and Carr et. al., 1997).

Currently only a few structures from Hygeia Hotel are exposed. The seawall and old dock alignment and a structure on the south end are exposed to wave action and are threatened by erosion. The three known middens on the island and other structure are concealed and not considered threatened. A high priority will be placed on finding funding to complete a phase I archeological survey of the park. Archeological information can then be used in the education center to interpret the areas past human activities.

RESOURCE MANAGEMENT PROGRAM

Special Management Considerations

Timber Management Analysis

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

A timber management analysis was not conducted for this park. The total acreage for the park is below the 1,000-acre threshold established by Florida Statutes. Timber management will be reevaluated during the next revision of this management plan.

Additional Considerations

The maritime hammock, restored Atlantic coast beach dune community, and worm reef, deserve special attention to ensure their physical and biological integrity.

Munyon Island is a 45-acre island in the Lake Worth Lagoon that is part of John D. MacArthur Beach State Park. Historically, it was a 15-acre island, with maritime hammock uplands. In 1936 and again in 1959-60, dredge spoil from the Intracoastal Waterway was placed on the island increasing its size to about 45 acres. Most of the island was subsequently infested with exotic plants, primarily Australian pine (*Casuarina equisetifolia*) and Brazilian pepper (*Schinus terebinthifolius*).

In 1991, the planning process began for restoration of Munyon Island. It was decided that the project would have to be phased due to funding constraints. Palm Beach County Environmental Resources Management offered to take the lead since they were able to dedicate staff biologists full-time to the project and, most importantly, they could use county vessel registration dollars as a match for grant funding sources. The Army Corps of Engineers assisted with a grant of $1.2 million. Florida Inland Navigation District, Florida Department of Environmental Protection,

Pollution Recovery Trust Fund and the Florida Department of Agriculture and Consumer Services all contributed to the project.

A level I archaeological survey was done followed by a level II survey in the known archeological hot spots. These two surveys allowed for the preservation of the cultural resources of the island that include an aboriginal midden, a historic site and a turn of the century cultural site (see cultural section below).

The Munyon Island project restored 20 acres of wetlands, which included 120,000 plantings of primarily red mangroves. These plants were grown in the park nursery, and the propagules came from within the park. The project also restored 23 acres of maritime hammock. The upland plants came via a grant from the Florida Department of Agriculture and Consumer Services. There were a total of 40 acres of exotic plants removed, mostly Australian pine (*Casuarina equisetifolia*) and Brazilian pepper (*Schinus terebinthifolius*). Over 1000 volunteers contributed immensely to this project. Volunteers planted all of the mangroves.

There were 163,000 cubic yards of fill removed from the site. Approximately 100,000 cubic yards of this material were cleaned and placed in an anoxic dredge-hole in the Lake Worth Lagoon just north of the park. The depth in the hole was raised from 22 feet to 8 feet in an attempt to encourage seagrass and macroalga colonization. 1,900 feet of riprap and a 1200 feet earthen berm were constructed for wave attenuation purposes. The riprap provides habitat and the berm provides a recreational amenity for boaters. A 170-foot boardwalk and an informational kiosk are located on the island so that visitors can see and read about the work first hand. Recently picnic shelters have been added to the island and there are plans for a boat dock.

Given the large effort of this restoration, continued exotic removal and maintenance of the Munyon Island Project are high priorities for the park. Further development of Munyon Island as a destination for visitors is proposed. The park will place a high priority on creating idle speed and exclusion zones around the island where appropriate when the docking facility is built. This will help protect seagrasses and limit disturbance to birds utilizing the area. All construction and visitor use will be designed to limit any disturbance to birds and other wildlife as well as protect cultural resources.

Management Needs and Problems

- Continue protecting and monitoring of sea turtle nesting sites and public turtle walks.
- Continue maintenance of Munyon Island Restoration Project.
- Expand existing exotic plant removal efforts.
- Continue restoration of beach dune community.
- Work with neighbors to establish proper storm water management for the outfall on the northern boundary of the park.
- Continue updating the plant and animal inventories.
- Improve the mapping, monitoring and management of designated species.

Management Objectives

The resources administered by the Division are divided into two principal categories: natural resources and cultural resources. The Division primary objective in natural resource management is to maintain and restore, to the extent possible, to the conditions that existed before the ecological disruptions caused by man. The objective for managing cultural resources is to protect these resources from human-related and natural threats. This will arrest deterioration and help preserve the cultural resources for future generations to enjoy.

Management Measures for Natural Resources

Hydrology

John D. MacArthur Beach State Park is surrounded by tidal wetlands (mangroves), estuarine open water and marine systems. Water is perhaps the most important influence on the uniqueness of a barrier island. Anything that degrades water quality can affect the natural environment and visitors to the park.

The issue of maintaining good surface water quality in John D. MacArthur Beach State Park extends beyond the park's wetlands. Point sources and non-point sources of surface water pollution coming into the park should be identified and proposed to regulating agencies for remediation. Every effort should be made to support acquisition programs for preservation of all wetlands within the unit's drainage basin.

Monitoring of ground water and surface water quality and quantity in our region are conducted by the South Florida Water Management District, DEP's "Surface Water Ambient Monitoring Program", and the FWCC Division of Marine Resources.

Soil erosion is not a concern for the park, except the loss of beach sand. Beach erosion is a concern for most of coastal Florida and the park has had renourishment projects completed to the north of it. The park supports protection of its coastal dunes but would not favor a beach renourishment project at the park. Sea oats planting may help keep sand on the beach during storm events.

There is a small outfall on the northern boundary of the park. The Park should work with neighbors to establish proper storm water management for this water.

Prescribed Burning

The objectives of prescribed burning are to create those conditions that are most natural for a particular community, and to maintain ecological diversity within the unit's natural communities. To meet these objectives, the park is partitioned into burn zones, and burn prescriptions are implemented for each zone. The park burn plan is updated annually to meet current conditions. All prescribed burns are conducted with authorization from the Department of Agriculture and Consumer Services, Division of Forestry (DOF). Wildfire suppression activities will be coordinated between the Division and the DOF.

Prescribed burning has not been conducted at John D. MacArthur Beach State Park. Natural fires in maritime hammock probably occur no more often than once every 26 to 100 year period; consequently, prescribed fire is not planned for the unit.

Designated Species Protection

The welfare of designated species is an important concern of the Division. In many cases, these species will benefit most from proper management of their natural communities. At times, however, additional management measures are needed because of the poor condition of some communities, or because of unusual circumstances that aggravate the particular problems of a species. The Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species.

The following ongoing and proposed actions benefit designated species at John D. MacArthur Beach State Park.

Three species of sea turtles nest within the park: loggerheads (*Caretta caretta*), green (*Chelonia mydas*), and leatherbacks (*Dermochelys coriacea*). During the summer months, John D, MacArthur Beach State Park staff conduct interpretive programs (sea turtle watches) which include a slide presentation and a walk along the beach to witness a nesting female loggerhead sea turtle. Most nesting activity occurs between April and September, peaking in late June through mid-July. All new crawls, either false or nest, are located daily by John U. Lloyd Beach State Park staff and identified to species, sector, nest number and date. At the end of each nesting season, staff will complete a summary of information on sea turtle nests. The following actions have been incorporated at John D. MacArthur Beach State Park to minimize human disturbance during the nesting season and to enhance present populations:

1. Protect nesting females on beaches by patrol and surveillance.
2. Survey beaches to count crawls and nests within the unit.
3. Count and report stranded or dead turtles as well as other relevant information.
4. Maintain the nesting beach to improve nesting success by reducing the use of artificial lighting near the beach and heavy equipment use on the beach.
5. Provide interpretive experiences to educate visitors about the plight of sea turtles.

Staff has located and monitors known gopher tortoise *(Gopherus polyphemus*) burrow sites. No additional protection measures are required at the time of this writing.

Least terns *(Sterna antillarum)* and black skimmers *(Rynchops niger)* forage in marine and estuarine waters surrounding the park. Least terns also loaf on the sandy spit of Munyon Island. Signage and other public information are used to advise park visitors of the need to prevent undue disturbances of loafing terns.

Many of the other listed species documented from this property are wading birds (herons, egrets, ibis, storks) using the area for foraging or loafing. Generic actions protecting the health of the Lake Worth Ecosystem Management Area, and the unit's wetland communities and associated trophic webs, will benefit these species. Ephemeral sand spits that form or exist adjacent to the park will be mapped and protected for the protection for wading bird habitat. During fall, various raptors and neotropical migrants also frequent the area. Some of these species will generally benefit from our protection of beach dune, mangrove swamp and maritime hammock communities.

Environmental education and interpretive efforts should opportunistically be continued for West Indian manatees (*Trichecus manitus latirostris*). Whenever this species is observed by park visitors at John D. MacArthur Beach State Park, staff members provide immediate interpretation. For additional protection, the Florida Park Patrol and the FWCC Marine Patrol enforce boating regulations in state parks. The park plans to coordinate with the Office of Waterway Management to create combustible engine exclusion zones, no wake and slow speed zones along western shoreline of the park were appropriate.

Designated plants in a park are not systematically or routinely monitored. Monitoring may be conducted for specific listed plants depending upon a need or project type, or the research interests of qualified academic investigators. Other plants receive more passive monitoring (e.g. satinleaf trees along the Satinleaf Interpretive Trail) because of their locations. Any declines of vigor and/or persistence observed in populations of listed plants results in increased monitoring by park staff for probable cause.

Some beach dune listed plants that occur in very low numbers (e.g. John D. MacArthur Beach State Park has one sea lavender plant) are subject to local extirpations from climatic phenomena such as hurricanes. Such cyclic natural events are not managed for, nor should they be.

Exotic Species Control

Exotic species are those plants or animals that are not native to Florida, but were introduced because of human-related activities. Exotics have fewer natural enemies and may have a higher survival rate than do native species, as well. They may also harbor diseases or parasites that significantly affect non-resistant native species. Consequently, it is the strategy of the Division to remove exotic species from native natural communities.

The overall goal for the park is to get each area of the park into maintenance phase. Exotic plants will always be a problem at the park due to its close proximity to urban landscaping. The largest problem is pockets of Brazilian pepper (*Schinus terebinthifolius*) in various parts of the hammock community. The Munyon Island restoration is threatened by exotic vine species (e.g. balsampear) and species that were left over from past human habitation (e.g. Gold Coast jasmine). Munyon is a high priority due to its costly restoration. There are a large number of invasive exotic plant species found in the park found mostly as saplings and seedlings. If maintenance is not performed, these could become major infestations (for example Old World climbing fern and carrotwood).

Problem Species

Problem species are defined as native species whose habits create specific management problems or concerns. Occasionally, problem species are also a designated species, such as alligators. The Division will consult and coordinate with appropriate federal, state and local agencies for management of designated species that are considered a threat or problem.

Raccoons (*Procyon lotor*) occasionally raid sea turtle nests and prey on hatchlings on the beach. Presently, this has not been a significant problem and monitoring of nest predation is noted during the daily nest counts. Supplemental feeding of raccoons by visitors can result in artificially high numbers and the spread of diseases and is discouraged by posted signs prohibiting the feeding of wildlife. Proper disposal of discarded food items by visitors, especially along the beach, will help in alleviating this threat.

Management Measures for Cultural Resources

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. Approval from Department of State, Division of Historical Resources (DHR) must be obtained before taking any actions, such as development or site improvements that could affect or disturb the cultural resources on state lands (see DHR Cultural Management Statement).

Actions that require permits or approval from DHR include development, site excavations or surveys, disturbances of sites or structures, disturbances of the substrate, and any other actions that may affect the integrity of the cultural resources. These actions could damage evidence that would someday be useful to researchers attempting to interpret the past.

There are features on Munyon Island that should be studied as to their historical context. If these features prove to be significant to the historical interpretation of the site, then measures should be taken for their protection. This process should probably occur before further recreational development of the island, as some of these features may be threatened.

Vandalism should be discouraged using interpretive signage that includes warnings against collecting artifacts in both terrestrial and aquatic environments. This signage should be placed at access points or areas of high visitor concentration rather than at sites themselves.

Research Needs

Natural Resources

Any research or other activity that involves the collection of plant or animal species on park property requires a collecting permit from the Department of Environmental Protection. Additional permits from the Florida Fish and Wildlife Conservation Commission, the Department of Agriculture and Consumer Services, or the U.S. Fish and Wildlife Service may also be required.

As on most of the lands managed by the Division, additional floral and faunal inventories are recommended to document the presence of rare species, evaluate habitat management practices, and understand community succession within the unit. Additional monitoring of the worm reef may also be beneficial.

Cultural Resources

The primary research needs in terms of cultural resources at John D. MacArthur Beach State Park is a Level I archaeological survey. Due to restoration efforts on Munyon Island this area of the park has had an archeological survey, but other areas of the park need further study. Some further study of site Pb214 may be required due to it being threatened by beach erosion. This will require trained experts and a funding source. Further research into the significance of the Munyon Island structures is needed before erosion degrades them. The Level I archaeological survey of the park should be given a high priority, since valuable, as yet unknown cultural resources may exist in the park. Information from the survey will provide valuable additions to the park's interpretive programs and to the proposed redesigned interpretive exhibits for the Nature Center.

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 contained in Addendum 6. Cost estimates for conducting priority management activities are based on the most cost effective methods and recommendations currently available.

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 of the Internal Improvement Trust Fund (board) are being managed for the purposes for which they were acquired and in accordance with a land management plan adopted pursuant to s. 259.032, the board of trustees, acting through the Department of Environmental Protection (department). 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 D. MacArthur Beach State Park was subject to a land management review on June 1, 1998 (see Addendum 7). 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 Division of Recreation and Parks. These responsibilities are to preserve representative examples of original natural Florida and its cultural resources, and to provide outdoor recreation opportunities for Florida's citizens and visitors.

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

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

John D. MacArthur Beach State Park is located within Palm Beach County within the city limits of the Village of North Palm Beach in the southeastern part of the state. The populations Palm Beach Count and the adjacent Martin County have grown 30 percent since 1990, and are projected to grow an additional 43 by 2020 (BEBR, University of Florida, 2002). As of 2000, 17 percent of residents in these counties were in the 0-14 age group, 36 percent in the 15-44 age groups, 23 percent in the 45-64 age group and 23 percent were aged 65 and over, which reflects a significantly older population than the state average. (BEBR, University of Florida, 2002). Nearly 2.4 million people reside within 50 miles of the park, which includes the cities of Ft. Lauderdale, West Palm Beach, Stuart, Port St. Lucie and Ft. Pierce (Census, 2000).

John D. MacArthur Beach State park recorded 101,924 visitors in fiscal year 2003-2004**.** This represents a net increase over the last five years. By Division estimates, these visitors contributed nearly $2,786,000 in direct economic impact and the equivalent of 56 jobs to the local economy in fiscal year 2003-04 (Florida Department of Environmental Protection, 2004).

Existing Use of Adjacent Lands

John D. MacArthur Beach State Park is located on Singer Island and Munyon Island, within one of the most intensely developed coastal areas of Florida. The park is bisected by State Road A1A, which provides very convenient access for motorists and bicyclists and pedestrians along sidewalks that connect to residential areas north and south of the state park. The Atlantic Ocean

beach forms the eastern shoreline of the park, and the park is bordered on the west by Lake Worth. The southern park boundary is the North Palm Beach/Riviera Beach city limits, with Riviera Beach located to the south.

Dense urban development surrounds this state park. High-rise condominiums are located immediately south of the beach area of the park and single-family residential developments are located to the north

Resource based recreation resources in the vicinity of MacArthur Beach State Park include Jonathan Dickinson State Park in Hobe Sound, and Ocean Reef County Park, located less than one mile south of the state park on Riviera Beach. Significant natural areas managed by the Department of Environmental Protection, the Florida Fish and Wildlife Commission and Palm Beach County are located within 15 miles of the state park. These include Jonathan Dickinson State Park and the Loxahatchee National Wild and Scenic River, Corbett Wildlife Management Area, Cypress Creek, Reese Groves, Loxahatchee Slough and Hungryland Slough Natural Areas and Grassy Waters Preserve. However, there are no natural corridors connecting these protected areas to the state park.

Planned Use of Adjacent Lands

The vicinity of the state park has undergone nearly complete urban development. Extensive new developments in the adjacent community that could cause significant new degradation to the park's resources are not likely. The urban setting will continue to affect both park resources and visitor experiences by the continued intrusion of air, water and noise pollution and occasional traffic congestion along the state road and boating congestion along accessible shorelines on the ocean and Lake Worth.

Palm Beach County is involved in an extensive effort to master plan and implement greenways and trails connections between public lands throughout the county. John D. MacArthur Beach State Park should be considered as a destination point within the network of urban trails, and as a location for blueway connections along the Atlantic Ocean and the Intracoastal Waterway. The Division will work with County planners to assure that the state park is fully considered in the planning process and that Division staff is consulted regarding park uses and resource protection issues.

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, supports 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.

Approximately 6,000 feet of shoreline on the Atlantic Ocean at John D. MacArthur Beach State Park allow beachcombing, sunbathing, fishing, swimming, snorkeling and scuba diving activities. Park facilities developed in the late 1980s provide safe, environmentally sensitive

access to this beach for nearly 100,000 visitors each year.

The two enclosed water features of the state park: Lake Worth Cove and Mangrove Lagoon are very shallow, mangrove-ringed intertidal areas. Because of their characteristic shallow depth and importance as undisturbed wading bird feeding areas, these interior waterways are not considered suitable for motorized boating activities. However, these wetlands do provide a rich resource for marine biology programs and interpretation. Guided tours, by canoe or kayak and by wading, and a managed number of unguided kayak excursions are provided by the park.

The upland landscape of the state park west of Lake Worth Cove comprises one of the few (and probably the largest) intact tropical maritime hammock communities remaining in this region of Florida. Nature trails, picnicking facilities, parking areas and the park visitor center provide support in this area for a range of recreational, interpretive and environmental education programs.

The Lake Worth shoreline at the park amounts to approximately 1.75 miles of a shallow, mangrove-fringed intertidal zone. An embayment is created between the inlet to Lake Worth Cove at Burnt Bridge on the east and Munyon Island on the west, at the southwestern corner of the park. This area encloses a shallow, sheltered water area of approximately 80 acres, suitable for water-based recreation and environmental education programs.

