Bahia Honda State Park

Unit Management Plan

Approved December 2020



FLORIDA DEPARTMENT OF Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Ron DeSantis
Governor

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Lt. Governor

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Secretary

December 21, 2020

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

RE: Bahia Honda State Park – Lease No. 3609

Dear Mr. Cutshaw,

On **December 11, 2020**, the Acquisition and Restoration Council (ARC) recommended approval of the **Bahia Honda State Park** management plan. Therefore, Division of State Lands, Office of Environmental Services (OES), acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the **Bahia Honda State Park** management plan. The next management plan update is due December 11, 2030.

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

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

Pursuant to s. 259.032, F.S., and Chapter 18-2.021, F.A.C., management plans for areas less than 160 acres may be handled in accordance with the negative response process. This process requires small management plans and management plan amendments be submitted to the Division of State Lands for review, and the Acquisition and Restoration Council (ARC) for public notification. The Division of State Lands will approve these plans or plan amendments submitted for review through delegated authority unless three

or more ARC members request the division place the item on a future council meeting agenda for review. To create better efficiency, improve customer service, and assist members of the ARC, the Division of State Lands will notice negative response items on Thursdays except for weeks that have State or Federal holidays that fall on Thursday or Friday. The Division of State Lands will contact you on the appropriate Friday to inform you if the item is approved via delegated authority or if it will be placed on a future ARC agenda by request of the ARC members.

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

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

Sincerely,

Deborah Burr
Office of Environmental Services
Division of State Lands

TABLE OF CONTENTS

INTRODUCTION 1
PURPOSE AND SIGNIFICANCE OF THE PARK 1
Park Significance 1
UNIT CLASSIFICATION 2
PURPOSE AND SCOPE OF THE PLAN 2
MANAGEMENT PROGRAM OVERVIEW 8
Management Authority and Responsibility 8
Park Management Goals 8
Management Coordination 9
Public Participation 9
Other Designations 9

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION 11
RESOURCE DESCRIPTION AND ASSESSMENT 12
Natural Resources 12
Topography 12
Geology 12
Soils 15
Minerals 15
Hydrology 15
Hydrological Management 16
Natural Communities 21
Natural Communities Management 36
Imperiled Species 38
Imperiled Species Management 44
Exotic and Nuisance Species 45
Exotic Species Management 48
Cultural Resources 49
Condition Assessment 49
Level of Significance 49
Prehistoric and Historic Archaeological Sites 50
Historic Structures 50
Collections 51
Cultural Resource Management 52
Special Management Considerations 53
Timber Management Analysis 53
Coastal/Beach Management 53
Sea Level Rise 54
Land Management Review 55

LAND USE COMPONENT

INTRODUCTION 57
EXTERNAL CONDITIONS 57
Existing Use of Adjacent Lands 58
Planned Use of Adjacent Lands 58
Florida Greenways and Trails System (FGTS) 59
Florida Keys Overseas Heritage Trail (FKOHT) 60
PROPERTY ANALYSIS 60
Recreational Resource Elements 60
Land Area 61
Water Area 61
Shoreline 61
Natural Scenery 61
Significant Habitat 61
Natural Features 62
Archaeological and Historic Features 62
Assessment of Use 62
Past Uses 62
Future Land Use and Zoning 62
Current Recreational Use and Visitor Programs 63
Other Uses 63
Protected Zones 63
Existing Facilities 64
Recreation Facilities 64
Support Facilities 64
CONCEPTUAL LAND USE PLAN 69
Potential Uses 69
Public Access and Recreational Opportunities 69
Recreational Carrying Capacity 70
Proposed Facilities 71
Capital Facilities and Infrastructure 71
Facilities Development 75
Optimum Boundary 75

IMPLEMENTATION COMPONENT

MANAGEMENT PROGRESS 79
Park Administration and Operations 79
Resource Management 79
Park Facilities 79
MANAGEMENT PLAN IMPLEMENTATION 80

TABLES

TABLE 1 – Bahia Honda State Park Management Zones 12
TABLE 2 – Natural Communities and Altered Landcovers 21
TABLE 3 – Imperiled Species Inventory 41
TABLE 4 – Inventory of FLEPPC Category I and II Exotic Plant Species 46
TABLE 5 – Cultural Sites Listed in the Florida Master Site File 52
TABLE 6 – Resource-Based Recreational Opportunities 58
TABLE 7 – Recreational Carrying Capacity 71
TABLE 8 – Implementation Schedule and Cost Estimates 81

MAPS

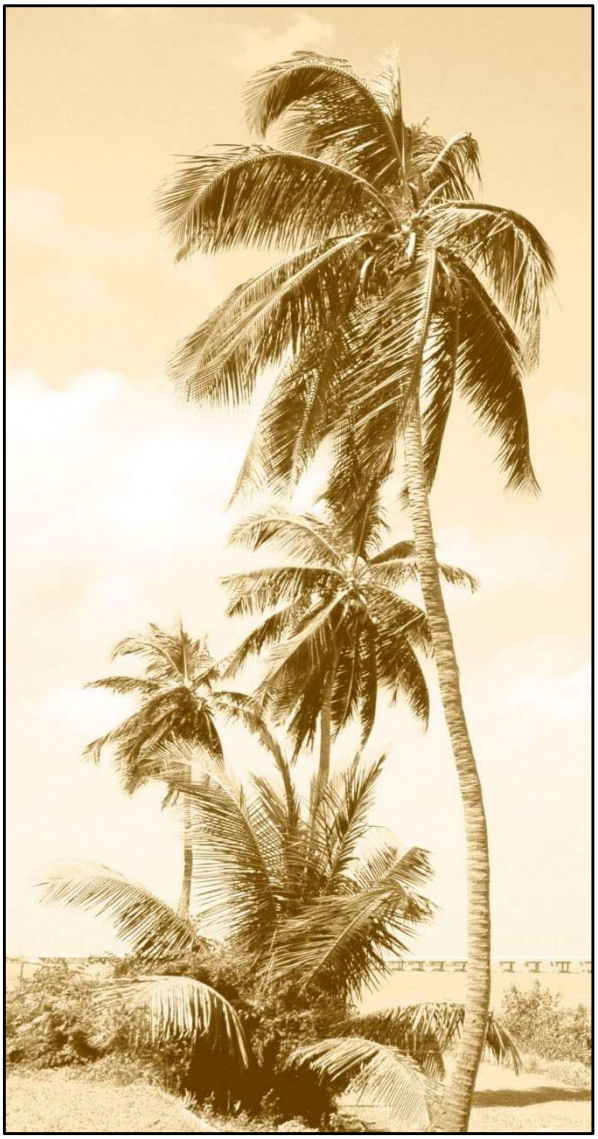
Vicinity Map 3
Reference Map 5
Management Zones Map 13
Soils Map 17
Natural Communities Map 23
Base Map Page 1 65
Base Map Page 2 67
Conceptual Land Use Plan 73
Optimum Boundary Map 77

LIST OF ADDENDA

ADDENDUM 1
Acquisition History ..... A 1 - 1
ADDENDUM 2
Advisory Group Members and Report ..... A 2 - 1
ADDENDUM 3
References Cited ..... A 3 - 1
ADDENDUM 4
Soil Descriptions ..... A 4 - 1
ADDENDUM 5
Plant and Animal List ..... A 5 - 1
ADDENDUM 6
Imperiled Species Ranking Definitions ..... A 6 - 1
ADDENDUM 7
Cultural Information ..... A 7 - 1
ADDENDUM 8
Land Management Review ..... A 8 - 1
ADDENDUM 9
Miami Blue Butterfly Management Plan ..... A 9 - 1
ADDENDUM 10
Monroe County Comprehensive Plan Compliance ..... A 10 - 1

Executive Summary

Bahia Honda State Park is located in Monroe County at mile marker 36, east of Big Pine Key. The park was initially acquired on September 21, 1961 through a donation by Monroe County. Subsequent additions to the park were obtained through the Save Our Coasts and Land Acquisition Trust Fund (LATF) programs. Currently, the park's total acreage is approximately 491 acres.



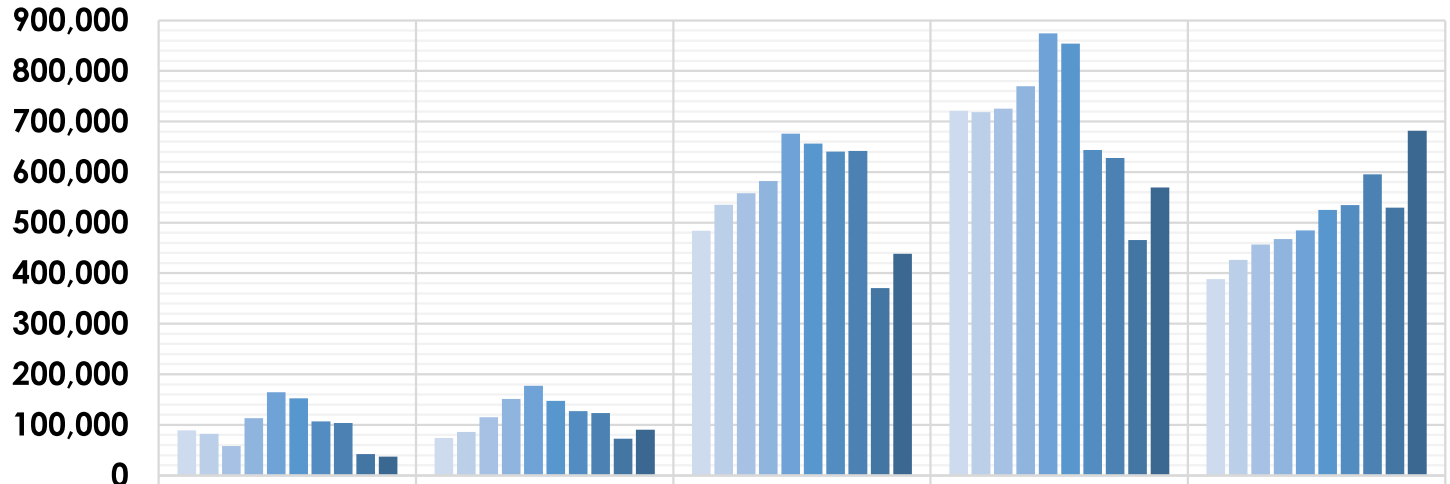
The purpose of Bahia Honda State Park is to protect and preserve Bahia Honda Key, which includes rare natural communities and one of the most recognizable segments of the Old Keys Bridges. Segments of Henry Flagler's railroad bridges built in the early 1900s are still important parts of the local landscape providing remarkable panoramic views of the key and surrounding waters.

The natural break in the offshore coral reef allows for the establishment of some of the largest segments of sandy and accessible beaches in the Florida Keys at the park. Beaches are a rare occurrence in the Florida Keys due to the majority of the natural shoreline consisting of low energy mangrove habitat. The beach dune natural community includes the largest silver palm hammock in the Florida Keys. In total, there are 43 listed plant and animal species that rely on the park for crucial habitat.



Bahia Honda State Park Natural Communities and Altered Landcover Types		
Landcovers	**Acreage**	**Percentage**
Marine Tidal Swamp	146.38	30%
Marine Substrate	135.15	27%
Developed	72.38	15%
Marine Tidal Marsh	52.64	11%
Beach Dune	36.73	7%
Coastal Berm	27.61	6%
Marine Seagrass Bed	18.20	4%
Spoil Area	0.96	0.1%
Key Tidal Rock Barren	0.54	0.1%
Total	**490.59**	**100%**

Annual Attendance: Fiscal Year 2009/10 - 2018/19



	Long Key	Curry Hammock	Bahia Honda	John Pennekamp	Fort Zachary Taylor
FY 09/10	89,426	73,846	484,070	721,091	388,521
FY 10/11	81,862	86,242	535,578	718,303	425,993
FY 11/12	58,033	115,360	557,785	725,619	456,452
FY 12/13	113,107	151,461	582,093	769,751	467,765
FY13/14	164,615	177,241	675,997	874,179	484,772
FY14/15	152,388	147,142	656,159	853,846	524,859
FY15/16	106,931	127,239	640,369	643,569	534,842
FY16/17	103,831	123,112	641,591	628,005	595,528
FY 17/18	41,945	72,898	370,222	465,511	529,809
FY 18/19	37,181	90,546	438,179	569,194	681,718

Hurricane Irma

On September 17, 2017, Hurricane Irma made landfall in the Florida Keys as a Category 4 hurricane. The storm's eye traversed across Cudjoe Key, just 15 miles west on US Highway 1 from Bahia Honda State Park. Maximum sustained winds reached speeds of 132 mph and storm surge was up as much as 8 feet. Given the size and strength of the storm, much of the park was devasted (as shown in the before and after images below). The park's main day use areas, support facilities, and main road were largely destroyed. Since 2017, park management and district staff have been hard at work rebuilding one of the most significant and treasured units of the Florida Park Service.













Post-Hurricane Irma Recovery

When Hurricane Irma made landfall on Cudjoe Key in 2017, the impact at Bahia Honda State Park was substantial. The oceanside shoreline was severely impacted, resulting in vegetative and infrastructure damage. The storm surge flowed into the secondary dune, and a deep wrack line was deposited approximately 180 feet from the shoreline. Sandspur campground and day use area were destroyed, the park road was heavily damaged, and Loggerhead Beach was severely damaged. Bahia Honda State Park was closed for two months to enable clean-up and debris removal. When the park reopened in November of 2017, only the area west of the ranger station was open to the public. Over time, native vegetation including sea lavender, bay cedar, railroad vine, sea oats, southern sea rocket, and inkberry slowly recruited along the shoreline, and the population of sea lavender is once again abundant. Overall, the beach has recovered from the impacts from Hurricane Irma. Loggerhead Beach required restoration and stabilization, and large boulders were installed to prevent erosion and protect the park road. Over 500 native plants, donated by the Dagny Johnson Key Largo Hammock Nursery, have been planted to aid in natural resource recovery.

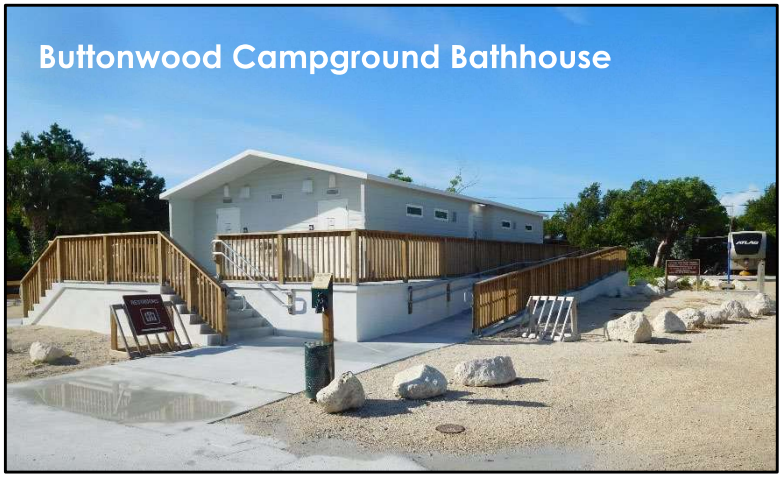
Infrastructure Repairs

Loggerhead Beach
Parking area fully rebuilt
Accessible beach ramp added
Restroom constructed to withstand Cat-5 storm
Three beach access stairs constructed
Accessible ramp added to concession building


Loggerhead Beach Restroom

Marina
Dredged to re-accommodate vessels
All fenders, posts, utilities repaired

Buttonwood Campground
Campground reopened
Utilities repaired at all sites
Bathhouse constructed to withstand Cat-5 storm


Buttonwood Campground Bathhouse

Cabins
New roofs, siding, interior furnishings

Sandspur Beach and Campground
Beach parking area ~50% complete
Restroom ~40% complete
Campground ~50% complete

Total Rebuild Cost to Date: $8.8 million

Resource Management Goals and Objectives

Hydrological Management

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

Objective: Conduct/obtain an assessment of the park's hydrological restoration needs.
Objective: Restore natural hydrological conditions and functions to approximately 8 acres of seagrass and mangrove salt marsh natural communities.