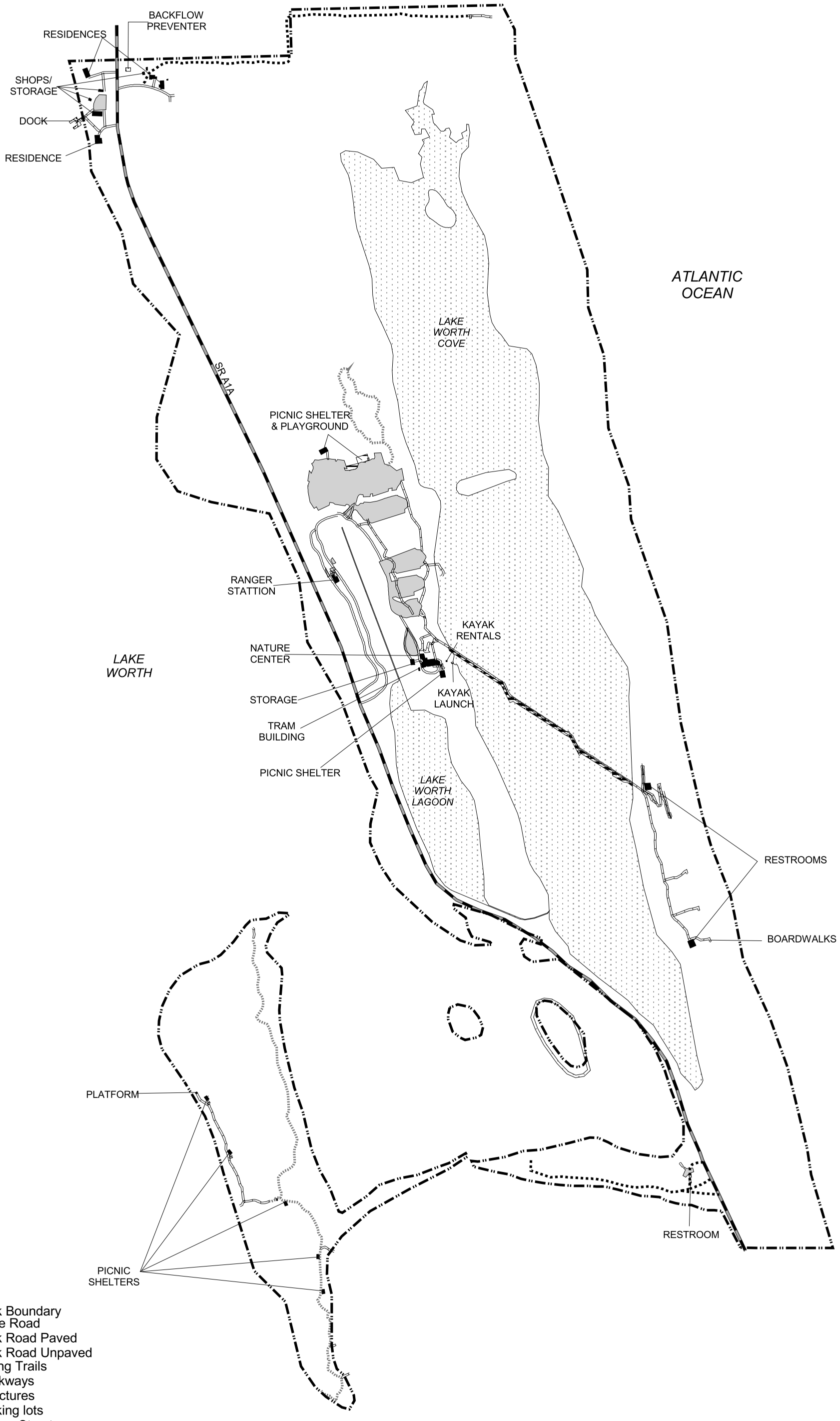
Munyon Island contains both historic and prehistoric cultural sites, the most visible being remnants of the Hygeia Hotel, located at the southern end of the island. Munyon Island was severely affected by the deposit of spoil from the construction of the Intracoastal Waterway, and subsequent maintenance operations, dating from the 1930s to 1960. The Munyon Island wetland restoration project administered by the Palm Beach County Department of Environmental Resources Management was part of a larger effort by Palm Beach County to undo some of the long-term environmental impacts of dredge and fill activities in Lake Worth. Approximately 20 acres of spoil deposited on the island were removed, and mangroves and native upland plants were planted by the County project between 1993 and 1997.

In the course of the design and implementation of the Munyon Island project, a linear berm approximately 1,200 feet long and about 75 feet wide was retained along the western edge of Munyon Island to provide an upland location for boat access and picnicking facilities.
At this time, access to Lake Worth is not provided through the state park, and access to the park by boat is not accommodated by developed facilities. Bridge fishing from Burnt Bridge on State Road A1A is a traditional activity. Parking spaces for approximately 20 vehicles have been provided by the Florida Department of Transportation within the state road right of way south of bridge to support that activity.

The aesthetic quality of the natural landscape in the state park is highly valued in the context of the surrounding, highly developed community. Lake Worth Cove provides exceptional vistas for the aesthetic enjoyment of the park visitors walking along the connecting boardwalk between the environmental education center and the beach. In addition, the drive, walk or bicycle ride through the park along the state road has become a favorite experience for many, and walking, playing, sunning or shelling along the park's undeveloped beach is a destination experience as well.

Assessment of Use

All legal boundaries, 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



JOHN D. MACARTHUR BEACH STATE PARK

BASE MAP

following sections.

Past Uses

Cultural sites on John D. MacArthur Beach State Park include both prehistoric and historic sites dating at least to the 15th Century. The beach and some of the upland areas of the state park have been a beach recreation destination for residents and visitors for many years. The most colorful historical use of the park land "Dr." James Munyon's Hygeia Hotel that operated on Munyon Island as a health resort from 1903 to 1917.

Other Uses

Munyon Island was used by the Army Corps of Engineers as a spoil site for construction and maintenance of the Intracoastal Waterway, but that use is now discontinued. With the exception of the right-of-way of State Road A1A, there are no non-park uses of state lands at this time.

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 D. MacArthur Beach State Park, approximately 170 acres above mean high water elevation have been designated as protected zones (see the Conceptual Land Use Plan). The protected areas include undisturbed or recovering tropical maritime hammock and beach dune uplands, the northern end of Munyon Island where large numbers of shorebirds have congregated for feeding and resting in the past and cultural sites on Munyon Island. The sand spit at the north end of Munyon Island has washed away, but these ephemeral resting habitats located in shallow waters along the park's western edge will be treated as protected zones as they appear in the future. The beach and dune zones of the park and all wetland areas are considered protected zones and will not be disturbed for development activities in the future, with one exception. Sea grass communities along the park's shoreline on Lake Worth are fragile and important ecological elements, and habitat areas capable of supporting the submerged vegetative community are included in the park's protected zones. Areas of seagrass that may be damaged by motorized vessels may be placed off limits as a protective measure, in the future. In addition, reduced speed or minimum wake boating regulations may be established around Munyon Island, outside the Intracoastal Waterway, to protect park resources and public safety, once the boating facilities on Munyon Island have been established.

Existing Facilities

The facilities for John D. MacArthur Beach State Park were constructed between 1987 and 1989. All facilities are in good condition at this time.

Recreation Facilities

Beach Use Area
Dune Boardwalks (4)
Backdune Nature Trail (.3 mi.)

Visitor Center
Picnic shelter
Kayak rental area
Satinleaf Nature Trail (0.1 mi.)

Picnic Area
Large shelter w/restrooms
Scattered picnic tables
Playground equipment

Munyon Island
Small picnic shelters (5)
Temporary restroom
Nature Trail (0.2 mi.)
Canoe/kayak launch

Support Facilities

Beach restrooms (2)
Lagoon boardwalk (1300 ft.)
Tram maintenance building
and volunteer office
Plant nursery
Ranger Station
Maintenance shop
Flammable storage building
Standard residences (2)
Mobile home residences (2)
Boat Dock
Park Road (0.5 mi.)
Parking areas (500 spaces)

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.

During the development of the unit management plan, the Division assesses potential impacts of proposed uses on the resources of the property. Uses that could result in unacceptable impacts are not included in the conceptual land use plan. Potential impacts are more thoroughly identified and assessed through the site planning process once funding is available for the development project. At that stage, design elements, such as sewage disposal and stormwater management, and design constraints, such as designated species or cultural site locations, are more thoroughly investigated. 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 and Proposed Facilities

Visitor and Environmental Education Center. The visitor center at John D. MacArthur Beach State Park was designed to provide a graphic exhibit area, aquarium displays, an audio-visual presentation room, an outdoor amphitheater and restrooms. Since the park opened in 1989, an ambitious environmental education program has evolved in response to the unique character and quality of the natural systems and resources of the state park. These programs have been hampered by the lack of a facility that directly supports many components of environmental education programs.

In addition, the Friends of MacArthur Beach State Park, the non-profit Citizens Support Organization that has formed in partnership with the Division, needs space for the successful gift shop operation that has been housed in the reception area of the visitor center.

JOHN D. MACARTHUR BEACH STATE PARK

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

CONCEPTUAL LAND USE PLAN

New structures adjacent to the existing visitor center are recommended to house these programs and to provide needed staff office space for the interpretive program coordinators and the CSO staff. This addition to the visitor center will be designed with great care to retain significant hammock trees and understory vegetation. The construction area will use the existing disturbed hammock located to the north and west of the visitor center building, to the greatest extent possible, and may be designed as a series of buildings to allow careful placement of the development footprint. Functional relationships between the visitor center, the gift shop and an environmental education classroom and office spaces will be important design considerations addressing the current conflicts that occur between the different public and staff uses.

Wildlife Boardwalk and Overlook. Except for the area traversed by the main bridge spanning Lake Worth Cove, none of the open water or shoreline areas of that waterbody are visible to park visitors. At low tide this area hosts a variety of foraging wading birds, and the mangrove fringe provides a multitude of roosting sites near sunset. An extension of the Satin Leaf Nature Trail should include a short boardwalk and overlook platform, unobtrusively sited at the waterward edge of the mangrove fringe, to allow wildlife observation and nature study opportunities. Careful site selection and design will assure that this facility is constructed with minimum impact to the protected mangrove community, and creates minimal disturbance to the birds' activities.

Munyon Island. Access to recreational opportunities on Munyon Island should be provided by development of new facilities. A canoe and kayak launch on Lake Worth, and a small parking area have been provided on a ruderal area located just west of A1A, near the southern park boundary. A boardwalk capable of carrying a passenger tram or bicycle traffic and small park support vehicles is proposed to link this upland area to the existing and proposed public use facilities on Munyon Island. The structure will traverse areas of previously disturbed mangrove vegetation and have minimal impacts to the protected resources of the park. The boardwalk should also provide several platforms for fishing.

If it is possible to expand the existing parking area, then additional parking for up to 20 cars should be provided here in the future. If expansion is not possible, given the constrains posed by the adjoining mangrove wetlands, then a tram vehicle that moves visitors from the main parking facilities east of State Road A1A to Munyon Island via the state road and the proposed boardwalk will be necessary.

In addition, facilities to allow convenient access to Munyon Island via Lake Worth by boat are recommended. A docking facility for up to 20 boats is planned to be constructed on the western berm shoreline of Munyon Island, where spoil material was left for this purpose. Up to six small picnic shelters are recommended to be provided on the berm for boaters who wish to picnic within view of the dock area. One large shelter and scattered tables are proposed for a picnic area located on the body of the island. A restroom should be provided to support these picnic areas and the proposed primitive group camping area discussed below. Wastewater disposal technology appropriate to the remote site will be used at this restroom. The project may be phased to allow evaluation of resource and operational impacts, and develop effective measures to provide high quality recreation and resource protection in this relatively remote area of the state park.

Cultural site interpretive programming is recommended on Munyon Island. The Hygeia Hotel site and antecedent homesteads and prehistoric sites located on the island should be

interpreted to the visiting public through graphic kiosks at appropriate locations, and through ranger- or volunteer-led interpretive programs.

A primitive group camp is proposed to be located near the northeastern shoreline of Munyon Island. The recommended area is a highly disturbed maritime hammock community. Approximately ten campsites are proposed, accommodating up to 40 campers at one time. A medium picnic shelter and fire ring is the recommended facilities to support this activity, and the restroom will be located between this site and the day use picnic facilities to allow use from both recreation areas.

With the development of facilities on Munyon Island, there will be a priority need for the budget and staffing resources to provide maintenance of facilities and interpretation and oversight for visitors to the area. Interpretive programs will be created to help manage visitor behavior, and park rules will be enforced. Monitoring of visitors' activities and resource conditions and the proactive management of public uses in the park will assure protection of the cultural resources and shorebird habitat on and around Munyon Island after the proposed development plan is implemented.

Division staff will work with Florida Department of Transportation staff to enhance shoreline-fishing access near Burnt Bridge on State Road A1A. Currently parking for fishermen is allowed on the state road right of way, but access points to Lake Worth and Lake Worth Lagoon are not designated. Improvements may include signage and stabilized access points to the water at the bridge abutments.

Support Facilities

An equipment storage building is needed to complete the park's maintenance facility. The existing service dock needs to be extended to deeper water for safe operation of a boat, which is necessary for park staff to provide an increased management presence on Munyon Island. No dredging is proposed in connection with the dock improvements. Electric and water service extensions are needed to upgrade existing beach use and canoe/kayak facilities. Service and emergency access to the northern end of the beach is along a marginal service road at the park boundary. Stabilization of this road is needed to improve accessibility reduce ongoing maintenance problems. If possible, the park's restrooms at the visitor center, north picnic area, ranger station and shop and residence areas should be connected to the local municipal wastewater treatment system.

Park staff is housed in two aging mobile homes located east of State Road A1A at the northern park boundary. These structures are not safe housing in the high-hazard hurricane zone of the park and should be replaced with permanent residences. Additional lodging is needed to accommodate student interns providing research services at the park, and other volunteer or park service staff. Two duplex residences or a quadruplex residence and a small storage shed are recommended to reduce both the development footprint and cost of the project. Division staff will need to work closely with the Village of North Palm Beach and with adjacent landowners to receive zoning and building permit approvals for this proposal.

Facilities Development

Preliminary cost estimates for the following list of proposed facilities are provided in Addendum 6. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist the Division in budgeting future park improvements, and may be revised as more information is collected through the planning and design processes.

Environmental Education Facility

Multi-purpose classroom building
Storage
Park and CSO administrative space
CSO Gift Shop

Wildlife Overlook

Overlook deck
Boardwalk (200 l.f.)

Support Facilities

Staff/volunteer housing (4 units)
Extend water and electric service to south-end canoe launch
Extend electric service to beach use area

Munyon Island Development

Parking (20 vehicles)
Boardwalk (2,600 feet)
Boat docks (20 slips)
Small picnic shelter (1)
Medium picnic shelter (1)
Large picnic shelter (1)
Primitive group camp (1)
Small restroom (1)
Water service
Stabilize northern beach access service road
Connect to local wastewater treatment system

Existing Use and Optimum 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 1).

The optimum 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 1.

Optimum Boundary

As additional needs are identified through park use, development, research, and as adjacent land uses change on private properties, modification of the unit's optimum boundary may occur for the enhancement of natural and cultural resources, recreational values and management efficiency. At this time, no lands are considered surplus to the needs of the park.

Identification of lands on the optimum boundary map is solely for planning purposes and not for regulatory purposes. A property’s identification on the optimum boundary map is not for use by any party or other government body to reduce or restrict the lawful right of private landowners. Identification on the map does not empower or require any government entity to impose additional or more restrictive environmental land use or zoning regulations.

Table 1--Existing Use And Optimum Carrying Capacity

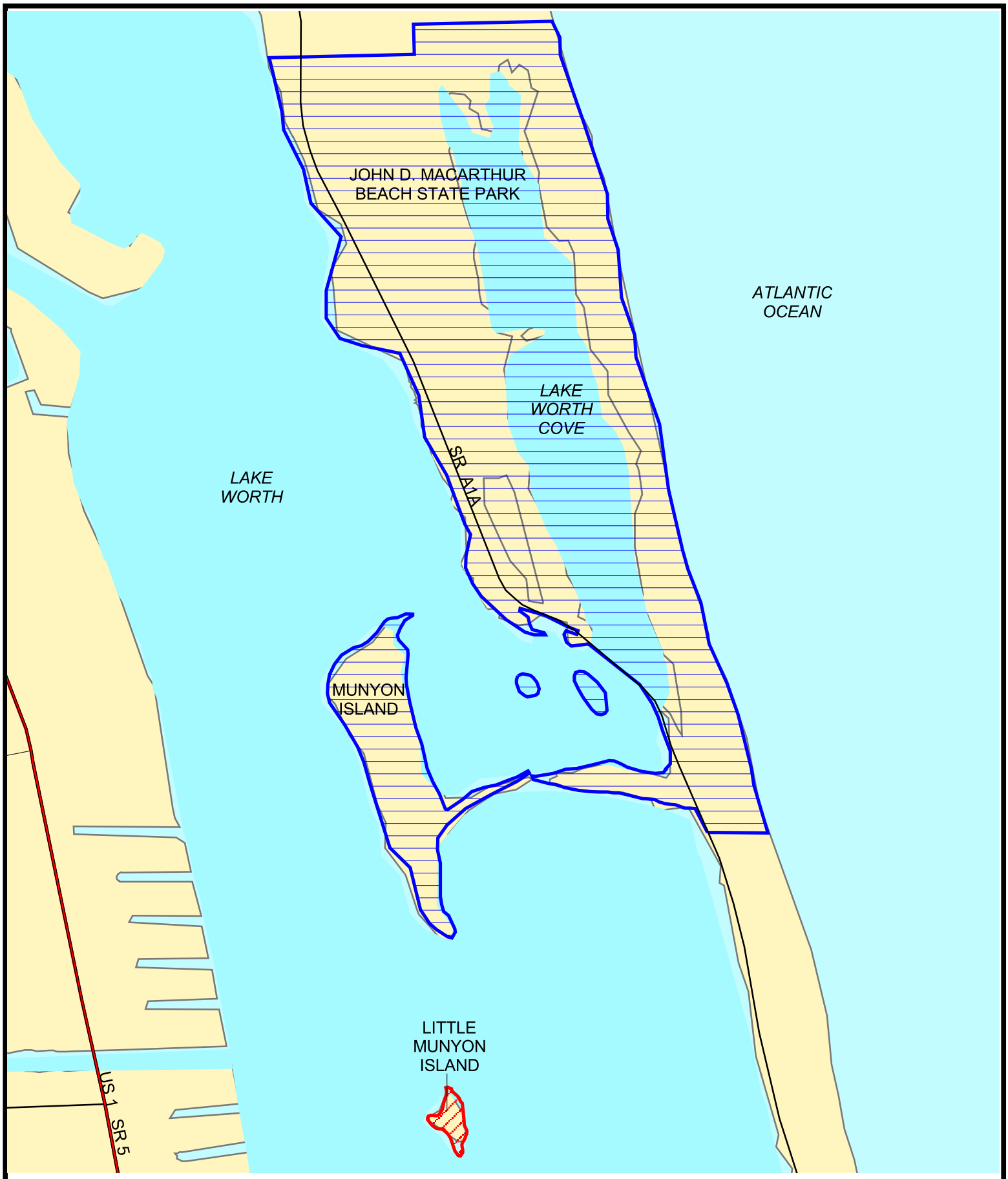
	Existing Capacity		Proposed Additional Capacity		Estimated Optimum Capacity	
Activity/Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Trails						
Nature	40	160			40	160
Picnicking	50	100	50	100	100	200
Beach Use	1,400	2,800			1,400	2,800
Visitor/Env. Ed Cntr.	100	400	60*	120*	160	520
Fishing						
Shoreline and Bridge	60	240	20	80	80	320
Boating						
Canoeing/kayaking	40	80			40	80
Boating	0	0	60	120	60	120
Camping						
Primitive Group	0	0	40	40	40	40
TOTAL	**1,690**	**3,780**	**190**	**420**	**1,920**	**4,240**

Note: Visitor turnover rates for educational programs are 2 per day, at maximum. Visitor center turnover rates average 4 per day.

Identification is not to be used as the basis for permit denial or the imposition of permit conditions.

The optimum boundary map reflects lands identified for direct management by the Division as part of the park. These parcels may include public as well as privately owned lands that improve the continuity of existing park lands, provide additional natural and cultural resource protection, and/or allow for future expansion of recreational activities.

A privately owned spoil island named Little Munyon Island, located immediately south of Munyon Island, is recommended for addition to the state park. The two-acre island is colonized primarily by exotic trees. However, resource management activities could improve the environmental quality and recreational potential of the island if it is acquired by the state (see Optimum Boundary Map). Efforts to bring submerged land areas adjacent to the park into public ownership are supported by the Division. However, it is not recommended that additional submerged lands be brought under the Division's direct authority.



JOHN D. MACARTHUR
BEACH STATE PARK

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

LEGEND
Park Boundary
Optimum Boudary

OPTIMUM BOUNDARY MAP

Addendum 1—Acquisition History

Purpose and Sequence of Acquisition

The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees) acquired John D. MacArthur Beach State Park to manage the property in such a way as to protect and restore the natural and cultural values of the property and provide the greatest benefit to the citizens of the state.

On July 7, 1981, the Trustees acquired sixty-one percent percent undivided interest in a 437.60-acre property that later became John D. MacArthur Beach State Park. The property was purchased from Palm Beach County, Florida. The purchase was funded under the Land Acquisition Trust Fund (LATF) program. The Trustees acquired the remaining thirty-nine percent undivided interest in John D. MacArthur Beach State Park on April 16, 1996.

Title Interest

The Trustees hold fee simple title to John D. MacArthur Beach State Park.

Lease Agreement

On July 13, 1981, Palm Beach County leased its 39% undivided interest in the MacArthur Beach State Park to the Trustees. On March 22, 1982, the Trustees leased both its 61 % undivided interest and the county's 39% undivided percent interest to the Florida Department of Environmental Protection, Division of Recreation and Parks (Division), under Lease No. 3205. This lease is for a period of fifty (50) years, and will expire on March 21, 2032.

As stipulated in the lease from the Trustees, the Division manages John D. MacArthur Beach State Park to develop, conserve and protect the natural and cultural resources of the park and to use the property for resource-based public outdoor recreation that is compatible with the conservation and protection of the resources.

Special Conditions on Use

John D. MacArthur 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, 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.

Outstanding Reservations

In accordance with the lease, all the property is utilized for public outdoor recreation and related purposes. Following is a listing of outstanding rights, reservations and encumbrances that apply to John D. MacArthur Beach State Park.

Instrument: .....Conservation Easement (granted to John D. MacArthur Park Conservation Corporation, Inc.)
Instrument Holder: .....Palm Beach County
Beginning Date: .....February 1, 1981
Ending Date: .....No ending date
Outstanding Rights, Uses, Etc.: .....This easement requires that the existing ecological relationships with terrestrial and aquatic animal species be fostered, preserved and enhanced.

Instrument: .....Lease Agreement (Lease No. 3205)
Instrument Holder: .....Trustees
Beginning Date: .....March 22, 1982
Ending Date: .....March 21, 2032
Outstanding Rights, Uses, Etc.: .....The Division is aware of a certain conservation easement on the property and agrees to comply with the terms and conditions of the easement.

Instrument: .....Easement (granted to Florida Power and Light Company)
Instrument Holder: .....DNR (Now DEP/Division)
Beginning Date: .....October 28, 1982
Ending Date: .....Coterminous with the term of Lease No. 3205
Outstanding Rights, Uses, Etc.: .....The easement enables the Florida Power and Light Company to install, construct, operate and maintain a distribution system for the transmission and distribution of electricity over a certain portion of the park.

Instrument: .....Easement (granted to Palm Beach County)
Instrument Holder: .....Trustees
Beginning Date: .....September 5, 1989
Ending Date: .....Will be in effect as long as sewer and water services are furnished
Outstanding Rights, Uses, Etc.: .....The easement will enable the county to install, operate and maintain water and sewer lines in a certain portion of the park.

Instrument: .....Easement (granted to FDOT)
Instrument Holder: .....Trustees
Beginning Date: .....May 6, 1996
Ending Date: .....Perpetual
Outstanding Rights, Uses, Etc.: .....The easement is for public right-of-way. When the right-of-way is abandoned or the property is no longer used for the right-of-way purpose, the right, title and interest in the property shall revert to the Trustees.

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The Honorable Daniel G. Noel, Mayor
Village of North Palm Beach
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Mr. Gerald Ward, P.E.
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Father Art Venezia
10970 State Road 703
North Palm Beach, Florida 33408

The Advisory Group appointed to review the proposed land management plan for John D. MacArthur Beach State Park met at the park's Nature Center on Wednesday, February 2, 2005. Mr. Paul Davis and Mr. Mike Stahl (Environmental Resource Management) and Mr. Tim Granowitz and Ms. Jean Matthews (Parks) represented Palm Beach County. Commissioner Marcus, Mayor Noel, Mr. Wasil, Mr. Shepherd, Mr. Weinstein, Mr. Fitzpatrick and Father Venezia did not attend. All other appointed members attended. Ms. Susan Snyder, and interested citizen, also attended. Division staff attending included George Jones, Daniel Jones, Phillip Myers and Lew Scruggs. Terry Coulliette represented the Division on the Advisory Group as park manager.

Mr. Scruggs began the meeting by explaining the purpose of the Advisory Group. He also provided a brief overview of the Division's planning process. He then asked each member of the advisory group to express his or her comments on the draft management plan.

Summary Of Advisory Group Comments

Mr. Ward suggested that Palm Beach County's greenways plans and CERP projects be referenced on the park vicinity map. He urged the Division to be persistent in dealing with FDOT regarding the proposed improvement for fishing access from Burnt Bridge. He recommended that the management plan have a statement that the Division will not support future proposals for beach renourishment at the state park. He stated that completion of a reconnaissance-level archaeological survey is an important management goal that should be funded, as information gathered would be valuable to updating the interpretive exhibits and programs of the park. He also suggested the Division should beware of allowing "storage creep" or the unnecessary expansion of service areas, over time. Mr. Ward stated that the management plan should provide a timeline for completion of the recommended resource management and development activities.

Mr. Ward recommended that attendance to the park should be stimulated, since the park's attendance growth does not track Palm Beach County's growth in population. He suggested providing more picnic tables, food service concessions, adequate bicycle parking and promotion of the park to local groups, such as bicycling clubs. He noted that the original plan for the state park included a much larger capacity for boat docking. He stated that providing a destination for recreational boaters is an important goal for the state park. Finally, Mr. Ward recommended that the park's Optimum Boundary map should include the privately-owned submerged land located south of the current park boundary.

Ms. Plockelman stated that her group is appalled at the proposal for a 20-slip boat dock on Munyon Island, and are concerned that the park will become a destination for jet ski activities with the proposed development. She supported the proposed boardwalk connection to Munyon Island, and suggested another boardwalk and an overlook on Lake Worth Cove north of the main parking area, to allow more access for birdwatching activities. She suggested that the park should publicize natural events such as the presence of manatees and seasonal bird migrations as a means to attract more visitors. Staff responded to the concern regarding boating and jet ski activities with the suggestion that sea grass areas within the park's management boundaries should be included in the designated protected zone, and that motorized vessels should be excluded from those areas for protection. Staff also recommended that appropriate reduced speed or no-wake zones should be established once

docking facilities are constructed as a safety precaution.

Ms. Laabs also opposed the development plan for Munyon Island. She pointed out that birds need undisturbed refuge areas, and most such areas around Lake Worth have been lost to development. She noted that birdwatching is an economically valuable activity that depends on preserved natural areas.

Ms. Welch expressed overall support for the draft plan, but included her concern with the proposed increased use on Munyon Island. She questioned whether that development would involve impacts to the mangrove restoration project and the remaining natural upland area, and asked if increased boat traffic would eliminate the ability for education programs to use the mud flats. Staff explained that the mangrove restoration project had been designed to accommodate the boating access, and explained that the scale of upland development on the island is proposed to be small, and located in the most disturbed areas. Regarding the proposed expansion of the park's Nature Center to include environmental education and gift shop facilities, Ms. Welch inquired about the size and suggested that room for future expansion needs to be considered in the design program.

Ms. Bane inquired if the park would receive the needed staff resources to manage the proposed Munyon Island development.

Mr. Wigal observed that the boat docks at St. Lucie Inlet Preserve State Park seem to be underused. He suggested that the environmental community is anticipating public uses on Munyon Island to mirror the activities at the County's park on Peanut Island, and suggested that state park rules, such as the exclusion of alcohol, will discourage those activities. Mr. Wigal asked if current public visitation to Munyon Island is included in the Division's attendance count for the state park. Staff replied that it is not, and that walk-in attendance on the beach is also not counted, but efforts to include these numbers through estimation methods will be made in the future.

Mr. Wigal stated that the park is becoming popular destination for kayaking recreation. He noted that continued access to the launch point on A1A is and important asset for the recreational users.

Mr. Thoburn reiterated that the development of Munyon Island would require adequate funding to manage and monitor for environmental impacts, without which damage to the park's resources will become a problem. He stated that stimulating attendance growth at the park has been a priority for the CSO, leading the group to fund several public relations, publicity and marketing efforts in the park's behalf. He suggested that both the park entrance fee, given the availability of free beach access just south and not far north of the park, and the relative inconvenience presented by the long walk from parking areas to the beach at MacArthur Beach are limiting factors to the park's attendance. He agreed with Mr. Wigal that the provision of kayaking opportunities have significantly contributed to visitation at the park.

Mr. Regan stated that the draft is a good plan. He agreed that the development plan for Munyon Island is of some concern. He agreed that adequate staffing and enforcement of park rules would be very important. He suggested that visitation to the park will inevitably grow as population pressure overrides the visitor preferences currently affecting the park's numbers.

He stated that the protection of sea turtle nesting habitat is the Fish and Wildlife Commission's primary concern for MacArthur Beach, and confirmed that poaching interdiction assistance to the park will continue to be available from his agency.

Mr. Granowitz stated support for the expanded recreational activities and access plans for Munyon Island. He noted that docks would help manage the way boaters reach and use the island. He noted that presence of the public will provide allies for resource protection, and that the Division's management authority that extends 400 feet beyond the park shorelines is a big asset in efforts to avoid resource impacts and unsafe public behaviors.

Mr. Granowitz and Ms. Matthews explained the County is developing more family-oriented programs at Peanut Island, but that the park there will continue to provide for the demand for more active recreational activities and family camping. They suggested that the County's initiative for improvements for boating recreation might be a source of support in educating and informing boaters about the Munyon Island facilities (what activities are available, rules and regulations, etc.). They noted that there is increasing interest in privately-operated water taxi services on Lake Worth that may result in transportation options for visitors to the park, in the future.

Mr. Davis stated that the draft plan is well written. He noted that the park has some of the best natural resources remaining in Palm Beach County. He noted that the offshore reef needs to be monitored and interpreted and that County staff have discussed assisting in installation of mooring buoys along the reef, if regulation of boat access is warranted. He suggested that cost estimates for exotic plant control should be doubled, based on the County's experience in maintaining the Munyon Island restoration project, and that cost estimates for sea turtle monitoring may be low also. He agreed that the boating capacity proposed for Munyon Island is high, and that monitoring and enforcement of protective measures should be priority management activities. He agreed that the park's protected zone should include sea grass beds surrounding Munyon Island. He agreed that Little Munyon Island and the privately-owned submerged land should be included in the park's optimum boundary, stating that land use regulations may not prohibit development of these areas.

Staff Recommendation

The following suggestions from the Advisory Group will be included in the ARC draft for the John D. MacArthur Beach State Park management plan.

- Reference to local greenways and trails initiatives.
- Increased estimated costs for exotic plant management activities.
- Discussion of the need for high priority to be placed on funding for archaeological surveys.
- Discussion of the need for high priority to be placed on acquiring the needed staff and operational resources to manage the proposed new Munyon Island development area,
- A boardwalk and overlook for access for nature study to Lake Worth Cove will be added to the Conceptual Land Use Plan.
- The Conceptual Land Use Plan will be revised to include the sea grass habitat around Munyon Island in the park's designated protected zone.

- Discussion will be added regarding regulation of boating speeds near the docking area, and exclusion of motorized vessels from the protected sea grass areas.
- Discussions will be added regarding the need for expanded interpretive programs, monitoring and proactive management of public uses in the park to avoid disturbances to the park's natural and cultural resources, with emphasis on the protection of the cultural resources and shorebird habitat on and around Munyon Island.

Division staff recommends approval of the draft plan with these additions.

Staff does not recommend the addition of the privately-owned submerged land south of the state park to the park's optimum boundary map. Extending the Division's management responsibility to that area would not enhance its ability to manage existing park resources or provide additional public recreation. The Division does support efforts to bring the submerged land into public ownership. However, management of the area by state park staff should not be necessary to provide protection, once it is in public ownership.

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Addendum 3—Soils Descriptions

Beaches (Bn) - This soil type occurs on narrow strips of tide washed sand along the Atlantic Coastline. They range from less than 100 feet to more than 500 feet wide, with an average width of 250 feet. As much as half of the beach may be covered with water at daily high tides, and all may be covered during storm events. Most beaches have a uniform, gentle slope up to the edge of the ocean.

The beaches are frequently mixed and reworked by waves. They are firm or compact near the water's edge, the drier sands further up the beach are loose. They consist of pale brown to light gray sand grains, which are a mixture of quartz sand and fragments of sea shells. The entire beach is subject to wind and tides. Rock outcrops are scattered throughout

Canaveral - Urban land complex (Cc) - The Canaveral soils are found in low dune-like areas near the coast. These soils have a water table within 10 to 40 inches of the surface for 2 to 6 months or more in an average year. They can recede to a depth of 50 inches or more during dry periods. They are poorly to moderately drained sandy soils. Permeability is rapid, with low available water capacity.

The surface layer is a dark grayish brown sand mixed with shell fragments, about 8 inches thick. The next layer is pale brown to very pale brown mixed sand and shell fragments, extending to 65 inches or more.

Cocoa - Urban land complex (CuB) - This soil type is found on narrow ridges near the Atlantic Ocean. It consists of thick sandy marine sediments over porous, coquina limestone. Permeability is rapid in all layers above the limestone. Available water levels in the upper sandy layers are very low, and low in the subsoil.

The upper layer consists of 3 inches of very dark grayish brown sand. The next 5 inches are composed of dark red sand. The next layer is loose yellowish red sand 14 inches thick. The subsoil is yellowish red, friable sand about 8 inches thick. There is a hard coquina limestone layer below the subsoil.

Palm Beach - Urban land complex (PbB) - This soil type is found on long dune ridges parallel to the Atlantic Ocean. Palm Beach soils are associated with Canaveral, Paola and St. Lucie Soils. They are similar to Canaveral soils, but have a water table deeper than 6 feet. The Palm Beach soils consist of nearly level to sloping, well drained, deep sandy soils.

The surface layer is dark grayish brown sand and shell fragments about 6 inches thick. The next layer is pale brown sand and shell fragments about 34 inches thick. The next layer consists of light yellowish brown sand and shell fragments, extending to a depth up to 80 inches or more.

Quartzipasmments (QAB) - This soil type consists of well drained, deep, sandy soils in areas where natural soils have been altered by cutting down ridges and spreading the soil material over adjacent lower soils. This is done when low areas are filled above natural ground level, and by filing and shaping soil material (i.e. to form golf courses). The sandy fill material may be hauled in from a distant location, but is usually obtained onsite by dredging nearby water areas, or by excavating to create new water areas.

Permeability is very rapid, and available water capture is low.

There is not a standard soil layer pattern for this soil type. The most common example has a surface layer of dark grayish brown sand about 6 inches thick. Next are stratified layers of gray, grayish brown, light gray, light brownish gray, and white sand in any sequence and variable thickness. The depth range of this strata is 6 to 32 inches. Below this layer is a strong brown sand 10 inches thick with some dark reddish brown fragments of weakly cemented sand. The next layer is a grayish brown sand 18 inches thick. The last layer is about 80 inches of white sand.

Tidal Swamp, Mineral (TM) - This soil type is found along the Intracoastal Waterway, and along associated estuarine rivers and lagoons. It consists of sandy marine sediments that are flooded by salt or brackish water during daily high tides. It has rapid permeability and high surface layer water capacity.

This soils surface layer is black, very dark gray, or very dark grayish brown and is 10 inches or more thick. It is a mucky sand or a mucky loamy sand. The surface layer is fibrous muck 4 to 6 inches thick. The next layer is black, very dark gray, very dark grayish brown, dark gray, gray, grayish brown, or brown sand, fine sand, or loamy sand.