Natural Communities Management

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

Objective: Conduct habitat improvement activities on 10 acres of coastal berm, beach/dune, and mangrove natural communities.

Imperiled Species Management

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

Objective: Monitor and document 6 selected imperiled animal species.
Objective: Monitor and document 15 selected imperiled plant species.

Exotic Species Management

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

Objective: Annually treat 0.2 acres of exotic plant species in the park.
Objective: Implement control measures on 5 exotic animal species in the park.

Cultural Resource Management

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

Objective: Bring 3 of 11 recorded cultural resources into good condition.

Capital Facilities Goals and Objectives

Facilities and Infrastructure Management

Goal: Develop and maintain the capital facilities and infrastructure.

Objective: Improve/repair six existing use areas and 1.6 miles of road.

Cabin Area
Develop new cabins (2)
Add floating dock

Concession Area
Construct ADA paddling launch

Calusa Beach Day Use Area
Add small picnic pavilions (2)
Replace restroom
Improve landscaping
Redesign parking area
Improve fishing platform

Loggerhead Beach Day Use Area
Renovate storage facility
Create special events pavilion

Buttonwood Campground
Redesign site configuration

Parkwide
Improve park road

Optimum Boundary and Land Acquisition

Southwest of the park, several parcels totaling approximately 40 acres have been added to the park's optimum boundary and are identified for potential acquisition as funding becomes available. The parcels on located on West Summerland Key, which is also known as Spanish Harbor Key. These parcels include the Spanish Harbor borrow pit and adjacent land to the north of US Highway 1 between mile marker 34 and mile marker 35.3.

Introduction

Bahia Honda State Park is located in Monroe County in between Marathon and Big Pine Key (see Vicinity Map). Access to the park is from U.S. Highway 1, also known as the Overseas Highway, at Mile Marker 36 (see Reference Map).

Bahia Honda State Park was acquired on September 21, 1961 through a donation by Monroe County and later additions through the Save Our Coasts and Land Acquisition Trust Fund (LATF) programs. Currently, the park comprises 491.25 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) hold fee simple title to the park, and on January 23, 1968, the Trustees leased (Lease No. 2324) the property to the Division of Recreation and Parks (DRP) under a 99-year lease. The current lease will expire on January 22, 2067. In 1988, the Trustees assigned a new lease number, Lease No. 3609, to Bahia Honda State Park without making any changes to the terms and conditions of Lease No. 2324.

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

Purpose and Significance of the Park

The purpose of Bahia Honda State Park is to protect and preserve Bahia Honda Key which includes rare natural communities and one of the most recognizable segments of the Old Keys Bridges.

Park Significance

- The natural break in the offshore coral reef allows for the establishment of some of the largest segments of sandy and accessible beaches in the Florida Keys at the park.

- The park is home to the largest stand of silver palm (*Coccothrinax argentata*) in the continental United States and 43 other listed plant and animal species including the dune lilly thorn (*Catesbaea parviflora*), least tern (*Sternulla antillarum*), Atlantic green turtle (*Chelonia mydas*), and hawksbill turtle (*Eretmochelys imbricata*).

- The unique environment on Bahia Honda Key allows for a wider variety of recreational activities than on most other keys in the area. Park visitors can enjoy overnight accommodations in cabins or in one of the several campgrounds, fishing, swimming, paddling, snorkeling, wildlife viewing, hiking, and picnicking among many other activities. Boat tours are also provided to visitors to the Looe Key National Marine Sanctuary.

- Segments of Henry Flagler's railroad bridges built in the early 1900s are still important parts of the local landscape providing remarkable panoramic views of the key and surrounding waters.

Unit Classification

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

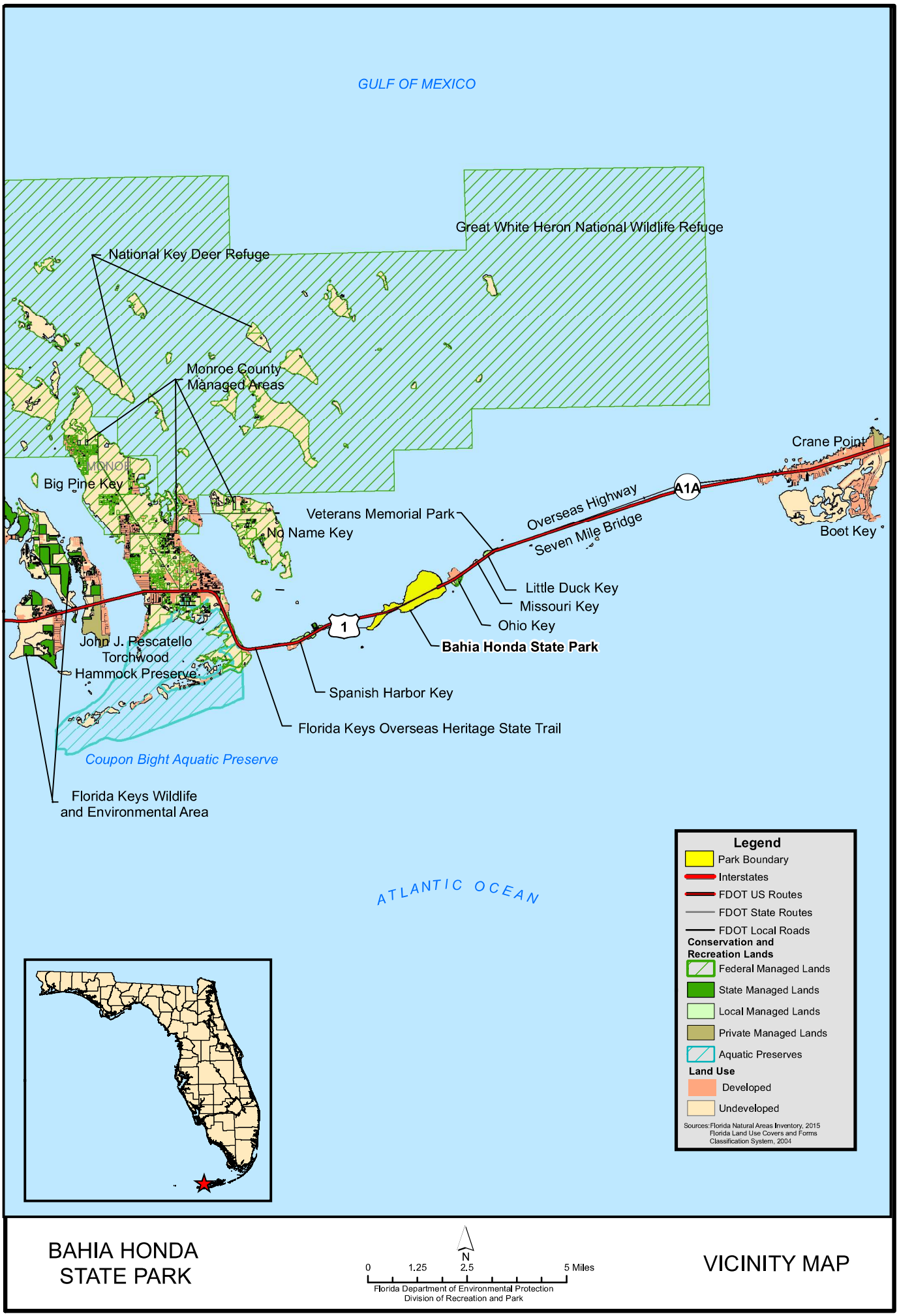
Purpose and Scope of the Plan

This plan serves as the basic statement of policy and direction for the management of Bahia Honda State Park as a unit of Florida's state park system. It identifies the goals, objectives, actions and criteria or standards that guide each aspect of park administration and sets forth the specific measures that will be implemented to meet management objectives and provide balanced public utilization. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and is intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the 2003 approved plan.