The above soils data was taken from the Soils Survey of Palm Beach County Area, Florida, 1978.

Addendum 4—Plant and Animal List

COMMON NAME	*Scientific Name*	Habitat Code Listed Species
FERNS		
Golden leather fern	*Acrostichum aureum*	
Giant leather fern	*Acrostichum danaeifolium*	
Swamp fern	*Blechnum serrulatum*	
Boston fern	*Nephrolepis cordifolia* *	
Boston fern	*Nephrolepis exaltata* *	
Boston fern	*Nephrolepis multiflora* *	
Old World climbing fern	*Lygodium microphyllum*	
Golden polypody	*Phlebodium aureum*	
Whisk fern	*Psilotum nudum*	
Bracken fern	*Pteridium aquilinum var. caudatum*	
Shoestring fern	*Vittaria lineata*	
GYMNOSPERMS		
AND CYCADS		
Slash pine	*Pinus elliottii*	
MONOCOTS		
False sisal	*Agave decipiens*	
Asparagus fern	*Asparagus densiflorus* *	
Carpetgrass	*Axonopus affinis*	
Southern sandbur	*Cenchrus echinatus*	
Coastal sandbur	*Cenhrus incertus*	
Sandspur	*Cenchrus tribuloides*	
Saw grass	*Cladium jamaicensis*	
Coconut palm	*Cocos nucifera* *	
Dayflower	*Commelina diffusa*	
Dayflower	*Commelina erecta var. augustifolia*	
Umbrella sedge	*Cyperus croceus*	
False saw grass	*Cyperus ligularis*	
Beach star	*Cyperus pedunculatus*	
Umbrella sedge	*Cyperus planifolius*	
Umbrella sedge	*Cyperus polystachyos*	
Tropical flatsedge	*Cyperus surinamensis*	
Egyptian grass	*Dactyloctenium aegyptium* *	
Variable witchgrass	*Dichanthelium commutatum*	
Southern crabgrass	*Digitaria ciliaris*	
Air-potato	*Dioscorea alata*	
Finger grass	*Eustachys petraea*	
Hurricane grass	*Fimbristylis cymosa* *	

COMMON NAME	*Scientific Name*	Habitat Code Listed Species
Toothed habenaria	*Habenaria floribunda*	
Spider lily	*Hymenocallis latifolia*	
African ground orchid	*Oeceoclades maculata* *	
Guniea grass	*Panicum maximum* *	
Panic grass	*Panicum portoricense*	
Seashore paspalum	*Paspalum distichum*	
Salt joint grass	*Paspalum setaceum*	
Senegal date palm	*Phoenix reclinata* *	
Beach star	*Remirea maritima*	1
Cabbage palm	*Sabal palmetto*	
Bowstring hemp	*Sansevieria hyacinthoides* *	
Baldwin's nutrush	*Scleria baldwinii*	
Saw palmetto	*Serenoa repens*	
Foxtail grass	*Setaria parviflora*	
Foxtail grass	*Setaria macrosperma*	
Greenbrier	*Smilax auriculata*	
Bamboo vine	*Smilax laurifolia*	
Smooth cordgrass	*Spartina alterniflora*	
Saltmeadow cordgrass	*Spartina patens*	
Coral dropseed grass	*Sporobolus domingensis*	
Coastal dropseed	*Sporobolus virginicus*	
Dropseed	*Sporobolus indicus var. indicus* *	
Florida thatch palm	*Thrinax radiata*	
Common wild pine	*Tillandsia fasciculata*	
Ball moss	*Tillandsia recurvata*	
Spanish-moss	*Tillandsia usneoides*	
Giant wild pine	*Tillandsia utriculata*	
Oyster plant	*Tradescantia spathacea*	
Sea oats	*Uniola paniculata*	
Spanish bayonet	*Yucca aloifolia*	
Angiosperms–Dicots		
Rosary pea	*Abrus precatorius* *	
Earleaf acacia	*Acacia auriculiformis* *	
Barb-wire cactus	*Acanthocereus tetragonus*	3, 5, 7
Hammock snakeroot	*Ageratina jucunda*	
Common ragweed	*Ambrosia artemisiifolia*	
Notch-leaved amaranth	*Amaranthus lividus* *	
Chaff flower	*Alternanthera flavescens*	
Chaff flower	*Alternanthera maritima*	
Pepper vine	*Ampelopsis arborea*	
Black calabash	*Amphitecna latifolia* *	
Torchwood	*Amyris elemifera*	

COMMON NAME	***Scientific Name***	**Habitat Code Listed Species**
Pond apple	*Annona glabra*	
Marlberry	*Ardisia escallonioides*	
Sea lavender	*Argusia gnaphalodes*	1
Black mangrove	*Avicennia germinans*	
Salt bush	*Baccharis halimifolia*	
Spanish needle	*Bidens alba var. radiata*	
Bishopwood	*Bischofia javanica* *	
Samphire	*Blutaparon vermiculare*	
Red spiderling	*Boerhavia diffusa*	
Sea oxeye	*Borrichia frutescens*	
Gumbo limbo	*Bursera simaruba*	
Yellow nicker-bean	*Caesalpinia bonduc*	
Sea rocket	*Cakile edentula*	
Beautyberry	*Callicarpa americana*	
Bay-bean	*Canavalia rosea*	
Jamaica caper	*Capparis cynophallophora*	
Limber caper	*Capparis flexuosa*	
Papaya	*Carica papaya* *	
Love vine	*Cassytha filiformis*	
Australian pine	*Casuarina equisetifolia* *	
Madagascar periwinkle	*Catharanthus roseus**	
Coinwort	*Centella asiatica*	
	Chaemecrista nictitans var. aspera	
Blodgett's spurge	*Chamaesyce blodgettii*	
Sand dune spurge	*Chamaesyce bombensis*	
Pillpod sandmat	*Chamaesyce hirta*	
Seaside spurge	*Chamaesyce mesembryanthemifolia*	
Florida hammock sandmat	*Chamaesyce ophthalmica*	
Snowberry	*Chiococca alba*	
Jack-in-the-bush	*Chromolaena odorata*	
Cocoplum	*Chrysobalanus icaco*	
Satinleaf	*Chrysophyllum oliviforme*	7
Fiddlewood	*Citharexylum spinosum*	
Stinging nettle	*Cnidoscolus stimulosus*	
Pigeon plum	*Coccoloba diversifolia*	
Sea plum	*Coccoloba diversifolia x Coccoloba uvifera*	
Seagrape	*Coccoloba uvifera*	
Lather leaf	*Colubrina asiatica* *	
Buttonwood	*Conocarpus erecta*	
Dwarf horseweed	*Conyza canadensis var. pusilla*	
Croton	*Croton glandulosus var. glandulosus*	
Beach croton	*Croton punctatus*	
Carrotwood	*Cupaniopsis anacardiopsis* *	
Coin vine	*Dalbergia ecastophyllum*	

*** Non-Native Species**

COMMON NAME	***Scientific Name***	**Habitat Code** **Listed Species**
Royal poinciana	*Delonix regia* *	
Beggarweed	*Desmodium incanum*	
Ponyfoot	*Dichondra carolinensis*	
Persimmon	*Diospyros virginiana*	
Milkbark	*Drypetes diversifolia*	
Guiana plum	*Drypetes lateriflora*	
Devil's potato	*Echites umbellata*	
False daisy	*Eclipta prostrata*	
Tasselflower	*Emilia fosbergii* *	
Loquat	*Eriobotrya japonica* *	
Coral bean	*Erythrina herbacea*	
White stopper	*Eugenia axillaris*	
Spanish stopper	*Eugenia foetida*	
Surinam cherry	*Eugenia uniflora* *	
Dog fennel	*Eupatorium aromaticum*	
Dog fennel	*Eupatorium capillifolium*	
Inkwood	*Exothea paniculata*	
Strangler fig	*Ficus aurea*	
Florida privet	*Foresteria segregata*	
Milk pea	*Galactia macreei*	
Bedstraw	*Galium hispidulum*	
Southern gaura	*Gaura angustifolia*	
Rabbit tobacco	*Gnaphalium obtusifolium*	
Cudweed	*Gnaphalium purpureum var. falcatum*	
Blolly	*Guapira discolor*	
Shoal grass	*Halodule wrightii*	
Engelman's seagrass	*Halophila engelmannii*	
Johnson’s seagrass	*Halophila johnsonii*	
Firebush, scarletbush	*Hamelia patens*	
Rock-rose	*Helianthemum corymbosum*	
Beach sunflower	*Helianthus debilis var. debilis*	
Scorpion tail	*Heliotropium angiospermun*	
Pineland heliotrope	*Heliotropium polyphyllum*	
St. Andrew's cross	*Hypericum hypericoides*	
Moon-flower	*Ipomoea alba*	
Morning glory	*Ipomoea indica var. acuminata*	
Railroad vine	*Ipomoea pes-caprae ssp. brasiliensis*	
Bloodleaf	*Iresine diffusa*	
Beach elder	*Iva imbricata*	
Gold Coast jasmine	*Jasminum dichotonum*	
Life plant	*Kalanchoe pinnata* *	
Black ironwood	*Krugiodendron ferreum*	
Wild lettuce	*Lactuca graminifolia*	
White mangrove	*Languncularia racemosa*	

*** Non-Native Species**

COMMON NAME	***Scientific Name***	**Habitat Code Listed Species**
Lantana	*Lantana camara* *	
Wild lantana	*Lantana involucrata*	
Peppergrass	*Lepidium virginicum*	
Blue toadflax	*Linaria canadensis*	
Chinaberry	*Melia azedarach* *	
Marsh elder	*Melanthera nivea*	
	Melanthera parvifolia	
Creeping cucumber	*Melothria pendula*	
Poor man's patch	*Mentzelia floridana*	
Woodrose	*Merremia dissecta*	
Poisonwood	*Metopium toxiferum*	
Hemp vine	*Mikania cordifolia*	
Sapodilla	*Manilkara zapote*	
Wild balsam apple	*Momordica charantia* *	
Red mulberry	*Morus rubra*	
Wax myrtle	*Myrica cerifera*	
Oleander	*Nerium oleander* *	
Lancewood	*Ocotea coriacea*	
Seaside evening primrose	*Oenothera humifusa*	
Beach peanut	*Okenia hypogaea*	
Prickly pear cactus	*Opuntia humifusa*	1
Prickly pear cactus	*Opuntia stricta*	3, 5
Lady's sorrel	*Oxalis corniculata*	
Violet wood sorrel	*Oxalis debilis var. corymbosa**	
Pellitory	*Parietaria floridana*	
Virginia creeper	*Parthenocissus quinquefolia*	
Corky-stemmed passionflower	*Passiflora suberosa*	
Redbay	*Persea borbonia var. borbonia*	
Swamp bay	*Persea palustris*	
Guinea-hen weed	*Petiveria alliacea*	
Creeping charlie	*Phyla nodiflora*	
	Phyllanthus abnormis	
	Phyllanthus amarus	
	Phyllanthus tenellus *	
Hairy crabweed	*Phyllanthus urinaria* *	
Ground cherries	*Physalis walteri*	
Pokeweed	*Phytolacca americana*	
Artillery plant	*Pilea microphylla*	
Cockspur	*Pisonia aculeata*	
Blackbead	*Pithecellobium keyense*	
Wild plumbago	*Plumbago scandens*	
Wild poinsettia	*Poinsettia cyathophora*	
Fiddler’s spurge	*Poinsettia heterophylla*	

*** Non-Native Species**

COMMON NAME	*Scientific Name*	Habitat Code Listed Species
Milkwort	*Polygala grandiflora*	
Water pepper	*Polygonum hydropiperoides*	
Rustweed	*Polypremum procumbens*	
Purslane	*Portulaca oleracea*	
Pink purslane	*Portulaca pilosa*	
Guava	*Psidium guajava* *	
Wild coffee	*Psychotria nervosa*	
Wild coffee	*Psychotria sulzneri*	
Mock bishopweed	*Ptilimnium capillaceum*	
Laurel oak	*Quercus laurifolia*	
Live oak	*Quercus virginiana*	
White indigo-berry	*Randia aculeata*	
Myrsine	*Rapanea punctata*	
Red mangrove	*Rhizophora mangle*	
Brown haired snoutbean	*Rhynchosia cinerea*	
Rougeberry	*Rivina humilis*	
Woody glasswort	*Salicornia perennis*	
Saltwort	*Salsola kali ssp. pontice* *	
Southern elderberry	*Sambucus canadensis*	
Milkweed vine	*Sarcostemma clausum**	
Inkberry	*Scaevola plumieri*	
Beach naupaka	*Scaevola sericea* *	
Umbrella tree	*Schefflera actinophylla*	
Brazilian pepper	*Schinus terebinthifolius* *	
Gulf graytwig	*Schoepfia chrysophylloides*	
Sea purslane	*Sesuvium portulacastrum*	
Broomweed	*Sida acuta*	
	Sida elliottii	
Indian hemp	*Sida rhombifolia*	
Mastic	*Sideroxylon foetidissimum*	
Willow bustic	*Sideroxylon salicifolia*	
Tough buckhorn	*Sideroxylon tenax*	
Paradise tree	*Simarouba glauca*	
Bahama nightshade	*Solanum bahamense*	
Goldenrod	*Solidago chapmanii*	
Goldenrod	*Solidago stricta*	
Necklace-pod	*Sophora tomentosa*	
Large leaf buttonweed	*Spermacoce assurgens*	
Sea blite	*Suaeda linearis*	
Bay-cedar	*Suriana maritima*	1
Java plum	*Syzygium cumini* *	
Turtle grass	*Thalassia testudinum*	
Seaside mahoe	*Thespesia populnea* *	
Poison ivy	*Toxicodendron radicans*	

*** Non-Native Species**

COMMON NAME	***Scientific Name***	**Habitat Code Listed Species**
Puncture weed	*Tribulus cistoides* *	
Blue curls	*Trichostema suffrutescens*	
Caesar's weed	*Urena lobata*	
Highbush blueberry	*Vaccinium corymbosum*	
Frostweed	*Verbesina virginica*	
Cow-pea	*Vigna luteola*	
	Vitis cinerea var. floridana	
Southern fox grape	*Vitis munsoniana*	
Muscadine grape	*Vitis rotundifolia*	
Calusa grape	*Vitis shuttleworthii*	
Wedelia	*Wedelia trilobata* *	
Hog-plum	*Ximenia americana*	
Hercules club	*Zanthoxylum clava-herculis*	
Wild lime	*Zanthoxylum fagara*	

*** Non-Native Species**

COMMON NAME	*Scientific Name*	Habitat Code All Species
Invertebrates		
Florida fighting conch	*Strombus alatus*	69, 78
Queen conch	*Strombus gigas*	69, 78
Florida crown conch	*Melogones corona*	69, 78
Rigid pen shell	*Atrina rigada*	69, 77, 78
American oyster	*Crassostrea virginica*	59, 64, 69, 78
Quahog	*Merceneria* sp.	59, 69, 78
Atlantic ribbed mussel	*Geukensia demissa*	59, 64, 69, 78
Barnacle	*Balanus amphitrite*	69, 78
Horshoe crab	*Limulus polyphemus*	59, 69, 78
Honeybee	*Apis mellifera*	Throughout Uplands
Sand fly	*Phlebotomus* sp.	1, 7
Mosquito	*Culex* spp. and others	Throughout
Golden orb weaver	*Nephila clavipes*	7
Spiny orb weaver	*Gasteracantha elipsoides*	7
Pink shrimp	*Penaeus duorarum*	59, 64, 69, 77
Sand flea	*Emerita talpodia*	69, 78
Fiddler crab	*Uca minax*	64
Fiddler crab	*Uca pugilator*	64
Fiddler crab	*Uca pugnax*	64
Mangrove crab	*Aratus pisonii*	64
Great land crab	*Cardisoma guanhumii*	7, 64
Land hermit crab	*Coenobita clypeatus*	7, 64
Hermit crab	*Pagarus annulipes*	59, 64, 69, 78
Striped hermit crab	*Clibinarius vittatus*	59, 64, 69, 78
Blue crab	*Callinecties sapidus*	59, 64, 69, 77, 78
Speckled crab	*Arenaeus cribrarius*	59, 64, 69, 77, 78
Stone crab	*Menippe mercenaria*	59, 64, 69, 77, 78
Ghost crab	*Ocypode quadrata*	1
Fish		
Nurse shark	*Ginglymostoma cirratum*	59, 64, 77
Bull shark	*Charcharhinus leucas*	59, 64, 77
Blacktip shark	*Charcharhinus limbatus*	59, 64, 77
Southern stingray	*Dasyatis americana*	59, 64, 77
Bluntnose ray	*Dasyatis sayi*	59, 64, 77
Ladyfish	*Elops saurus*	59, 64, 77

COMMON NAME	*Scientific Name*	Habitat Code All Species
Tarpon	*Megalops atlantica*	59, 64, 77
American eel	*Anguilla rostrata*	59, 64, 77
Scaled sardine	*Harengula jaguana*	59, 64, 77
Bay anchovy	*Anchoa mitchilli*	59, 64, 77
Atlantic needlefish	*Strongylura marina*	59, 64, 77
Redfin needlefish	*Strongylura notata*	59, 64, 77
Marsh killifish	*Fundulus confluentus*	59, 64, 77
Gulf killifish	*Fundulus grandis*	59, 64, 77
Dusky pipefish	*Syngnathus floridae*	59, 64, 77
Gulf pipefish	*Syngnathus scovelli*	59, 64, 77
Snook	*Centropomus undecimalis*	59, 64, 77
Inshore lizardfish	*Synodus foetens*	59, 64, 77
Hardhead catfish	*Arius felis*	59, 64, 77
Bluefish	*Pomatomus saltatrix*	59, 64, 77
Fringed filefish	*Monacanthus ciliatus*	59, 64, 77
Planehead filefish	*Monacanthus hispidus*	59, 64, 77
Leatherjacket	*Oligoplites sauras*	59, 64, 77
Tripletail	*Lobotes surinamensis*	59, 64, 77
Sailors choice	*Haemulon parrai*	59, 64, 77
Bluestriped grunt	*Haemulon sciurus*	59, 64, 77
Bluelip parrotfish	*Cryptotmus roseus*	59, 64, 77
Great barracuda	*Sphyraenidae barracuda*	59, 64, 77
Banded blenny	*Paraclinus fasciatus*	59, 64, 77
Blackcheek tonguefish	*Symphurus plagiusa*	59, 64, 77
Checkered puffer	*Sphoeroides testudineus*	59, 64, 77
Striped burrfish	*Chilomycterus schoepfi*	59, 64, 77
Crevalle jack	*Caranx hippos*	59, 64, 77
Lookdown	*Selene vomer*	59, 64, 77
Permit	*Trachinotus falcatus*	59, 64, 77
Mutton snapper	*Lutjanus analis*	59, 64, 77
Schoolmaster	*Lutjanus apodus*	59, 64, 77
Gray snapper	*Lutjanus griseus*	59, 64, 77
Irish pompano	*Diapterus olisthostomus*	59, 64, 77
Striped mojarra	*Diapterus plumieri*	59, 64, 77
Spotfin mojarra	*Eucinostomus argenteus*	59, 64, 77
Silver jenny	*Eucinostomus gula*	59, 64, 77
Mottled mojarra	*Eucinostomus lefroyi*	59, 64, 77
Slender mojarra	*Eucinostomus pseudogula*	59, 64, 77
Sheepshead	*Archosargus probatocephalus*	59, 64, 77
Sea bream	*Archosargus probatocephalus*	59, 64, 77
Pinfish	*Lagodon rhomboides*	59, 64, 77
Pigfish	*Orthopristis chrysoptera*	59, 64, 77
Spotted seatrout	*Cynoscion nebulosus*	59, 64, 77
Red drum	*Sciaenops ocellatus*	59, 64, 77

*** Non-Native Species**

COMMON NAME	*Scientific Name*	Habitat Code All Species
Striped mullet	*Mugil cephalus*	59, 64, 77
White mullet	*Mugil curema*	59, 64, 77
Southern flounder	*Paralichthys lethostigma*	59, 64, 77
Lined sole	*Arcirus lineatus*	59, 64, 77
Amphibians		
Southern toad	*Bufo terrestris*	7
Cuban treefrog	*Osteopilus septentrionalis* *	7, 81, 82
Reptiles		
Atlantic loggerhead turtle	*Caretta caretta*	1, 69, 77, 78
Atlantic green turtle	*Chelonia mydas*	1, 69, 77, 78
Atlantic leatherback turtle	*Dermochelys coriacea*	1, 69, 77, 78
Hawksbill turtle	*Eretmochelys imbricata*	77, 78
Kemp's Ridley turtle	*Lepidochelys kempi*	77, 78
Gopher tortoise	*Gopherus polyphemus*	7
Indo-pacific gecko	*Hemidactylus garnotii* *	81
Green anole	*Anolis carolinensis*	1, 7
Cuban brown anole	*Anolis sagrei* *	1, 7
Ground skink	*Scincella lateralis*	7
Southeastern five-lined skink	*Eumeces inexpectatus*	7
Six-lined racerunner	*Cnemidophorous sexlineatus sexlineatus*	1, 7
Southern black racer	*Coluber constrictor priapus*	1, 7
Corn snake	*Elaphe guttata*	7
Yellow rat snake	*Elaphe obsoleta quadrivittata*	7
Scarlet kingsnake	*Lampropeltis triangulum elapsoides*	7
Eastern coachwhip	*Masticophis flagellum flagellum*	1, 7
Dusky pigmy rattlesnake	*Sistrurus miliarius*	7
Eastern diamondback rattlesnake	*Crotalus adamenteus*	7
Birds		
Common loon	*Gavia immer*	59, 69, 77, 78
Pied-billed grebe	*Podilymbus podiceps*	59
Brown pelican	*Pelecanus occidentalis*	59, 69, 77, 78
Double-crested cormorant	*Phalacrocorax auritus*	59, 64, 69, 77, 78
Anhinga	*Anhinga anhinga*	59, 64
Great egret	*Ardea alba*	59, 64
Great blue heron	*Ardea herodias*	59, 64
Cattle egret	*Bubulcus ibis*	64

COMMON NAME	*Scientific Name*	Habitat Code All Species
Green heron	*Butorides virescens*	64
Little blue heron	*Egretta caerulea*	59, 64
Reddish egret	*Egretta rufescens*	59, 64
Snowy egret	*Egretta thula*	59, 64
Tricolored heron	*Egretta tricolor*	59, 64
Yellow-crowned night heron	*Nyctanassa violacea*	1, 59, 64
Black-crowned night heron	*Nycticorax nycticorax*	59, 64
Roseate spoonbill	*Ajaia ajaja*	59, 64
White ibis	*Eudocimus albus*	59, 64
Wood stork	*Mycteria americana*	59, 64
Turkey vulture	*Cathartes aura*	Throughout
Black vulture	*Coragyps atratus*	Throughout
Lesser scaup	*Aythya affinis*	59
White-winged scoter	*Melanitta deglandi*	69, 77, 78
Surf scoter	*Melanitta perspicillata*	69, 77, 78
Red-breasted merganser	*Mergus serrator*	59
Sharp-shinned hawk	*Accipiter striatus*	Throughout Uplands
Cooper's hawk	*Accipiter cooperii*	Throughout Uplands
Red-shouldered hawk	*Buteo lineatus*	Throughout Uplands
Red-tailed hawk	*Buteo jamaicensis*	Throughout Uplands
Osprey	*Pandion haliaetus*	1, 59, 69, 77, 78
Merlin	*Falco columbarius*	Throughout Uplands
Peregrine falcon	*Falco peregrinus*	Throughout Uplands
American kestrel	*Falco sparverius*	Throughout Uplands
American coot	*Fulica americana*	59
Clapper rail	*Rallus longirostris*	64
American oystercatcher	*Haematopus palliatus*	59, 64
Semi-palmated plover	*Charadrius semipalmatus*	1, 64
Killdeer	*Charadrius vociferus*	1, 64, 81
Wilson's plover	*Charadrius wilsonia*	1, 64
Black-bellied plover	*Pluvialis squatarola*	1, 64
Ruddy turnstone	*Arenaria interpres*	1, 64
Spotted sandpiper	*Actitus macularia*	1, 64
Sanderling	*Calidris alba*	1, 64
Dunlin	*Calidris alpina*	1, 64
Western sandpiper	*Calidris mauri*	1, 64

*** Non-Native Species**

COMMON NAME	*Scientific Name*	Habitat Code All Species
Least sandpiper	*Calidris minutilla*	1, 64
Semi-palmated sandpiper	*Calidris pusilla*	1, 64
Short-billed dowitcher	*Limnodromus griseus*	1, 64
Willet	*Catoptrophorus semipalmatus*	1, 64
Lesser yellowlegs	*Tringa flavipes*	1, 64
Greater yellowlegs	*Tringa melanoleuca*	1, 64
Laughing gull	*Larus articulla*	1, 59, 64, 69, 77, 78
Ring-billed gull	*Larus delawarensis*	1, 59, 64, 69, 77, 78
Great black-backed gull	*Larus marinus*	1, 59, 64, 69, 77, 78
Black skimmer	*Rynchops niger*	1, 59
Least tern	*Sterna antillarum*	1, 59, 69, 77, 78
Forster's tern	*Sterna forsteri*	1, 59, 69, 77, 78
Royal tern	*Sterna maxima*	1, 59, 69, 77, 78
Sandwich tern	*Sterna sandvicensis*	1, 59, 69, 77, 78
Rock dove	*Columbia livia* *	Throughout Uplands
Ground dove	*Columbina passerina*	Throughout Uplands
Mourning dove	*Zenaida macroura*	Throughout Uplands
Yellow-billed cuckoo	*Coccyzus americanus*	Throughout Uplands
Smooth-billed ani	*Crotophaga ani*	Throughout Uplands
Great horned owl	*Bubo virginianus*	Throughout Uplands
Eastern screech owl	*Otus asio*	Throughout Uplands
Chuck-will's widow	*Caprimulgus carolinensis*	Throughout Uplands
Common nighthawk	*Chordeiles minor*	Throughout Uplands
Belted kingfisher	*Ceryle alcyon*	59, 64
Northern flicker	*Colaptes auratus*	Throughout Uplands
Pileated woodpecker	*Dryocopus pileatus*	Throughout

*** Non-Native Species**

COMMON NAME	*Scientific Name*	Habitat Code All Species
		Uplands
Red-bellied woodpecker	*Melanerpes carolinus*	Throughout Uplands
Downy woodpecker	*Picoides pubescens*	Throughout Uplands
Great-crested flycatcher	*Myiarchus crinitus*	Throughout Uplands
Eastern kingbird	*Tyrannus tyrannus*	Throughout Uplands
Barn swallow	*Hirundo rustica*	Throughout
Purple martin	*Progne subis*	Throughout
Tree swallow	*Tachycineta bicolor*	Throughout
Fish crow	*Corvus ossifragus*	Throughout
Blue jay	*Cyanocitta cristata*	Throughout Uplands
Carolina wren	*Thryothorus ludovicianus*	Throughout Uplands
House wren	*Troglodytes aedon*	Throughout Uplands
Blue-gray gnatcatcher	*Polioptila caerulea*	Throughout Uplands
American robin	*Turdus migratorius*	Throughout Uplands
Gray catbird	*Dumetella carolinensis*	Throughout Uplands
Northern mockingbird	*Mimus polyglottos*	Throughout Uplands
Brown thrasher	*Toxostoma rurum*	Throughout Uplands
European starling	*Sturnus vulgaris* *	Throughout Uplands
Black-whiskered vireo	*Vireo altiloquus*	Throughout Uplands
White-eyed vireo	*Vireo griseus*	Throughout Uplands
Red-eyed vireo	*Vireo olivaceus*	Throughout Uplands
Solitary vireo	*Vireo solitarius*	Throughout Uplands
Red-winged blackbird	*Agelaius phoeniceus*	Throughout
Northern cardinal	*Cardinalis cardinalis*	Throughout Uplands
Black-throated blue warbler	*Dendroica caerulescens*	Throughout Uplands

*** Non-Native Species**

COMMON NAME	*Scientific Name*	Habitat Code All Species
Yellow-rumped warbler	*Dendroica coronat*	Throughout Uplands
Prairie warbler	*Dendroica discolor*	Throughout Uplands
Yellow-throated warbler	*Dendroica dominica*	Throughout Uplands
Palm warbler	*Dendroica palmarum*	Throughout Uplands
Cape May warbler	*Dendroica tigrina*	Throughout Uplands
Common yellowthroat	*Geothylpis trichas*	Throughout Uplands
Black-and-white warbler	*Mniotilta varia*	Throughout Uplands
Northern parula	*Parula americana*	Throughout Uplands
Painted bunting	*Passerina ciris*	Throughout Uplands
Boat-tailed grackle	*Quiscalus major*	Throughout
Common grackle	*Quiscalus quiscula*	Throughout
Ovenbird	*Seirus aurocapillus*	Throughout Uplands
American redstart	*Setophaga ruticalla*	Throughout Uplands
Mammals		
Opossum	*Didelphis marsupialis*	Throughout Uplands
Nine-banded armadillo	*Dasypus novemcinctus**	Throughout Uplands
Eastern cottontail	*Sylvilagus floridanus floridanus*	Throughout Uplands
Marsh rabbit	*Sylvilagus palustris*	Throughout
Gray squirrel	*Scirurus carolinensis*	Throughout
Hispid cotton rat	*Sigmodon hispidus*	Throughout
Gray fox	*Urocyon cineroargenteus*	Throughout
Raccoon	*Procyon lotor*	Throughout
Eastern spotted skunk	*Spilogale putoris*	Throughout Uplands
West Indian manatee	*Trichecus manatus latirostris*	59, 69, 77
Atlantic bottle-nose dolphin	*Tursiops truncatus*	59, 69, 77

*** Non-Native Species**

Terrestrial
1. Beach Dune
2. Bluff
3. Coastal Berm
4. Coastal Rock Barren
5. Coastal Strand
6. Dry Prairie
7. Maritime Hammock
8. Mesic Flatwoods
9. Coastal Grasslands
10. Pine Rockland
11. Prairie Hammock
12. Rockland Hammock
13. Sandhill
14. Scrub
15. Scrubby Flatwoods
16. Shell Mound
17. Sinkhole
18. Slope Forest
19. Upland Glade
20. Upland Hardwood Forest
21. Upland Mixed Forest
22. Upland Pine Forest
23. Xeric Hammock

Palustrine
24. Basin Marsh
25. Basin Swamp
26. Baygall
27. Bog
28. Bottomland Forest
29. Depression Marsh
30. Dome
31. Floodplain Forest
32. Floodplain Marsh
33. Floodplain Swamp
34. Freshwater Tidal Swamp
35. Hydric Hammock
36. Marl Prairie
37. Seepage Slope
38. Slough
39. Strand Swamp
40. Swale
41. Wet Flatwoods
42. Wet Prairie

Lacustrine
43. Clastic Upland Lake
44. Coastal Dune Lake
45. Coastal Rockland Lake
46. Flatwood/Prairie Lake

Lacustrine—Continued
47. Marsh Lake
48. River Floodplain Lake
49. Sandhill Upland Lake
50. Sinkhole Lake
51. Swamp Lake

Riverine
52. Alluvial Stream
53. Blackwater Stream
54. Seepage Stream
55. Spring-Run Stream

Estuarine
56. Estuarine Composite Substrate
57. Estuarine Consolidated Substrate
58. Estuarine Coral Reef
59. Estuarine Grass Bed
60. Estuarine Mollusk Reef
61. Estuarine Octocoral Bed
62. Estuarine Sponge Bed
63. Estuarine Tidal Marsh
64. Estuarine Tidal Swamp
65. Estuarine Unconsolidated Substrate
66. Estuarine Worm Reef

Marine
67. Marine Algal Bed
68. Marine Composite Substrate
69. Marine Consolidated Substrate
70. Marine Coral Reef
71. Marine Grass Bed
72. Marine Mollusk Reef
73. Marine Octocoral Bed
74. Marine Sponge Bed
75. Marine Tidal Marsh
76. Marine Tidal Swamp
77. Marine Unconsolidated Substrate
78. Marine Worm Reef

Subterranean
79. Aquatic Cave
80. Terrestral Cave

Miscellaneous
81. Ruderal
82. Developed

MTC Many Types Of Communities

OF Overflying

Addendum 5—Designated Species List

RANK EXPLANATIONS FOR FNAI GLOBAL RANK, FNAI STATE RANK, FEDERAL STATUS AND STATE STATUS

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 man-made 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 and 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 and 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)

RANK EXPLANATIONS FOR FNAI GLOBAL RANK, FNAI STATE RANK, FEDERAL STATUS AND STATE STATUS

LEGAL STATUS

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

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 which 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 which is likely to become an endangered species within the foreseeable 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 as a consequence is destined or very likely to become an endangered species within the foreseeable 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 which, in the foreseeable 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.

John D. MacArthur Beach State Park

Designated Species

Plants

DESIGNATED SPECIES STATUS

Common Name	***Scientific Name***	**FDACS**	**USFWS**	**FNAI**
Giant wild pine	*Tillandsia utricularia*	E		
Beach star	*Cyperus pedunculatus*	E		
Sea lavender	*Argusia gnaphalodes*			G4, S3
Barb-wire cactus	*Acanthocereus tetragonus*	E		
Prickly pear cactus	*Opuntia stricta*	T		
Inkberry	*Scaevola plumieri*	T		
Beach peanut	*Okenia hypogaea*			G3, S2

John D. MacArthur Beach State Park

Designated Species

Plants

	DESIGNATED SPECIES STATUS

John D. MacArthur Beach State Park

Designated Species

Animals

DESIGNATED SPECIES STATUS

Common Name	*Scientific Name*	FFWCC	USFWS	FNAI
FISH				
Common snook	*Centropomus undecimalis*	SSC		S2
REPTILES				
Atlantic loggerhead turtle	*Caretta caretta*	T	T	G3, S3
Atlantic green turtle	*Chelonia mydas*	E	E	G3, S2
Atlantic leatherback turtle	*Dermochelys coriacea*	E	E	G3, S2
Hawksbill turtle	*Eretmochelys imbricata*	E	E	G3, S2
Kep's Ridley turtle	*Lepidochelys kempi*	E	E	G3, S2
Gopher tortoise	*Gopherus polyphemus*	SSC		G3, S3
BIRDS				
Great egret	*Ardea alba*			G5, S4
Little Blue Heron	*Egretta caerulea*	SSC		G5, S4
Reddish egret	*Egretta rufescens*	SSC		G4, S2
Snowy egret	*Egretta thula*	SSC		G5, S4
Tricolored Heron	*Egretta tricolor*	SSC		G5, S4
White Ibis	*Eudocimus albus*	SSC		G5, S4
Merlin	*Falco columbarius*			G5, S?
Peregrine falcon	*Falco peregrinus tundrius*	E		G4, S2
American kestrel	*Falco sparverius*			G5, S3?
American oystercatcher	*Haematopus palliatus*	SSC		G5, S3

John D. MacArthur Beach State Park

Designated Species

Animals

DESIGNATED SPECIES STATUS

Common Name	***Scientific Name***	**FFWCC**	**USFWS**	**FNAI**
Wood Stork	*Mycteria americana*	E	E	G4, S2
Eastern brown pelican	*Pelecanus occidentalis*	SSC		G4, S3
Black skimmer	*Rynchops niger*	SSC		G5, S3
Least tern	*Sterna antillarum*	T		G4, S3
MAMMALS				
West Indian manatee	*Trichecus manatus latirostris*	E	E	G2, S2

Addendum 6—Priority Schedule And Cost Estimates

Estimates are developed for the funding and staff resources needed to implement the management plan based on goals, objectives and priority management activities. Funding priorities for all state park management and development activities are reviewed each year as part of the Division's legislative budget process. The Division prepares an annual legislative budget request based on the priorities established for the entire state park system. The Division also aggressively pursues a wide range of other funds and staffing resources, such as grants, volunteers, and partnerships with agencies, local governments and the private sector for supplementing normal legislative appropriations to address unmet needs. The ability of the Division to implement the specific goals, objectives and priority actions identified in this plan will be determined by the availability of funding resources for these purposes.