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

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

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



BAHIA HONDA STATE PARK

N

0 1.25 2.5 5 Miles

Florida Department of Environmental Protection
Division of Recreation and Park

VICINITY MAP



BAHIA HONDA STATE PARK

N

0 0.5 1 2 Miles

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

REFERENCE MAP

Secondary and Incompatible Uses

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

In the development of this plan, the potential of the park to accommodate secondary management purposes was analyzed. These secondary purposes were considered within the context of DRP's statutory responsibilities and the resource needs and values of the park. This analysis considered the park's natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For this park, it was determined that accepting clean fill to assist with efforts to restore borrow pits could be accommodated in a manner that would be compatible and not interfere with the primary purpose of resource-based outdoor recreation and conservation. This compatible secondary management purpose is addressed in the Resource Management Component of the plan.

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 accepting clean fill to assist with efforts to restore borrow pits would be appropriate at this park as an additional source of revenue for land management since it is compatible with the park's primary purpose of resource-based outdoor recreation and conservation.

Contract Services

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

Management Authority and Responsibility

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

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

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

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

Park Management Goals

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

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

Management Coordination

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

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

Public Participation

DRP provided an opportunity for public input by conducting a public hearing and an Advisory Group meeting to present the draft management plan to the public. These meetings were held on June 9th and 10th, 2016, respectively. Meeting notices were published in the Florida Administrative Register, June 1, 2016, Volume 42/Issue 106, included on the Department Internet Calendar, posted in clear view at the park, and promoted locally. The purpose of the Advisory Group meeting is to provide the Advisory Group members an opportunity to discuss the draft management plan (see Addendum 2).

Other Designations

Bahia Honda State Park is within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes. The park was designated as a component of the Florida Greenways and Trails System in 2002, a program administered by the Department's Office of Greenways and Trails as defined by Section 260, Florida Statute.

All waters within the park are designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. The Department also classifies surface waters in this park as Class III waters. This park is not within or adjacent to an aquatic preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes). However, the park is within the Florida Keys National Marine Sanctuary.

Resource Management Component

The DRP has implemented resource management programs for the perpetual preservation of representative examples of the state's significant natural and cultural resources. This component of the plan describes the natural and cultural resources of the park and identifies the methods that will be used to manage them. Management measures expressed in this plan are consistent with the DRP's overall mission in natural systems management.

The DRP's resource management philosophy is guided by the principles of natural systems management. Primary emphasis is placed on restoring and maintaining the natural processes that shaped the structure, function, and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management for imperiled species can be accommodated on a case-by-case basis and should be compatible with the maintenance and restoration of natural processes.

The DRP's management goal for cultural resources is to preserve sites and objects that represent Florida's cultural periods, significant historic events, or persons contributing to the history of Florida. This goal often entails active measures to stabilize, reconstruct, restore, or rehabilitate cultural resources. Appropriate public use of cultural resources will be considered according to the park's unit classification and the sensitivity of the resources.

Park units are often components of larger ecosystems, and their proper management can be affected by conditions that occur beyond park boundaries. Ecosystem management is implemented through an evaluation program that assesses resource conditions, refines management activities, and reviews local and regional development permit applications for park impacts.

The entire park is divided into management zones that delineate areas on the ground that are used to coordinate management activities (see Management Zones Map). The shape and size of each zone may be based on natural community type, burn zone, and the location of existing roads and fire breaks. Table 1 reflects the management zones with the acres of each zone.

Management Goals, Objectives, and Actions

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

Table 1. Bahia Honda State Park Management Zones			
Management Zone	**Acreage**	**Managed with Prescribed Fire**	**Contains Known Cultural Resources**
BH-01	0.54 acres	N	N
BH-02	221.24 acres	N	N
BH-03	36.35 acres	N	N
BH-04	49.89 acres	N	N
BH-05	44.56 acres	N	Y
BH-06	52.28 acres	N	N
BH-07	52.53 acres	N	Y
BH-08	33.76 acres	N	N

Topography

Bahia Honda is part of the physiographic region of high coral keys with maximum elevation of eight to ten feet, and less than two feet on Little Bahia Honda Key. The edge of the continental shelf parallels the Keys approximately seven miles offshore. Much of the park's total area is submerged land or intertidal, with depths that do not exceed ten feet.

Human activity has altered the natural topography of both the uplands and the submerged communities in the park. Dredging in the 1930s was conducted for construction of the Overseas Highway, excavating two borrow pits on the north side of the island. One of the borrow pits functions as a marina and boat basin while the second is located adjacent to the cabin and primitive camping area of the park. On either side of this second borrow pit are two spits of land that were created as a result of the dredging operation.

During development in the 1960s, a third borrow pit was dredged to develop land at the west end of the park. This borrow pit is connected to the marina and boat basin via a small mangrove channel and is utilized as a boat basin for campers and marina for the Florida Keys National Marine Sanctuary Law Enforcement.

Geology

The upper layer geologic formation of the Florida Keys from Soldier Key to Bahia Honda Key is Key Largo limestone. Built by the coral polyps of ancient coral reef formations, these fossilized remains are similar to the present living coral reefs offshore. As sea level has fluctuated over time, the land mass of South Florida has alternately been submerged and exposed above the level of the water. Approximately 120,000 years ago, sea level dropped close to its present level exposing the coral and allowing for the formation of the islands of the Florida Keys. When the area of the Keys is submerged, the limestone from ancient coral reefs provides the necessary substrate for new growth of coral formations and coral reefs. Subsequently, the Key Largo limestone is quite thick, as much as 145 feet in some areas of the Upper Keys (Hoffmeister, 1974).



BAHIA HONDA STATE PARK

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MANAGEMENT ZONES MAP

Soils

Information published in the U.S. Department of Agriculture's Classification and Correlation of the Soils of Monroe County Keys Area Florida identifies eight soil types at Bahia Honda State Park (see Soils Map). They are Matecumbe muck, Keylargo muck, Udorthents-Urban land complex, Rock outcrop-Cudjoe complex, Lignumvitae marl, Bahiahonda fine sand, Key West marl and Beaches.

Matecumbe muck can be found at the lower elevations that are subject to occasional flooding. It is moderately well drained and can be found in association with the poorly drained Cudjoe, Lignumvitae and Key West soils. Keylargo muck, Rock outcrop-Cudjoe complex, Lignumvitae and Key West marl are associated with mangrove tidal swamps. Bahiahonda fine sand is associated with the upland habitats at Bahia Honda. It is subject to flooding only during tropical storm events. Beaches are areas that are constantly being reworked by wind and tides. They consist of about 16 inches of sand underlain by approximately 44 inches of fine sand. Soils here are poorly drained. Udorthents-Urban land complex includes constructed upland areas where land has been altered by dredging and filling for development (United States Department of Agriculture, Natural Resources Conservation Service, 1995). Addendum 4 contains detailed soil descriptions for the park.

Management activities will comply with those practices that will best prevent erosion in order to conserve the soil resources of the park and the offshore water resources of the Florida Keys National Marine Sanctuary. These include protecting beach dune vegetation and augmenting planting of beach dune vegetation when necessary.

Minerals

Key Largo limestone is the major mineral deposit at Bahia Honda State Park. Minor mineral deposits include calcite and halite.

Hydrology

The primary natural source of freshwater in the Florida Keys is rain. Historically, early settlers collected rainwater in cisterns or used water from wells and solution holes that tapped the small, shallow freshwater lenses. These lenses form in the limestone above sea level during the rainy season. Until recently, nearshore freshwater upwelling, an extension of the Biscayne Aquifer, occurred in at least one location on northern Key Largo. Drainage of the Everglades and the subsequent canalization of southeast Florida (including canals in the Florida Keys) resulted in saltwater intrusion into the Biscayne Aquifer and changed the regional hydrology. Only on the larger islands such as Key Largo and Big Pine Key is rainwater retained for any length of time.

The major hydrological alteration in the park is a result of the development of U.S. Highway 1 after the destruction of the railroad. Both the railroad construction and the subsequent construction of the highway bisected the island's interior lagoon into two separate lagoons located in Management Zones BH-02 and BH-04. Because there are no culverts or other natural connections between these lagoons, they have operated independently of each other for close to a century.

There is minimal tidal movement on either side, but less so on the south side of U.S. 1 in zone BH-04 due to the location of the tidal creek at the south end of the zone. Sand accretion at the entrance to the tidal creek often times blocks water flow into this lagoon. The mangrove tidal creek leading into BH-03 and BH-02 has become overgrown and no longer allows an adequate flow of water to flush out the lagoon on the north side of U.S. 1 in zone BH-02. This alteration has adversely affected the quality of the lagoons and they no longer function as suitable habitat for fish or as feeding grounds for wading birds. Salinity levels in both lagoons are higher than in the surrounding nearshore waters.

Hydrological studies have been conducted with the possibility of using recent technology, direction boring, to reconnect the two lagoons. However, it was determined that this process would not accomplish restoration goals due to the other dynamics of the water flow into the lagoons.

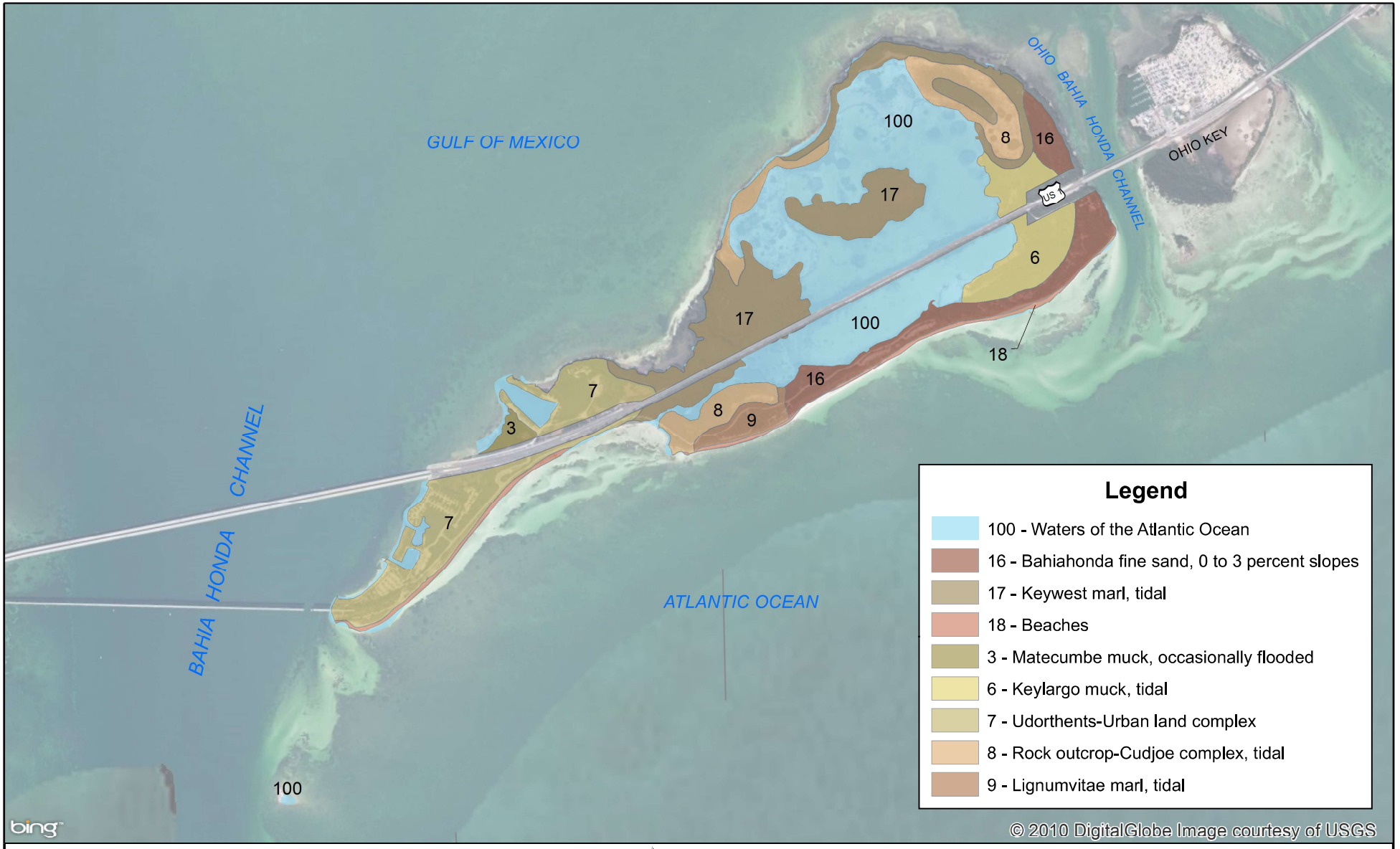
Hydrological alteration has also occurred in zone BH-08 due to development of the ranger residence particularly the development of the dirt road that leads to the residence area. Culverts were installed under this road, but they have never been large enough to allow for functional flow, which would have maintained connectivity between the mangrove habitats. Hydrological restoration in this management zone was completed in 2019 using funding from the Keys Restoration Fund.

The last area of hydrological alteration is in zone BH-07 on the road from the Buttonwood campground towards the bridge underpass. This area was dredged but the elevation is higher as the mangrove creek heads towards the bay on the north then it is further into the mangroves to the east. A small culvert is located under the bridge, but due to years of poor drainage and sediment accumulation, was no longer operational. Hydrological restoration at this site was completed in 2018 using funding from the Keys Restoration Fund.

Hydrological Management

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

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



BAHIA HONDA STATE PARK

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Department of Environmental Protection
Division of Recreation and Parks

SOILS MAP

Objective: Conduct/obtain an assessment of the park's hydrological restoration needs. The hydrology at Bahia Honda has been altered in six areas of the park in zones BH-02, BH-04, BH-07 and BH-08. Two restoration projects were completed in Management Zone BH-08 in 2018 and 2019.