Natural and Cultural Resources - Ongoing Activities (Per annum basis)

1. Sea Turtles - Educate the public using staff and volunteers to conduct approximately 12 Turtle Walks per year. These programs enhance protection of marine turtles by making the public aware of the status of threats against these animals. Staff time is 2 staff times 4 hours each per walk times $22.00 per hour. **Total cost: $2,112**

2. Sea Turtle Index Nesting Surveys - conducted daily by staff for approximately 150 days per season. Surveys are used to determine the status of nesting marine turtles in Florida. This unit is one of 35 beaches used in the official survey. Staff time is approximately 3 hour per day times $22.00 per day. **Total cost: $9,900**

3. Beach Erosion Study - conducted monthly to monitor the attrition and/or growth of the beach. Photo points taken twice per year. Staff time is two staff for 2 hours per month. **Total cost: $1,056**

4. Beach Patrol/Cleanup - daily activity by staff to monitor human encroachment on dunes, remove debris that washes ashore that impedes wildlife and enforce and interpret rules for the overall protection of the resources. **Total cost: $4,400**

5. Exotic Removal - Remove non-native vegetation from various zones throughout the park on a routine basis. This is done in conjunction with regular duties. Time varies from month to month. On the average 600 hours per year. **Total cost: $13,200**

Additional Projects/Equipment Should Funding Allow

6. Exotic Removal at Munyon Island by Contractor - follow up on the restoration project on this island is critical to prevent growth of exotic vegetation. Staffing limitations due to routine operational demands do not allow adequate follow-up. Contract follow up is prudent. The cost would be approximately 30 acres times $1200 per acre. **Total cost: $36,000**

7. Exotic removal of Brazilian pepper in hammock. **Total cost $25,000**

8. Archeological survey of midden sites within Park. **Total cost: $10,000**

9. Meet staffing needs associated with routine maintenance, visitor services and park operations. 0-10 years. **Total cost per year $75,652**

*** Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.**

John D. MacArthur Beach State Park

Priority Schedule And Cost Estimates

Capital Improvements

Development Area or Facility	Cost
Environmental Education Facility	$400,000.00
Wildlife Boardwalk and Overlook	84,000.00
Munyon Island Development	2,578,000.00
Support Facilities	1,838,600.00
Total w/ contingency	**$ 5,880,720.00**

*** Categories of the uniform cost accounting system not reflected in this addendum, have no schedule or cost associated with them.**

Addendum 7—Additional Information

FNAI Descriptions

DHR Cultural Management Statement

And

Land Management Review Report

Descriptions Of Natural Communities Developed By FNAI

This summary presents the hierarchical classification and brief descriptions of 82 Natural Communities developed by Florida Natural Areas Inventory and identified as collectively constituting the original, natural biological associations of Florida.

A Natural Community is defined as a distinct and recurring assemblage of populations of plants, animals, fungi and microorganisms naturally associated with each other and their physical environment. For more complete descriptions, see Guide to the Natural Communities of Florida, available from Florida Department of Natural Resources.

The levels of the hierarchy are:

Natural Community Category - defined by hydrology and vegetation.

Natural Community Groups - defined by landform, substrate, and vegetation.

Natural Community Type - defined by landform and substrate; soil moisture condition; climate; fire; and characteristic vegetation.

TERRESTRIAL - Upland habitats dominated by plants which are not adapted to anaerobic soil conditions imposed by saturation or inundation for more than 10% of the growing season.

XERIC UPLANDS - very dry, deep, well-drained hills of sand with xeric-adapted vegetation.

Sandhill - upland with deep sand substrate; xeric; temperate; frequent fire (2-5 years); longleaf pine and/or turkey oak with wiregrass understory.

Scrub - old dune with deep fine sand substrate; xeric; temperate or subtropical; occasional or rare fire (20 - 80 years); sand pine and/or scrub oaks and/or rosemary and lichens.

Xeric Hammock - upland with deep sand substrate; xeric-mesic; temperate or subtropical; rare or no fire; live oak and/or sand live oak and/or laurel oak and/or other oaks, sparkleberry, saw palmetto.

COASTAL UPLANDS - substrate and vegetation influenced primarily by such coastal (maritime) processes as erosion, deposition, salt spray, and storms.

Beach Dune - active coastal dune with sand substrate; xeric; temperate or subtropical; occasional or rare fire; sea oats and/or mixed salt-spray tolerant grasses and herbs.

Coastal Berm - old bar or storm debris with sand/shell substrate; xeric-mesic; subtropical or temperate; rare or no fire; buttonwood, mangroves, and/or mixed halophytic herbs and/or shrubs and trees.

Coastal Grassland - coastal flatland with sand substrate; xeric-mesic; subtropical or temperate;

occasional fire; grasses, herbs, and shrubs with or without slash pine and/or cabbage palm.

Coastal Rock Barren - flatland with exposed limestone substrate; xeric; subtropical; no fire; algae, mixed halophytic herbs and grasses, and/or cacti and stunted shrubs and trees.

Coastal Strand - stabilized coastal dune with sand substrate; xeric; subtropical or temperate; occasional or rare fire; dense saw palmetto and/or seagrape and/or mixed stunted shrubs, yucca, and cacti.

Maritime Hammock - stabilized coastal dune with sand substrate; xeric-mesic; subtropical or temperate; rare or no fire; mixed hardwoods and/or live oak.

Shell Mound - Indian midden with shell substrate; xeric-mesic; subtropical or temperate; rare or no fire; mixed hardwoods.

MESIC UPLANDS - dry to moist hills of sand with varying amounts of clay, silt or organic material; diverse mixture of broadleaved and needleleaved temperate woody species.

Bluff - steep slope with rock, sand, and/or clay substrate; hydric-xeric; temperate; sparse grasses, herbs and shrubs.

Slope Forest - steep slope on bluff or in sheltered ravine; sand/clay substrate; mesic-hydric; temperate; rare or no fire; magnolia, beech, spruce pine, Shumard oak, Florida maple, mixed hardwoods.

Upland Glade - upland with calcareous rock and/or clay substrate; hydric-xeric; temperate; sparse mixed grasses and herbs with occasional stunted trees and shrubs, e.g., eastern red cedar.

Upland Hardwood Forest - upland with sand/clay and/or calcareous substrate; mesic; temperate; rare or no fire; spruce pine, magnolia, beech, pignut hickory, white oak, and mixed hardwoods.

Upland Mixed Forest - upland with sand/clay substrate; mesic; temperate; rare or no fire; loblolly pine and/or shortleaf pine and/or laurel oak and/or magnolia and spruce pine and/or mixed hardwoods.

Upland Pine Forest - upland with sand/clay substrate; mesic-xeric; temperate; frequent or occasional fire; longleaf pine and/or loblolly pine and/or shortleaf pine, southern red oak, wiregrass.

ROCKLANDS - low, generally flat limestone outcrops with tropical vegetation; or limestone exposed through karst activities with tropical or temperate vegetation.

Pine Rockland - flatland with exposed limestone substrate; mesic-xeric; subtropical; frequent fire; south Florida slash pine, palms and/or hardwoods, and mixed grasses and herbs.

Rockland Hammock - flatland with limestone substrate; mesic; subtropical; rare or no fire; mixed tropical hardwoods, often with live oak.

Sinkhole - karst feature with steep limestone walls; mesic-hydric; subtropical or temperate; no fire; ferns, herbs, shrubs, and hardwoods.

MESIC FLATLANDS - flat, moderately well-drained sandy substrates with admixture of organic material, often with a hard pan.

Dry Prairie - flatland with sand substrate; mesic-xeric; subtropical or temperate; annual or frequent fire; wiregrass, saw palmetto, and mixed grasses and herbs.

Mesic Flatwoods - flatland with sand substrate; mesic; subtropical or temperate; frequent fire; slash pine and/or longleaf pine with saw palmetto, gallberry and/or wiregrass or cutthroat grass understory.

Prairie Hammock - flatland with sand/organic soil over marl or limestone substrate; mesic; subtropical; occasional or rare fire; live oak and/or cabbage palm.

Scrubby Flatwoods - flatland with sand substrate; xeric-mesic; subtropical or temperate; occasional fire; longleaf pine or slash pine with scrub oaks and wiregrass understory.

PALUSTRINE - Wetlands dominated by plants adapted to anaerobic substrate conditions imposed by substrate saturation or inundation during 10% or more of the growing season. Includes non-tidal wetlands; tidal wetlands with ocean derived salinities less than 0.5 ppt and dominance by salt-intolerant species; small (less than 8 ha), shallow (less than 2 m deep at low water) water bodies without wave-formed or bedrock shoreline; and inland brackish or saline wetlands.

WET FLATLANDS - flat, poorly drained sand, marl or limestone substrates.

Hydric Hammock - lowland with sand/clay/organic soil, often over limestone; mesic-hydric; subtropical or temperate; rare or no fire; water oak, cabbage palm, red cedar, red maple, bays, hackberry, hornbeam, blackgum, needle palm, and mixed hardwoods.

Marl Prairie - flatland with marl over limestone substrate; seasonally inundated; tropical; frequent to no fire; sawgrass, spikerush, and/or mixed grasses, sometimes with dwarf cypress.

Wet Flatwoods - flatland with sand substrate; seasonally inundated; subtropical or temperate; frequent fire; vegetation characterized by slash pine or pond pine and/or cabbage palm with mixed grasses and herbs.

Wet Prairie - flatland with sand substrate; seasonally inundated; subtropical or temperate; annual or frequent fire; maidencane, beakrush, spikerush, wiregrass, pitcher plants, St. John's wort, mixed herbs.

SEEPAGE WETLANDS - sloped or flat sands or peat with high moisture levels maintained by downslope seepage; wetland and mesic woody and/or herbaceous vegetation.

Baygall - wetland with peat substrate at base of slope; maintained by downslope seepage, usually saturated and occasionally inundated; subtropical or temperate; rare or no fire; bays and/or dahoon holly and/or red maple and/or mixed hardwoods.

Seepage Slope - wetland on or at base of slope with organic/sand substrate; maintained by downslope seepage, usually saturated but rarely inundated; subtropical or temperate; frequent or occasional fire; sphagnum moss, mixed grasses and herbs or mixed hydrophytic shrubs.

FLOODPLAIN WETLANDS - flat, alluvial sand or peat substrates associated with flowing water courses and subjected to flooding but not permanent inundation; wetland or mesic woody and herbaceous vegetation.

Bottomland Forest - flatland with sand/clay/organic substrate; occasionally inundated; temperate; rare or no fire; water oak, red maple, beech, magnolia, tuliptree, sweetgum, bays, cabbage palm, and mixed hardwoods.

Floodplain Forest - floodplain with alluvial substrate of sand, silt, clay or organic soil; seasonally inundated; temperate; rare or no fire; diamondleaf oak, overcup oak, water oak, swamp chestnut oak, blue palmetto, cane, and mixed hardwoods.

Floodplain Marsh - floodplain with organic/sand/alluvial substrate; seasonally inundated; subtropical; frequent or occasional fire; maidencane, pickerelweed, sagittaria spp., buttonbush, and mixed emergents.

Floodplain Swamp - floodplain with organic/alluvial substrate; usually inundated; subtropical or temperate; rare or no fire; vegetation characterized by cypress, tupelo, black gum, and/or pop ash.

Freshwater Tidal Swamp - river mouth wetland, organic soil with extensive root mat; inundated with freshwater in response to tidal cycles; rare or no fire; cypress, bays, cabbage palm, gums and/or cedars.

Slough - broad, shallow channel with peat over mineral substrate; seasonally inundated, flowing water; subtropical; occasional or rare fire; pop ash and/or pond apple or water lily.

Strand Swamp - broad, shallow channel with peat over mineral substrate; seasonally inundated, flowing water; subtropical; occasional or rare fire; cypress and/or willow.

Swale - broad, shallow channel with sand/peat substrate; seasonally inundated, flowing water; subtropical or temperate; frequent or occasional fire; sawgrass, maidencane, pickerelweed, and/or mixed emergents.

BASIN WETLANDS - shallow, closed basin with outlet usually only in time of high water; peat or sand substrate, usually inundated; wetland woody and/or herbaceous vegetation.

Basin Marsh - large basin with peat substrate; seasonally inundated; temperate or subtropical; frequent fire; sawgrass and/or cattail and/or buttonbush and/or mixed emergents.

Basin Swamp - large basin with peat substrate; seasonally inundated, still water; subtropical or temperate; occasional or rare fire; vegetation characterized by cypress, blackgum, bays and/or mixed hardwoods.

Bog - wetland on deep peat substrate; moisture held by sphagnum mosses, soil usually saturated, occasionally inundated; subtropical or temperate; rare fire; sphagnum moss and titi and/or bays and/or dahoon holly, and/or mixed hydrophytic shrubs.

Coastal Interdunal Swale - long narrow depression wetlands in sand/peat-sand substrate; seasonally inundated, fresh to brackish, still water; temperate; rare fire; graminoids and mixed wetland forbs.

Depression Marsh - small rounded depression in sand substrate with peat accumulating toward center; seasonally inundated, still water; subtropical or temperate; frequent or occasional fire; maidencane, fire flag, pickerelweed, and mixed emergents, may be in concentric bands.

Dome Swamp - rounded depression in sand/limestone substrate with peat accumulating toward center; seasonally inundated, still water; subtropical or temperate; occasional or rare fire; cypress, blackgum, or bays, often tallest in center.

LACUSTRINE - Non-flowing wetlands of natural depressions lacking persistent emergent vegetation except around the perimeter.

Clastic Upland Lake - generally irregular basin in clay uplands; predominantly with inflows, frequently without surface outflow; clay or organic substrate; colored, acidic, soft water with low mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

Coastal Dune Lake - basin or lagoon influenced by recent coastal processes; predominantly sand substrate with some organic matter; salinity variable among and within lakes, and subject to saltwater intrusion and storm surges; slightly acidic, hard water with high mineral content (sodium, chloride).

Coastal Rockland Lake - shallow basin influence by recent coastal processes; predominantly barren oolitic or Miami limestone substrate; salinity variable among and within lakes, and subject to saltwater intrusion, storm surges and evaporation (because of shallowness); slightly alkaline, hard water with high mineral content (sodium, chloride).

Flatwoods/Prairie Lake - generally shallow basin in flatlands with high water table; frequently with a broad littoral zone; still water or flow-through; sand or peat substrate; variable water chemistry, but characteristically colored to clear, acidic to slightly alkaline, soft to moderately hard water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

Marsh lake - generally shallow, open water area within wide expanses of freshwater marsh; still water

or flow-through; peat, sand or clay substrate; occurs in most physiographic regions; variable water chemistry, but characteristically highly colored, acidic, soft water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

River Floodplain Lake - meander scar, backwater, or larger flow-through body within major river floodplains; sand, alluvial or organic substrate; colored, alkaline or slightly acidic, hard or moderately hard water with high mineral content (sulfate, sodium, chloride, calcium, magnesium); mesotrophic to eutrophic.

Sandhill Upland Lake - generally rounded solution depression in deep sandy uplands or sandy uplands shallowly underlain by limestone; predominantly without surface inflows/outflows; typically sand substrate with organic accumulations toward middle; clear, acidic moderately soft water with varying mineral content; ultra-oligotrophic to mesotrophic.

Sinkhole Lake - typically deep, funnel-shaped depression in limestone base; occurs in most physiographic regions; predominantly without surface inflows/outflows, but frequently with connection to the aquifer; clear, alkaline, hard water with high mineral content (calcium, bicarbonate, magnesium).

Swamp Lake - generally shallow, open water area within basin swamps; still water or flow-through; peat, sand or clay substrate; occurs in most physiographic regions; variable water chemistry, but characteristically highly colored, acidic, soft water with moderate mineral content (sodium, chloride, sulfate); oligo-mesotrophic to eutrophic.

RIVERINE - Natural, flowing waters from their source to the downstream limits of tidal influence and bounded by channel banks.

Alluvial Stream - lower perennial or intermittent/seasonal watercourse characterized by turbid water with suspended silt, clay, sand and small gravel; generally with a distinct, sediment-derived (alluvial) floodplain and a sandy, elevated natural levee just inland from the bank.

Blackwater Stream - perennial or intermittent/seasonal watercourse characterized by tea-colored water with a high content of particulate and dissolved organic matter derived from drainage through swamps and marshes; generally lacking an alluvial floodplain.

Seepage Stream - upper perennial or intermittent/seasonal watercourse characterized by clear to lightly colored water derived from shallow groundwater seepage.

Spring-run Stream - perennial watercourse with deep aquifer headwaters and characterized by clear water, circumneutral pH and, frequently, a solid limestone bottom.

SUBTERRANEAN - Twilight, middle and deep zones of natural chambers overlain by the earth's crust and characterized by climatic stability and assemblages of trogloxenic, troglophilic, and troglobitic organisms.

Aquatic Cave - cavernicolous area permanently or periodically submerged; often characterized by troglobitic crustaceans and salamanders; includes high energy systems which receive large quantities of organic detritus and low energy systems.

Terrestrial Cave - cavernicolous area lacking standing water; often characterized by bats, such as Myotis spp., and other terrestrial vertebrates and invertebrates; includes interstitial areas above standing water such as fissures in the ceiling of caves.

MARINE/ESTUARINE (The distinction between the Marine and Estuarine Natural Communities is often subtle, and the natural communities types found under these two community categories have the same

descriptions. For these reasons they have been grouped together.) - Subtidal, intertidal and supratidal zones of the sea, landward to the point at which seawater becomes significantly diluted with freshwater inflow from the land.

Consolidated Substrate - expansive subtidal, intertidal and supratidal area composed primarily of nonliving compacted or coherent and relatively hard, naturally formed mass of mineral matter (e.g., coquina limerock and relic reefs); octocorals, sponges, stony corals, nondrift macrophytic algae, blue-green mat-forming algae and seagrasses sparse, if present.

Unconsolidated Substrate - expansive subtidal, intertidal and supratidal area composed primarily of loose mineral matter (e.g., coralgal, gravel, marl, mud, sand and shell); octocorals, sponges, stony corals, nondrift macrophytic algae, blue-green mat-forming algae and seagrasses sparse, if present.

Octocoral Bed - expansive subtidal area occupied primarily by living sessile organisms of the Class Anthozoa, Subclass Octocorallia (e.g., soft corals, horny corals, sea fans, sea whips, and sea pens); sponges, stony corals, nondrift macrophytic algae and seagrasses spares, if present.

Sponge Bed - expansive subtidal area occupied primarily by living sessile organisms of the Phylum Porifera (e.g., sheepswool sponge, Florida loggerhead sponge and branching candle sponge); octocorals, stony corals, nondrift macrophytic algae and seagrasses sparse, if present.