Action 1.	Completed hydrological assessment of interior lagoons
Action 2.	Develop restoration plan for filling borrow pits
Action 3.	Implement restoration of borrow pits to functional seagrass habitat
Action 4.	Completed two restoration projects within mangrove habitat

The interior lagoons in BH-02 and BH-04, once a single ecosystem, were bisected during the construction of U.S. Highway 1 in the early 1930s. Due to decreased tidal flow, the lagoons are no longer as productive or functional as they once were. The absence of adequate flushing has resulted in higher salinities, decreased productivity as juvenile fish habitat and decreased productivity as feeding grounds. The most efficient and productive way to reconnect the lagoons and increase tidal flow is to install culverts under U.S. Highway 1. In the late 1990s a project was undertaken to measure and compare the tidal flow at key locations on the oceanside and bayside of the island. However, despite several days of data collection, the principle surveyor determined that there were too many variables, and he deemed the data to be invalid. Within the last two years, communication has opened again with the Florida Department of Transportation and other entities to address the restoration of these lagoons. A hydrological study has been conducted and determined that installing culverts under U.S. Highway 1 will not aid in the restoration of the interior lagoons due to the decrease in tidal flow from the two mangrove creeks into the northern and southern lagoons.

There are three borrow pits in the park that are at a depth of approximately 32 feet. The first in zone BH-08 is located between the cabins and the primitive camping area and was dredged for fill material for the construction of U.S. Highway 1. Two spits were created on either side of this borrow pit altering the natural mangrove shoreline. District staff have been working with the Keys Environmental Trust Fund to obtain permits necessary to fill this borrow pit in order to restore seagrass beds. The plan is to fill in the pit to a depth of six to eight feet. Although this is deeper than the adjacent seagrass beds, it will allow for the reestablishment of seagrass while still providing recreational use of the site.

The two borrow pits in zone BH-07 were dredged for fill material for the construction of U.S. Highway 1 and later for the development of the park. The first is utilized as a concession and public use marina and the second, which is connected to the first by a small mangrove creek, is used as a marina for the Florida Keys National Marine Sanctuary Law Enforcement and as a dockage for campers. Inadequate water flow in and out of this second marina has resulted in anoxic conditions as sediment has continued to settle without the ability for proper flushing. The Florida Keys Water Quality Committee is looking at sites throughout the Keys where similar conditions persist. There are no plans yet to improve water quality in this marina.

Hydrological alteration in zone BH-07 had adversely affected the health of a mangrove ecosystem. This site is located at the bridge that leads from the Buttonwood campground to the cabins. There are two issues that have impacted proper water flow; the end of the creek that flows into the water is at a

higher elevation than the rest of the creek, and the culvert under the bridge is not functional. Restoration at this site was completed in 2018 through funding from the Keys Restoration Fund. Monitoring continues within the mangrove ecosystem to evaluate health and recovery of the wetland. Staff manage excess debris that washes in during extreme high tides.

The second area of wetland alteration is in zone BH-08 on the road that leads to the ranger residences. This road was installed between two mangrove habitats, and fill material was dumped to the northeast of the road creating a berm and further affecting the tidal flow. Culverts that were placed under the dirt road have never been adequate to handle water flow. Historically the spring tides at the new and full moon did not create any issues, but the extreme high tides of the spring and fall associated with the new and full moon are so great that the road flooded for several day making access to and from the residences difficult. Restoration of this site was completed in 2019 through funding from the Keys Restoration Fund and monitoring will continue to evaluate health and recovery of the wetland.

Objective: Restore natural hydrological conditions and functions to approximately eight acres of Seagrass and Mangrove Salt marsh natural communities.

Action 1. Install approximately 219,000 cubic yards of material to restore seagrass habitat in the borrow pit

Once permits from the South Florida Water Management District and the Army Corp of Engineers are secured, filling the borrow pit in zone BH-08 can begin. This project will consist of working with contractors who are in need of disposing clean fill material, selecting a site near the project site for mobilization of the fill material, then once inspected, installing the material into the borrow pit. Typically, this material is large pieces of concrete from demolished buildings or bridges. Once the elevation is close to the desired depth, smaller sized fill material will be installed. The borrow pit is approximately 4.39 acres with a depth of approximately 32 feet, consistent with other borrow pits throughout the Keys. This will require approximately 218,715 cubic yards of fill material similar projects have been completed or are underway in Dagny Johnson Key Largo Hammock Botanical State Park with great success.

Four acres of mangrove salt marsh were restored in 2019 by installing culverts at the bridge and under the road to the ranger residences, dredging the end of the tidal creek by the bridge to an elevation that is lower than the creek, and removing the berm to the northeast of the road to increase tidal flow.

Natural Communities

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

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

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

The park contains nine distinct natural communities as well as altered landcover types. A list of known plants and animals occurring in the park is contained in Addendum 5.

Table 2. Natural Communities and Altered Landcover Types

Landcovers	Acreage	Percentage
Marine Tidal Swamp	146.38	30%
Marine Substrate	135.15	27%
Developed	72.38	15%
Marine Tidal Marsh	52.64	11%
Beach Dune	36.73	7%
Coastal Berm	27.61	6%
Marine Seagrass Bed	18.20	4%
Spoil Area	0.96	0.1%
Key Tidal Rock Barren	0.54	0.1%
Total	**490.59**	**100%**

Beach Dune – 36.73 acres

Desired future condition: A coastal mound or ridge of unconsolidated sediments found along shorelines with moderate to high energy waves. Vegetation will consist of herbaceous dune forming grass species such as sea oats (*Uniola paniculata*) and beach panicum (*Panicum amarum*). Other typical species may include sea rocket (*Cakile lanceolata*.), railroad vine (*Ipomea pes-caprae*), blue paspalum (*Paspalum caespitosum*), beach morning glory (*Ipomea imperati*), bay bean (*Canavalia rosea*), and sea purslane (Sesuvium portulacastrum). Occasionally shrubs such as beach elder (*Iva imbricata*), inkberry (*Scaevola plumieri*), bay cedar (*Suriana maritima*), and sea lavender (*Heliotropium gnaphalodes*) may be scattered within the herbaceous vegetation.

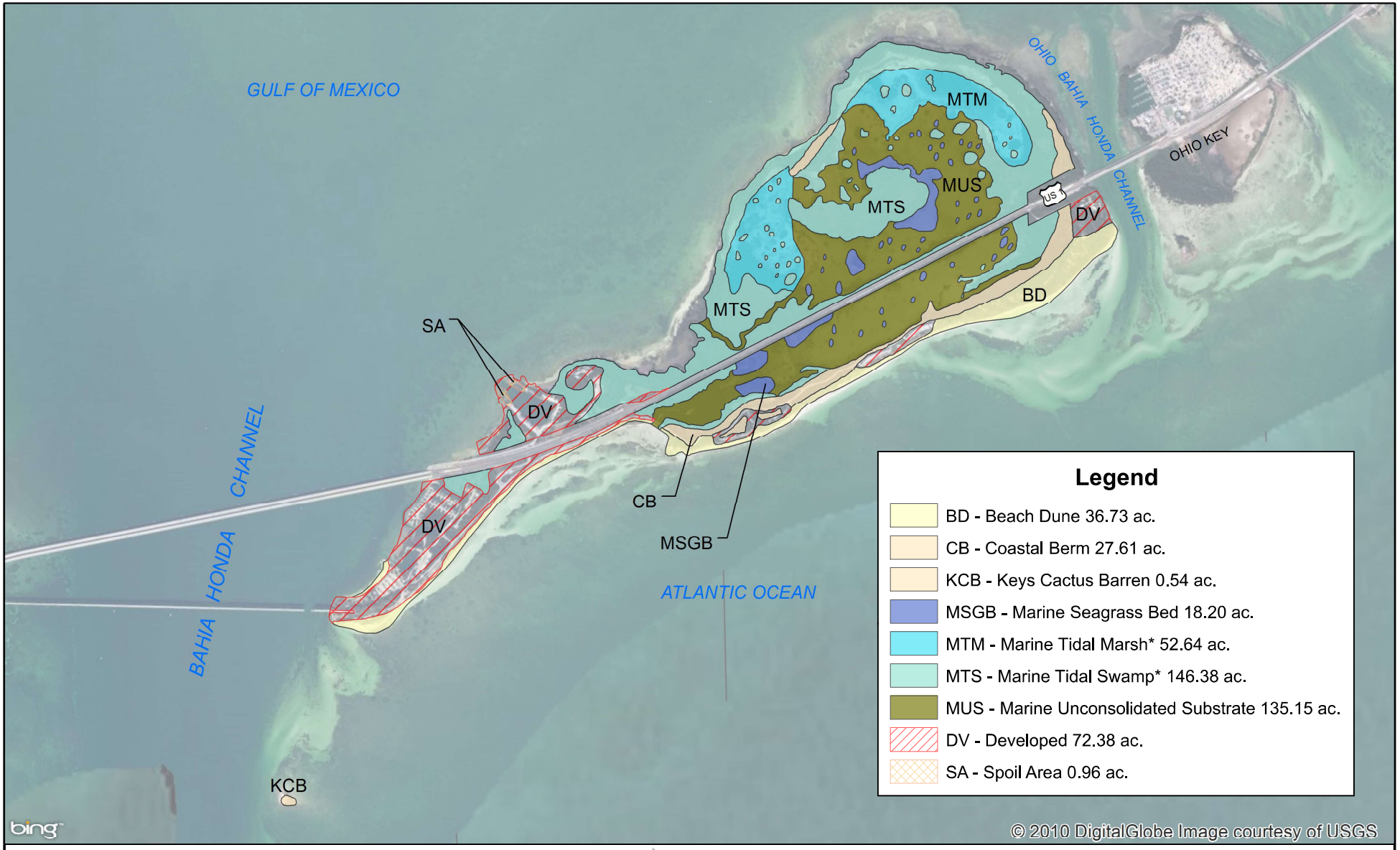
Description and assessment: The beach dune at Bahia Honda occurs along the south side of U.S. Highway 1 in zones BH-05, BH-06 and BH-07; and on the north side of U.S. Highway 1 in zone BH-07. The sand is organic in nature, composed of calcium carbonate particles derived mostly from calcareous algae, with minor additions from corals and mollusks.

Prior to Hurricane Irma, the beach dune in zones BH-05 and BH-06 was in excellent condition comprised of a naturally occurring beach and a well-developed primary and secondary dune system. Species common in the primary dune included sea oats, beach panicum, beach elder, wild poinsettia (*Euphorbia cyathophora*) southern sea rocket, railroad vine, bay cedar (*Suriana maritima*), Cuban clustervine (*Jacquemontia havanensis*) and inkberry. In addition, there is a significant population of the imperiled sea lavender, which has increased in abundance and distribution since Hurricane George impacted the island in 1998.

Fluctuations on sand accumulation occur and some beach erosion has taken place in zone BH-05 but minimal impacts were experienced in these two zones during the active 2004/2005 hurricane season.

When Hurricane Irma made landfall on Cudjoe Key in 2017, the impact at Bahia Honda State Park was substantial. The oceanside shoreline in Management Zones BH-05, BH-06, and BH-07 was severely impacted including vegetative damage/destruction and infrastructure damage. The storm surge flowed into the secondary dune, and a deep wrack line was deposited approximately 180 feet from the shoreline. Sandspur Campground and day use area were destroyed, the park road was damaged or destroyed, and Loggerhead Beach, at the western end of BH-07, was severely damaged. Additional impacts to the natural resources were inadvertently impacted from the construction clean-up, resulting in a significant loss of native species.

Bahia Honda State Park was closed for two months to enable clean-up and debris removal. Because of the issue of safety, and the absence of facilities in the Sandspur day use and Sandspur Campground, when the park opened again in November 2017, only the area west of the Ranger Station/entrance road was open to the public. Over time, native vegetation slowly recruited along the shoreline in all three management zones including sea lavender, bay cedar, railroad vine, sea oats, southern sea rocket and inkberry. The population of sea lavender is once again abundant in all three management zones.



BAHIA HONDA STATE PARK

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NATURAL COMMUNITIES MAP

During this time, non-native invasive species also recruited in including beach naupaka (*Scaevolea taccada*), Australian pine (*Casuarina equesitifolia*), portia (*Thespesia populnea*), and latherleaf (*Colubrina asiatica*). Regular efforts at exotic removal were conducted by park and District staff.

In 2018 least terns (*Sterna antillarum*) nested on the beach in Management Zone BH-06, adjacent to the Sandspur day use area. Fifteen nests were documented, and this colony was included in the Florida Fish and Wildlife's Florida Shorebird database. It is believed that a number of least tern individuals moved from the historic nest sites on the Old Bahia Honda Bridge to the beach as it provided more suitable habitat. Towards the end of the nesting season, over 140 least tern adults and juveniles were observed in the vicinity of the nesting colony.

Sea turtle nesting is documented in all beach areas in zones BH-05, BH-06, and BH-07, although activity on the bayside in zone BH-07 is limited and the primary nesting habitat occurs on the Atlantic side of the island. In zone BH-07, sea turtles have nested in remote areas along the edges of the parking lot. The majority of nesting sea turtles are loggerhead turtles (*Caretta caretta*), with hawksbill turtles (*Eretmochelys imbricata*) nesting more consistently on a bi-annual cycle. In 2009, a green turtle (*Chelonia mydas*) was observed in the early morning by park visitors and park staff. This was the first documentation of this species at Bahia Honda. A second green nest was documented in 2015. In 2016, a leatherback turtle (*Dermochelys coriacea*) nested at the park, the first documented leatherback in the Florida Keys. Although the nest contained 65 eggs, only 7 hatched, likely due to saltwater inundation from high tides which affected other sea turtle nests.

The beach dune habitat supports over thirty-nine species of shorebirds that forage on the amphipods found in the wrack line or in the nearshore waters along the beach. Quarterly shorebird surveys have been conducted in the park since the early 1990s, nesting shorebird surveys are conducted monthly from March – August, non-breeding surveys are conducted quarterly, and winter shorebird surveys are conducted annually. Species documented at the park include semipalmated plover (*Charadrius semipalmatus*), Wilson's plover, piping plover (*Charadrius melodus*), reddish egret (*Dichromanassa rufescens*), willet (*Tringa semipalmata*), ruddy turnstone (*Arenaria interpres*), laughing gull (*Leucophaeus atricilla*), least tern (*Sternulla antillarum*), semipalmated sandpiper (*Calidris pusilla*), and sanderling (*Calidris alba*). A sooty tern (*Onychoprion fuscatus*) and a glaucous gull (*Larus hyperboreus*) were observed, both of which stayed in the park for only a short period of time.

Ghost crabs (*Ocypode quadrata*) or their burrows are commonly found along the beach and southeastern five-lined skink (*Eumeces inexpectuatus*) can be observed in the primary dune.

A narrow freshwater marsh is located between the primary and secondary dune in zone BH-05. This freshwater interdunal swale is a unique component of the beach dune and is not known to occur anywhere else in the Florida Keys. Although this marsh has been adversely impacted by Hurricane Georges in 1998, the 2004/2005 Hurricane seasons, and by Hurricane Irma in 2017, the habitat has recovered and freshwater flora including saw grass (*Cladium jamaicensis*) persists. Freshwater levels fluctuate depending upon the season, being particularly low or dry during the winter months.

The beach in zone BH-07 has recovered from the impacts from Hurricane Irma, although there was beach loss at the western most end of the management zone. However, native vegetation including sea lavender, beach elder and inkberry have recruited in, helping to stabilize the shoreline. This area is narrower than the beach/dune habitat in Management Zone BH-05 because it has a less well-developed primary dune and no secondary dune. This management zone is known as Loggerhead Beach and required restoration and stabilization post-Hurricane Irma. Large boulders were installed to prevent erosion and protect the park road. Over 500 native plants, donated by the Dagny Johnson Key Largo Hammock Nursery have been planted in this management zone to aid in natural resource protection.