Coral Reef - expansive subtidal area with elevational gradient or relief and occupied primarily by living sessile organisms of the Class Hydrozoa (e.g., fire corals and hydrocorals) and Class Anthozoa, Subclass Zoantharia (e.g., stony corals and black corals); includes deepwater bank reefs, fringing barrier reefs, outer bank reefs and patch reefs, some of which may contain distinct zones of assorted macrophytes, octocorals, & sponges.

Mollusk Reef - substantial subtidal or intertidal area with relief from concentrations of sessile organisms of the Phylum Mollusca, Class Bivalvia (e.g., molluscs, oysters, & worm shells); octocorals, sponges, stony corals, macrophytic algae and seagrasses sparse, if present.

Worm Reef - substantial subtidal or intertidal area with relief from concentrations of sessile, tubicolous organisms of the Phylum Annelida, Class Polychaeta (e.g., chaetopterids and sabellarids); octocorals, sponges, stony corals, macrophytic algae and seagrasses sparse, if present.

Algal Bed - expansive subtidal, intertidal or supratidal area, occupied primarily by attached thallophytic or mat-forming prokaryotic algae (e.g, halimeda, blue-green algae); octocorals, sponges, stony corals and seagrasses sparse, if present.

Grass Bed - expansive subtidal or intertidal area, occupied primarily by rooted vascular macrophytes, (e.g., shoal grass, halophila, widgeon grass, manatee grass and turtle grass); may include various epiphytes and epifauna; octocorals, sponges, stony corals, and attached macrophytic algae sparse, if present.

Composite Substrate - expansive subtidal, intertidal, or supratidal area, occupied primarily by Natural Community elements from more than one Natural Community category (e.g., Grass Bed and Algal Bed species; Octocoral and Algal Bed species); includes both patchy and evenly distributed occurrences.

Tidal Marsh - expansive intertidal or supratidal area occupied primarily by rooted, emergent vascular macrophytes (e.g., cord grass, needlerush, saw grass, saltwort, saltgrass and glasswort); may include various epiphytes and epifauna.

Tidal Swamp - expansive intertidal and supratidal area occupied primarily by woody vascular macrophytes (e.g., black mangrove, buttonwood, red mangrove, and white mangrove); may include various epiphytes and epifauna.

DEFINITIONS OF TERMS Terrestrial and Palustrine Natural Communities

Physiography

Upland - high area in region with significant topographic relief; generally undulating
Lowland - low area in region with or without significant topographic relief; generally flat to gently sloping
Flatland - generally level area in region without significant topographic relief; flat to gently sloping
Basin - large, relatively level lowland with slopes confined to the perimeter or isolated interior locations
Depression - small depression with sloping sides, deepest in center and progressively shallower towards the perimeter
Floodplain - lowland adjacent to a stream; topography influenced by recent fluvial processes
Bottomland - lowland not on active floodplain; sand/clay/organic substrate

Hydrology

occasionally inundated - surface water present only after heavy rains and/or during flood stages
seasonally inundated - surface water present during wet season and flood periods
usually inundated - surface water present except during droughts

Climatic Affinity of the Flora

tropical - community generally occurs in practically frost-free areas
subtropical - community generally occurs in areas that experience occasional frost, but where freezing temperatures are not frequent enough to cause true winter dormancy
temperate - community generally occurs in areas that freeze often enough that vegetation goes into winter dormancy

Fire

annual fire - burns about every 1-2 years
frequent fire - burns about every 3-7 years
occasional fire - burns about every 8-25 years
rare fire - burns about every 26-100 years
no fire - community develops only when site goes more than 100 years without burning

LATIN NAMES OF PLANTS MENTIONED IN NATURAL COMMUNITY DESCRIPTIONS

anise - *Illicium floridanum*
bays:
  swamp bay -*Persea palustris*
  gordonia -*Gordonia lasianthus*
  sweetbay -*Magnolia virgiana*
beakrush - *Rhynchospora* spp.
beech - *Fagus grandifolia*
blackgum - *Nyssa biflora*
blue palmetto - *Sabal minor*
bluestem - *Andropogon* spp.
buttonbush - *Cephalanthus occidentalis*
cabbage palm - *Sabal palmetto*
cacti - *Opuntia* and *Harrisia* spp.,
  predominantly *stricta* and *pentagonus*
cane - *Arundinaria gigantea* or *A. tecta*
cattail - *Typha* spp.
cedars:
  red cedar - *Juniperus silicicola*
  white cedar - *Chamaecyparis thyoides* or *C. henryi*
cladonia - *Cladonia* spp.
cypress - *Taxodium distichum*
dahoon holly - *Ilex cassine*
diamondleaf oak - *Quercus laurifolia*
fire flag - *Thalia geniculata*
Florida maple - *Acer barbatum*
gallberry - *Ilex glabra*
gums:
  tupelo - *Nyssa aquatica*
  blackgum - *Nyssa biflora*
  Ogeechee gum - *Nyssa ogeche*
hackberry - *Celtis laevigata*
hornbeam - *Carpinus caroliniana*
laurel oak - *Quercus hemisphaerica*
live oak - *Quercus virginiana*
loblolly pine - *Pinus taeda*
longleaf pine - *Pinus palustris*
magnolia - *Magnolia grandiflora*
maidencane - *Panicum hemitomon*
needle palm - *Rhapidophyllum hystrix*
overcup oak - *Quercus lyrata*
pickerel weed - *Pontederia cordata* or *P. lanceolata*
pignut hickory - *Carya glabra*
pop ash - *Fraxinus caroliniana*
pond apple - *Annona glabra*
pond pine - *Pinus serotina*
pyramid magnolia - *Magnolia pyramidata*
railroad vine - *Ipomoea pes-caprae*
red cedar - *Juniperus silicicola*
red maple - *Acer rubrum*
red oak - *Quercus falcata*
rosemary - *Ceratiola ericoides*
sagittaria - *Sagittaria lancifolia*
sand pine - *Pinus clausa*
saw palmetto - *Serenoa repens*
sawgrass - *Cladium jamaicensis*
scrub oaks - *Quercus geminata, Q. chapmanii, Q. myrtifolia,Q. inopina*
sea oats - *Uniola paniculata*
seagrape - *Coccoloba uvifera*
shortleaf pine - *Pinus echinata*
Shumard oak - *Quercus shumardii*
slash pine - *Pinus elliottii*
sphagnum moss - *Sphagnum* spp.
spikerush - *Eleocharis* spp.
spruce pine - *Pinus glabra*
St. John's wort - *Hypericum* spp.
swamp chestnut oak - *Quercus prinus*
sweetgum - *Liquidambar styraciflua*
titi - *Cyrilla racemiflora*, and *Cliftonia monophylla*
tuliptree - *Liriodendron tulipfera*
tupelo - *Nyssa aquatica*
turkey oak - *Quercus laevis*
water oak - *Quercus nigra*
waterlily - *Nymphaea odorata*
white cedar - *Chamaecyparis thyoides*
white oak - *Quercus alba*
willow - *Salix caroliniana*
yucca - *Yucca aloifolia*

A. GENERAL DISCUSSION

Archaeological and historic sites are defined collectively in 267.021(3), F.S., as "historic properties" or "historic resources." They have several essential characteristics that must be recognized in a management program.

First of all, they are a finite and non-renewable resource. Once destroyed, presently existing resources, including buildings, other structures, shipwreck remains, archaeological sites and other objects of antiquity, cannot be renewed or revived. Today, sites in the State of Florida are being destroyed by all kinds of land development, inappropriate land management practices, erosion, looting, and to a minor extent even by well-intentioned professional scientific research (e.g., archaeological excavation). Measures must be taken to ensure that some of these resources will be preserved for future study and appreciation.

Secondly, sites are unique because individually they represent the tangible remains of events that occurred at a specific time and place.

Thirdly, while sites uniquely reflect localized events, these events and the origin of particular sites are related to conditions and events in other times and places. Sites can be understood properly only in relation to their natural surroundings and the activities of inhabitants of other sites. Managers must be aware of this "systemic" character of historic and archaeological sites. Also, it should be recognized that archaeological sites are time capsules for more than cultural history; they preserve traces of past biotic communities, climate, and other elements of the environment that may be of interest to other scientific disciplines.

Finally, the significance of sites, particularly archaeological ones, derives not only from the individual artifacts within them, but equally from the spatial arrangement of those artifacts in both horizontal and vertical planes. When archaeologists excavate, they recover, not merely objects, but also a record of the positions of these objects in relation to one another and their containing matrix (e.g., soil strata). Much information is sacrificed if the so-called "context" of archaeological objects is destroyed or not recovered, and this is what archaeologists are most concerned about when a site is threatened with destruction or damage. The artifacts themselves can be recovered even after a site is heavily disturbed, but the context -- the vertical and horizontal relationships -- cannot. Historic structures also contain a wealth of cultural (socio-economic) data that can be lost if historically sensitive maintenance, restoration or rehabilitation procedures are not implemented, or if they are demolished or extensively altered without appropriate documentation. Lastly, it should not be forgotten that historic structures often have associated potentially significant historic archaeological features that must be considered in land management decisions.

B. STATUTORY AUTHORITY

Chapter 253, Florida Statutes ("State Lands") directs the preparation of "single-use" or "multiple-use" land management plans for all state-owned lands and state-owned sovereignty submerged lands. In this document, 253.034(4), F.S., specifically requires that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites, as well as other fragile resources..."

Chapter 267, Florida Statutes is the primary historic preservation authority of the state. The importance of protecting and interpreting archaeological and historic sites is recognized in 267.061(1)(a), F.S.:The rich and unique heritage of historic properties in this state, representing more than 10,000 years of human presence, is an important legacy to be valued and conserved for present and future generations. The destruction of these nonrenewable historic resources will engender a significant loss to the state's quality of life, economy, and cultural environment. It is therefore declared to be state policy to:

1. Provide leadership in the preservation of the state's historic resources; [and]

2. Administer state-owned or state-controlled historic resources in a spirit of stewardship and trusteeship;...

Responsibilities of the Division of Historical Resources in the Department of State pursuant to 267.061(3), F.S., include the following:

1. Cooperate with federal and state agencies, local Governments, and private organizations and individuals to direct and conduct a comprehensive statewide survey of historic resources and to maintain an inventory of such responses.
2. Develop a comprehensive statewide historic preservation plan.
3. Identify and nominate eligible properties to the National Register of Historic Places and otherwise administer applications for listing properties in the National Register of Historic Places.
4. Cooperate with federal and state agencies, local governments, and organizations and individuals to ensure that historic resources are taken into consideration at all levels of planning and development.
5. Advise and assist, as appropriate, federal and state agencies and local governments in carrying out their historic preservation responsibilities and programs.
6. Carry out on behalf of the state the programs of the National Historic Preservation Act of 1966, as amended, and to establish, maintain, and administer a state historic preservation program meeting the requirements of an approved program and fulfilling the responsibilities of state historic preservation programs as provided in subsection 101(b) of that act.
7. Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an appreciation of Florida history and culture. Prior to the acquisition, preservation, interpretation, or operation of a historic property by a state agency, the Division shall be provided a reasonable opportunity to review and comment on the proposed undertaking and shall determine that there exists historic authenticity and a feasible means of providing for the preservation, interpretation and operation of such property.
8. Establish professional standards for the preservation, exclusive of acquisition, of historic resources in state ownership or control.
9. Establish guidelines for state agency responsibilities under subsection (2).

Responsibilities of other state agencies of the executive branch, pursuant to 267.061(2), F.S., include:

1. Each state agency of the executive branch having direct or indirect jurisdiction over a proposed state or state-assisted undertaking shall, in accordance with state policy and prior to the approval of expenditure of any state funds on the undertaking, consider the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places. Each such agency shall afford the division a reasonable opportunity to comment with regard to such an undertaking.
2. Each state agency of the executive branch shall initiate measures in consultation with the division to assure that where, as a result of state action or assistance carried out by such agency, a historic property is to be demolished or substantially altered in a way that adversely affects the character, form, integrity, or other qualities that contribute to [the] historical, architectural, or archaeological value of the property, timely steps are taken to determine that no feasible and prudent alternative to the proposed demolition or alteration exists, and, where no such alternative is determined to exist, to assure that timely steps are taken either to avoid or mitigate the adverse effects, or to undertake an appropriate archaeological salvage excavation or other recovery action to document the property as it existed prior to demolition or alteration.
3. In consultation with the division [of Historical Resources], each state agency of the executive branch shall establish a program to locate, inventory, and evaluate all historic properties under the agency's ownership or control that appear to qualify for the National Register. Each such agency shall exercise caution to assure that any such historic property is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly.
4. Each state agency of the executive branch shall assume responsibility for the preservation of historic

resources that are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purpose of carrying out agency responsibilities, the agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with preservation of such properties, the mission of the agency, and the professional standards established pursuant to paragraph (3)(k), any preservation actions necessary to carry out the intent of this paragraph.

5. Each state agency of the executive branch, in seeking to acquire additional space through new construction or lease, shall give preference to the acquisition or use of historic properties when such acquisition or use is determined to be feasible and prudent compared with available alternatives. The acquisition or use of historic properties is considered feasible and prudent if the cost of purchase or lease, the cost of rehabilitation, remodeling, or altering the building to meet compliance standards and the agency's needs, and the projected costs of maintaining the building and providing utilities and other services is less than or equal to the same costs for available alternatives. The agency shall request the division to assist in determining if the acquisition or use of a historic property is feasible and prudent. Within 60 days after making a determination that additional space is needed, the agency shall request the division to assist in identifying buildings within the appropriate geographic area that are historic properties suitable for acquisition or lease by the agency, whether or not such properties are in need of repair, alteration, or addition.

6. Consistent with the agency's mission and authority, all state agencies of the executive branch shall carry out agency programs and projects, including those under which any state assistance is provided, in a manner which is generally sensitive to the preservation of historic properties and shall give consideration to programs and projects which will further the purposes of this section.

Section 267.12 authorizes the Division to establish procedures for the granting of research permits for archaeological and historic site survey or excavation on state-owned or controlled lands, while Section 267.13 establishes penalties for the conduct of such work without first obtaining written permission from the Division of Historical Resources. The Rules of the Department of State, Division of Historical Resources, for research permits for archaeological sites of significance are contained in Chapter 1A-32, F.A.C.

Another Florida Statute affecting land management decisions is Chapter 872, F.S. Section 872.02, F.S., pertains to marked grave sites, regardless of age. Many state-owned properties contain old family and other cemeteries with tombstones, crypts, etc. Section 872.05, F.S., pertains to unmarked human burial sites, including prehistoric and historic Indian burial sites. Unauthorized disturbance of both marked and unmarked human burial site is a felony.

C. MANAGEMENT POLICY

The choice of a management policy for archaeological and historic sites within state-owned or controlled land obviously depends upon a detailed evaluation of the characteristics and conditions of the individual sites and groups of sites within those tracts. This includes an interpretation of the significance (or potential significance) of these sites, in terms of social and political factors, as well as environmental factors. Furthermore, for historic structures architectural significance must be considered, as well as any associated historic landscapes.

Sites on privately owned lands are especially vulnerable to destruction, since often times the economic incentives for preservation are low compared to other uses of the land areas involved. Hence, sites in public ownership have a magnified importance, since they are the ones with the best chance of survival over the long run. This is particularly true of sites that are state-owned or controlled, where the basis of management is to provide for land uses that are minimally destructive of resource values.

It should be noted that while many archaeological and historical sites are already recorded within state--owned or controlled--lands, the majority of the uplands areas and nearly all of the inundated areas have not been surveyed to locate and assess the significance of such resources. The known sites are, thus,

only an incomplete sample of the actual resources - i.e., the number, density, distribution, age, character and condition of archaeological and historic sites - on these tracts. Unfortunately, the lack of specific knowledge of the actual resources prevents formulation of any sort of detailed management or use plan involving decisions about the relative historic value of individual sites. For this reason, a generalized policy of conservation is recommended until the resources have been better addressed.

The generalized management policy recommended by the Division of Historical Resources includes the following:

1. State land managers shall coordinate all planned activities involving known archaeological or historic sites or potential site areas closely with the Division of Historical Resources in order to prevent any kind of disturbance to significant archaeological or historic sites that may exist on the tract. Under 267.061(1)(b), F.S., the Division of Historical Resources is vested with title to archaeological and historic resources abandoned on state lands and is responsible for administration and protection of such resources. The Division will cooperate with the land manager in the management of these resources. Furthermore, provisions of 267.061(2) and 267.13, F.S., combined with those in 267.061(3) and 253.034(4), F.S., require that other managing (or permitting) agencies coordinate their plans with the Division of Historical Resources at a sufficiently early stage to preclude inadvertent damage or destruction to known or potentially occurring, presently unknown archaeological and historic sites. The provisions pertaining to human burial sites must also be followed by state land managers when such remains are known or suspected to be present (see 872.02 and 872.05, F.S., and 1A-44, F.A.C.)

2. Since the actual resources are so poorly known, the potential impact of the managing agency's activities on historic archaeological sites may not be immediately apparent. Special field survey for such sites may be required to identify the potential endangerment as a result of particular management or permitting activities. The Division may perform surveys, as its resources permit, to aid the planning of other state agencies in their management activities, but outside archaeological consultants may have to be retained by the managing agency. This would be especially necessary in the cases of activities contemplating ground disturbance over large areas and unexpected occurrences. It should be noted, however, that in most instances Division staff's knowledge of known and expected site distribution is such that actual field surveys may not be necessary, and the project may be reviewed by submitting a project location map (preferably a 7.5 minute U.S.G.S. Quadrangle map or portion thereof) and project descriptive data, including detailed construction plans. To avoid delays, Division staff should be contacted to discuss specific project documentation review needs.

3. In the case of known significant sites, which may be affected by proposed project activities, the managing agency will generally be expected to alter proposed management or development plans, as necessary, or else make special provisions to minimize or mitigate damage to such sites.

4. If in the course of management activities, or as a result of development or the permitting of dredge activities (see 403.918(2)(6)a, F.S.), it is determined that valuable historic or archaeological sites will be damaged or destroyed, the Division reserves the right, pursuant to 267.061(1)(b), F.S., to require salvage measures to mitigate the destructive impact of such activities to such sites. Such salvage measures would be accomplished before the Division would grant permission for destruction of the affected site areas. The funding needed to implement salvage measures would be the responsibility of the managing agency planning the site destructive activity. Mitigation of historic structures at a minimum involves the preparation of measured drawings and documentary photographs. Mitigation of archaeological resources involves the excavation, analysis and reporting of the project findings and must be planned to occur sufficiently in advance to avoid project construction delays. If these services are to be contracted by the state agency, the selected consultant will need to obtain an Archaeological Research Permit from the Division of Historical Resources, Bureau of Archaeological Research (see 267.12, F.S. and Rules 1A-32 and 1A-46 F.A.C.).

5. For the near future, excavation of non-endangered (i.e., sites not being lost to erosion or development) archaeological site is discouraged. There are many endangered sites in Florida (on

both private and public lands) in need of excavation because of the threat of development or other factors. Those within state-owned or controlled lands should be left undisturbed for the present - with particular attention devoted to preventing site looting by "treasure hunters". On the other hand, the archaeological and historic survey of these tracts is encouraged in order to build an inventory of the resources present, and to assess their scientific research potential and historic or architectural significance.

6. The cooperation of land managers in reporting sites to the Division that their field personnel may discover is encouraged. The Division will help inform field personnel from other resource managing agencies about the characteristics and appearance of sites. The Division has initiated a cultural resource management training program to help accomplish this. Upon request the Division will also provide to other agencies archaeological and historical summaries of the known and potentially occurring resources so that information may be incorporated into management plans and public awareness programs (See Management Implementation).

7. Any discovery of instances of looting or unauthorized destruction of sites must be reported to the agent for the Board of Trustees of the Internal Improvement Trust Fund and the Division so that appropriate action may be initiated. When human burial sites are involved, the provisions of 872.02 and 872.05, F. S. and Rule 1A-44, F.A.C., as applicable, must also be followed. Any state agent with law enforcement authority observing individuals or groups clearly and incontrovertibly vandalizing, looting or destroying archaeological or historic sites within state-owned or controlled lands without demonstrable permission from the Division will make arrests and detain those individuals or groups under the provisions of 267.13, 901.15, and 901.21, F.S., and related statutory authority pertaining to such illegal activities on state-owned or controlled lands. County Sheriffs' officers are urged to assist in efforts to stop and/or prevent site looting and destruction.

In addition to the above management policy for archaeological and historic sites on state-owned land, special attention shall be given to those properties listed in the National Register of Historic Places and other significant buildings. The Division recommends that the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (Revised 1990) be followed for such sites.

The following general standards apply to all treatments undertaken on historically significant properties.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alterations of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy materials that

characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired. (see Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings [Revised 1990]).

Divisions of Historical Resources staff are available for technical assistance for any of the above listed topics. It is encouraged that such assistance be sought as early as possible in the project planning.

D. MANAGEMENT IMPLEMENTATION

As noted earlier, 253.034(4), F.S., states that "all management plans, whether for single-use or multiple-use properties, shall specifically describe how the managing agency plans to identify, locate, protect and preserve, or otherwise use fragile non-renewable resources, such as archaeological and historic sites..." The following guidelines should help to fulfill that requirement.

1. All land managing agencies should contact the Division and send U.S.G.S. 7.5 minute quadrangle maps outlining the boundaries of their various properties.
2. The Division will in turn identify site locations on those maps and provide descriptions for known archaeological and historical sites to the managing agency.
3. Further, the Division may also identify on the maps areas of high archaeological and historic site location probability within the subject tract. These are only probability zones, and sites may be found outside of these areas. Therefore, actual ground inspections of project areas may still be necessary.
4. The Division will send archaeological field recording forms and historic structure field recording forms to representatives of the agency to facilitate the recording of information on such resources.
5. Land managers will update information on recorded sites and properties.
6. Land managers will supply the Division with new information as it becomes available on previously unrecorded sites that their staff locate. The following details the kind of information the Division wishes to obtain for any new sites or structures that the land managers may report:

A. Historic Sites

(1) Type of structure (dwelling, church, factory, etc.).
(2) Known or estimated age or construction date for each structure and addition.
(3) Location of building (identify location on a map of the property, and building placement, i.e., detached, row, etc.).
(4) General Characteristics: (include photographs if possible) overall shape of plan (rectangle, "L" "T" "H" "U", etc.); number of stories; number of vertical divisions of bays; construction materials (brick, frame, stone, etc.); wall finish (kind of bond, coursing, shingle, etc.); roof shape.
(5) Specific features including location, number and appearance of:
(a) Important decorative elements;
(b) Interior features contributing to the character of the building;
(c) Number, type, and location of outbuildings, as well as date(s) of construction;
(d) Notation if property has been moved;
(e) Notation of known alterations to building.

B. Archaeological Sites

(1) Site location (written narrative and mapped location).
(2) Cultural affiliation and period.
(3) Site type (midden, burial mound, artifact scatter, building rubble, etc.).

(4) Threats to site (deterioration, vandalism, etc.).
(5) Site size (acreage, square meters, etc.).
(6) Artifacts observed on ground surface (pottery, bone, glass, etc.).
(7) Description of surrounding environment.

7. No land disturbing activities should be undertaken in areas of known archaeological or historic sites or areas of high site probability without prior review by the Division early in the project planning.

8. Ground disturbing activities may proceed elsewhere but land managers should stop disturbance in the immediate vicinity of artifact finds and notifies the Division if previously unknown archaeological or historic remains are uncovered. The provisions of Chapter 872, F.S., must be followed when human remains are encountered.

9. Excavation and collection of archaeological and historic sites on state lands without a permit from the Division are a violation of state law and shall be reported to a law enforcement officer. The use of metal detectors to search for historic artifacts shall be prohibited on state lands except when authorized in a 1A-32, F.A.C., research permit from the Division.

10. Interpretation and visitation which will increase public understanding and enjoyment of archaeological and historic sites without site destruction or vandalism is strongly encouraged.

11. Development of interpretive programs including trails, signage, kiosks, and exhibits is encouraged and should be coordinated with the Division.

12. Artifacts found or collected on state lands are by law the property of the Division. Land managers shall contact the Division whenever such material is found so that arrangements may be made for recording and conservation. This material, if taken to Tallahassee, can be returned for public display on a long term loan.

E. ADMINISTERING AGENCY

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

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

Contact Person: **Susan M. Harp**
Historic Preservation Planner
Telephone (850) 245-6333
Suncom 205-6333
FAX (850) 245-6437

Land Management Review of MacArthur Beach State Park, Palm Beach County (Lease No. 3205): April 17, 1998

Prepared by Division of State Lands Staff

Robert Clark, Program Administrator
William Howell, OMC Manager
Amy Knight, Planner

June 1, 1998

Management Review Team Members

AGENCY REPRESENTED	TEAM MEMBER APPOINTED	TEAM MEMBER IN ATTENDANCE
DEP/DRP	Mr. J. B. Miller	Mr. J. B. Miller
DEP Southeast District	Mr. Herb Zebuth	Mr. Herb Zebuth
DACS/DOF	Mr. Jim Rath	Mr. Jim Rath
GFC	Mr. Frank Smith	Mr. Frank Smith
Soil and Water Conservation District	Mr. Patrick Martin (Palm Beach Co.)	none
County Commission	Mr. Richard Walesky (Dade Co.)	Mr. Richard Walesky
Conservation Organization	Mr. Jim Murrian (The Nature Conservancy)	none
Private Land Manager	Mr. George Gann (Institute for Regional Cons.)	Mr. George Gann

Process for Implementing Regional Management Review Teams

Legislative Intent and Guidance:

Section 8 of CS/CS/HBs 1119 & 1577 (§259.036, F. S.) was enacted to determine whether conservation, preservation, and recreation lands owned by the state Board of Trustees of the Internal Improvement Trust Fund are being managed for the purposes for which they were acquired and in accordance with adopted land-management plans. It establishes land management review teams to evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions, or archaeological features, and to evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan. If a land-management plan has not been adopted, the review shall consider the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices are in compliance with the management policy statement and management prospectus for that property. If the land management review team determines that reviewed lands are not being managed for the purposes for which they were acquired or in compliance with the adopted land management plan, management policy statement, or management prospectus, or if the managing agency fails to address the review findings in the updated management plan, the Department shall provide the review findings to the Board, and the managing agency must report to the Board its reasons for managing the lands as it has. No later than the second board meeting in October of each year, the Department shall report the annual review findings of its land management review team.

Review Site

The management review of MacArthur Beach State Park considered approximately 225 acres in Palm Beach County that are managed by the Division of Recreation and Parks. The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the management concept. LAMAC approved the management plan on May 29, 1997 and the management plan update is due in May 2002.

Review Team Analysis

The management review checklist was analyzed as follows: The checklist consisted of two parts: a plan review section that answered whether or not the management plan sufficiently addressed protection/ restoration/ management needs for a series of items; and a field review section that scored to what extent sufficient management actions were being taken for a series of items. For each item in each section the scores for all team members were averaged. Some items received high scores (> 2.5) in the field review, which indicates that exceptional management actions are being taken. These items are identified in the checklist results as "Exceptional" and are indicated with a plus (+) in the corresponding checklist (Attachment 1). Items for which the average score was low (< 0.5 for plan review; < 1.5 for field review) are identified as "Inadequate" in the checklist results, and indicated with a minus (-) in the corresponding checklist (Attachment 1).
Review Team Findings
Checklist results

Exceptional management actions

I.A.4	Estuarine tidal swamp	Management/protection of the tidal swamp community is excellent.
I.B.1.a	Sea turtles	Management/protection of sea turtles is exceptional.
III.B.1	Restoration:	The managing agency is doing an excellent job of restoringMunyon Island natural communities on Munyon Island.
III.B.2	Restoration: causeway	The managing agency is doing an excellent job of south restoring native vegetation to the filled area adjacent to the south causeway.
III.I.b	Sanitary facilities	The managing agency is providing ample public restroom facilities.
III.I.3.a	Buildings	Buildings on the property are excellent.
IV.	Education/ public outreach	Educational programs and public outreach at MacArthur Beach are outstanding.

Inadequate items: Plan review

III.A.1	Prescribed fire: area	The number of acres scheduled for prescribed burns should be addressed in the plan.
DRP RESPONSE:		**Disagree. There are no fire-dependent communities on this unit**.
III.B.1	Restoration:	The excellent restoration efforts on Munyon Island should Munyon Island be addressed in the plan.
DRP RESPONSE:		**Agree. DRP agrees that the restoration efforts are excellent and should be mentioned in the plan, but any extensive description of the results**

		should be addressed by the environmental permitting process. (Note: The restoration on Munyon Island occurred after approval of the management plan and therefore any reported "deficiencies" related to this project could not have been covered in the existing plan.
III.B.2	Restoration: south causeway	The excellent restoration efforts on the south causeway fill areashould be addressed in the plan.
DRP RESPONSE:		**Agree. Again, DRP agrees with the appraisal of the restoration efforts, the restoration results should be addressed elsewhere and not in the plan**.
III.D.2.a	Ground water Quality	Monitoring of ground water quality should be addressed in the plan.
DRP RESPONSE:		**Disagree. Except in cases where there are known or suspected problems (such as in the vicinity of old cattle vats or the use of wells in areas near domestic or industrial waste treatment facilities or waste streams), ground water quality monitoring is not cost beneficial.**
III.D.2.b	Ground water Quantity	Monitoring of ground water quantity should be addressed in the plan.
DRP RESPONSE:		**Disagree. Ground water quantity monitoring is expensive and should be reserved for those cases where potential problems are suspected which could adversely impact resources of the park. We know there are salt water intrusion problems occurring here as elsewhere along the coast of Florida**
III.D.3.a	Surface water Quality	Monitoring of surface water quality should be addressed in the plan.
DRP RESPONSE:		**Disagree. Monitoring of surface waters is recommended and pursued if the circumstances indicate there are existing problems or in cases where DEP monitoring stations are needed to establish background water quality conditions in Florida's more pristine ecosystems. Monitoring purely for the purposes of documenting surface water quality conditions is usually unnecessary. Water quality monitoring surveys are costly and should be reserved for situations where the natural resources and public health and safety appear to be threatened due to nearby sources of pollution. In general, the water quality condition can be ascertained by the condition of the**

		biological communities in the water. If the communities are experiencing noticeable stress, DRP will take appropriate action to determine what is causing the problem including enlisting the aid of other agencies to help monitor surface water quality.
III.D.3.b	Surface water quantity	Monitoring of surface water quantity should be addressed in the plan.
DRP RESPONSE:		**Disagree. The question of monitoring surface water quantity is similar to that for monitoring water quantity (see above comments). Monitoring should only be conducted in cases where offsite activities are considered to be a potentially serious problem which could impact natural resources or recreational uses of the park. DRP will contact the WMD for assistance in monitoring surface water quantity for any parks when this appears to be the case. Otherwise, DRP does not plan to have quantity monitoring conducted at state parks**.

Recommendations to the managing agency

The following recommendations resulted from a discussion and consensus of review team members.

1.The review team supports local efforts to acquire adjacent privately-owned submerged lands for addition to the park.

DRP RESPONSE: DRP endorses and supports local efforts to acquire adjacent privately-owned submerged lands as additions to the park.

2.The team recommends that DRP concentrate public use on Munyon Island to the southern half of the island and boater access area.

DRP RESPONSE: The areas designated for public recreational use have already been determined and approved by LMAC. Any proposals to modify the present plan will be handled during the development process for the next plan update.

3.The team recommends revegetation of the historic hotel site on the extreme southern end of Munyon Island.

DRP RESPONSE: Once final plans for the use and interpretation of the historic hotel site are decided, a determination will be made concerning whether or not vegetative restoration is appropriate.

4.The team recommends a complete Type I revision of the management plan for this unit.

DRP RESPONSE: DRP does not believe the review team has any responsibility under the management review process to recommend types of plans

5.The team recommends that DRP pursue acquisition of Little Munyon Island.

DRP RESPONSE: DRP endorses and supports local efforts to acquire adjacent privately-owned submerged lands as additions to the park.

The management plan must include responses to the checklist items and the recommendations that are identified above. The checklist items should be addressed in relation to the category(ies) in which they received a low score, e.g. whether the plan sufficiently addressed protection/ restoration/ management needs, or whether sufficient management actions were being taken.
Is the land being managed for the purpose for which it was acquired?

After completing the checklist, team members were asked to answer "yes" or "no" to this question and given the opportunity to provide general comments. **All team members agreed that MacArthur Beach State Park is being managed for the purpose for which it was acquired.**

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

After completing the checklist, team members were asked to answer "yes" or "no" to this question and given the opportunity to provide general comments. **All team members agreed that actual management practices, including public access, were in compliance with the management plan for this site.**

Memorandum

Florida Department of Environmental Protection

October 19, 1998

TO: Mr. Robert Clark, EA
Division of State Lands

FROM: Albert Gregory, Chief, Office of Park Planning
Dana C. Bryan, Chief, Bureau of Natural
& Cultural Resources

SUBJECT: Response to Land Management Review (LMR) for the John D. MacArthur Beach State Park

The Land Management Review determined that the management of this unit meets the two tests prescribed by law. The review team concluded that the land is being managed for the purposes for which it was acquired and in accordance with the land management plan.

The following comments are provided by field staff and our offices in response to the June 1, 1998 report of the team review of John D. MacArthur Beach State Park. Our comments address the land management plan and field management concerns listed in the review and if appropriate, recommendations and identify any revisions or actions we plan to take.

Plan Review:

I.B.1.d. - Least Terns: Disagree. There is no documented history of any ground-nesting colonies of least terns in the park. However, least terns do forage and rest in the park. We believe there are a number of valid reasons why least terns will avoid using the park including the tip of Munyon Island as a nesting site.

III.A.1. - Prescribed fire: Disagree. There are no fire-dependent communities on this unit.

III.B.1. - Restoration of Munyon Island: Agree. DRP agrees that the restoration efforts are excellent and should be mentioned in the plan, but any extensive description of the results should be addressed by the environmental permitting process. (Note: The restoration on Munyon Island occurred after approval of the management plan and therefore any reported "deficiencies" related to this project could not have been covered in the existing plan.

III.B.2. - Restoration: south causeway fill area: Agree. Again, DRP agrees with the appraisal of the restoration efforts, the restoration results should be addressed elsewhere and not in the plan.

III.E.2.a. - Ground water quality: Disagree. Except in cases where there are known or suspected problems (such as in the vicinity of old cattle vats or the use of wells in areas near domestic or industrial waste treatment facilities or waste streams), ground water quality monitoring is not cost beneficial.

III.E.2.b. - Ground water quantity: Disagree. Ground water quantity monitoring is expensive and should be reserved for those cases where potential problems are suspected which could adversely impact resources of the park. We know there are salt water intrusion problems occurring here as elsewhere along the coast of Florida.
III.E.3.a. - Surface water quality: Disagree. Monitoring of surface waters is recommended and pursued if

the circumstances indicate there are existing problems or in cases where DEP monitoring stations are needed to establish background water quality conditions in Florida's more pristine ecosystems. Monitoring purely for the purposes of documenting surface water quality conditions is usually unnecessary. Water quality monitoring surveys are costly and should be reserved for situations where the natural resources and public health and safety appear to be threatened due to nearby sources of pollution. In general, the water quality condition can be ascertained by the condition of the biological communities in the water. If the communities are experiencing noticeable stress, DRP will take appropriate action to determine what is causing the problem including enlisting the aid of other agencies to help monitor surface water quality.

III.E.3.b. - Surface water quantity: Disagree. The question of monitoring surface water quantity is similar to that for monitoring water quantity (see above comments). Monitoring should only be conducted in cases where offsite activities are considered to be a potentially serious problem which could impact natural resources or recreational uses of the park. DRP will contact the WMD for assistance in monitoring surface water quantity for any parks when this appears to be the case. Otherwise, DRP does not plan to have quantity monitoring conducted at state parks.

Recommendations:

1) DRP endorses and supports local efforts to acquire adjacent privately-owned submerged lands as additions to the park.

2) The areas designated for public recreational use have already been determined and approved by LMAC. Any proposals to modify the present plan will be handled during the development process for the next plan update.

3) Once final plans for the use and interpretation of the historic hotel site are decided, a determination will be made concerning whether or not vegetative restoration is appropriate.

4) DRP does not believe the review team has any responsibility under the management review process to recommend types of plans.

Thank you for the opportunity to comment on the LMR.

AG/DCB/mb
cc: George Jones, Chief, Parks District 5