The small beach on the bayside of zone BH-07 is adjacent to the parking lot. This area was also impacted by Hurricane Irma, but to a lesser degree than the oceanside of the island. Although the small beach is subject to erosion particularly around several coconut palm (*Cocus nucifera*) trees.

Although the beach/dune habitat suffered impacts from Hurricane Irma, recovery continues and the natural community is in good condition.

General management measures: Most of the beach dune at Bahia Honda is in the desired future condition particularly in zone BH-05 where the secondary dune persists. In order to maintain this condition, non-native plant species particularly beach naupaka, portia, and other invasive species need to continue to be removed when found. Beach naupaka is a popular coastal landscape plant whose seeds float so the beach will always need consistent monitoring to eliminate recruits germinating on the beach/dune.

In the narrower sections of the beach dune in zone BH-07, it may not be possible to achieve the desired future condition. The area that is reinforced by large boulders has little to no dune vegetation and little to no beach even at low tide. In other areas of zone BH-07 where the beach is wider and natural dune vegetation is persisting, the beach has achieved its desired future condition.

The freshwater interdunal swale is in its desired future condition. Regular surveys for exotic infestation and unauthorized access are the management measures that can ensure that this unique habitat is maintained in this condition. However, it is subject to storm surges, saltwater inundation and drought, which are outside of the park's ability to manage.

Coastal Berm – 27.61 acres

Desired future condition: Coastal berm habitat is found on the seaward edge or landward edge of the mangroves or further inland depending on the height of the storm surge that formed them. They range in height from 1 to 10 feet. Structure and composition of the vegetation is variable depending on height and time since the last storm event. Coastal berm will consist of a mixture of tropical herbs, shrubs and trees and is defined by its substrate of coarse, calcareous, storm-deposited sediment forming long narrow ridges that parallel the shore. The most stable berms may share some tree species with rockland hammocks, but generally have a greater proportion of shrubs and herbs. Tree species may include blolly (*Guapira discolor*), gumbo limbo (*Bursera simaruba*), and poisonwood

(*Metopium toxiferum*). Characteristic tall shrub and short tree species include Spanish stopper (*Eugenia foetida*), hog plum (*Ximenia americana*), white indigo berry (*Randia aculeata*), seven-year apple (*Genipa clusiifolia*), blackbead (*Pithecellobium keyense*), and saffron plum (*Sideroxylon celastrinum*). Short shrubs and herbs include perfumed spiderlily (*Hymenocallis latifolia*), limber caper (*Capparis flexuosa*), wild lantana (*Lantana involucrata*), and rougeplant (*Rivina humilis*). More seaward berms or those more recently affected by storm deposition may support a suite of plants similar to beaches, including shoreline seapurslane (*Sesuvium portulacastrum*), saltgrass (*Distichlis spicata*), and seashore dropseed (*Sporobolus virginicus*), or dense shrub thickets with buttonwood (*Conocarpus erectus*), black, red, and white mangroves (*Avicennia germinans, Rhizophora mangle, and Laguncularia racemosa*), joewood (*Jacquinia keyensis*), and bushy seaside oxeye (*Borrichia frutescens*).

Description and assessment: The coastal berm at Bahia Honda is found in Management Zone BH-02 on the eastern side between the mangrove swamp and the salt marsh, in Management Zone BH-03 in a narrow fringe on the north side behind the mangrove swamp, in Management Zone BH-05 on the secondary dune, and in Management Zone BH-06 fragmented by the Sandspur campground. All of the coastal berm habitats provide critical habitat for wildlife particularly migrating birds and the white-crowned pigeon (*Patogioenas leucocephala*).

The coastal berm in zone BH-02 is in excellent condition and was not impacted by Hurricane Irma in 2017. There is minimal exotic infestation mainly portia and latherleaf, and regular exotic removal has been conducted in this management zone. Follow-up treatment needs to continue to ensure that recruits are treated and or removed. The coastal berm is orientated in a north-south direction grading into salt marsh to the west and mangrove swamp to the east. Vegetation includes hammock species such as poisonwood, blackbead, milkbark, darling plum (*Reynosia septentrionalis*), and silver palm (*Cocothrinax argentata*). The park was developed in the early 1960s except for the eastern end of the island that had remained in private ownership until the 1980s. Once the land was acquired, restoration was conducted to remove an entrance road and restore the original wetland elevations.

The coastal berm in zone BH-03 is located towards the northwest section of the zone on a narrow ridge just behind the fringing mangrove swamp. This habitat is in excellent condition. Although it is impacted by debris washed ashore during high tide or storm events, it was not adversely impacted by Hurricane Irma in 2017. Species found here include Spanish stopper (*Eugenia foetida*), blackbead, poisonwood, pigeon plum (*Coccoloba diversifolia*), and gumbo limbo.

The coastal berm in zone BH-05 was in excellent condition prior to the impacts from Hurricane Irma. The coastal berm is in the secondary dune on the southeast end of the island and was impacted by downed vegetation and a storm surge that washed to the edge of the habitat. Unauthorized spur trails were a problem in the past but many of these were covered over by debris washed ashore during storm events since 1998. Several trails persist but access on these trails appears to have decreased. This is the largest coastal berm habitat in the park and prior to Hurricane Irma, supported a host of imperiled species including two naturally occurring yellow wood (*Zanthoxylum flavum*) trees, Cuban clustervine, Garber's spurge (*Chamaesyce garberii*), dune lily thorn (*Catesbaea parviflora*), and the largest silver palm hammock in the Florida Keys. Other more common species found here include

poisonwood, gumbo limbo, seagrape (*Coccoloba uvifera*), red ironwood, blackbead, lantana, and black torch (*Erithalis fruticosa*). This site is one of the outplanting locations for the ongoing yellow wood augmentation project initiated in 1996. This management zone was also the location of the Silver Palm Nature Trail, which was destroyed in Hurricane Irma.

This habitat suffered a significant amount of damage during Hurricane Irma in 2017, although it has since recovered. Management Zone BH-05 is considered a protected area, so it is an area of the park that was not targeted for contractor cleanup after the storm. Despite the amount of damage, several of the imperiled species have recruited in including dune lily thorn and Cuban clustervine. Unfortunately, none of the outplanted or naturally occurring yellow wood trees survived the storm.

A portion of the coastal berm in zone BH-06 is fragmented by the Sandspur campground. Most of the habitat was in good condition prior to Hurricane Irma, although impacts were evident in the vegetation adjacent to the campsites. When the campground was open, garbage, trampling and habitat encroachment were the most obvious signs of use although certain areas also contain spur trails leading from the campsites to the main park drive. This area was a more mature coastal berm than that found in zone BH-05 as the main canopy species consisted of pigeon plum, milkbark, poisonwood and gumbo limbo with silver palm as an understory component. Hurricane Irma destroyed the campground and impacted much of the vegetation. Post storm cleanup also impacted native vegetation.

Prior to Hurricane Irma, the National Champion yellow wood persisted in this coastal berm along with one other naturally occurring individual. The majority of outplanted individuals that are part of the yellow wood conservation project were located in this management zone. In May of 2017, flowers were observed for the first time since the inception of this augmentation project on one of the outplanted yellow wood. Unfortunately, this plant did not survive the storm/cleanup. The National Champion is still persisting, but only two of the twenty-five outplanted individuals survived.

The coastal berm in Management Zone BH-06 also supports the only known manchineel trees (*Hippomane mancinella*) that occur in the park. This is a rare species that is known from only a few locations in the Florida Keys. Individuals had persisted on the south side of the park drive in the Sandspur campground, and survived Hurricane Irma. However, with the new construction of the Sandspur campground, it is unclear as to whether they persist. Prior to Hurricane Georges in 1998, there was a large individual adjacent to the bathhouse in the Sandspur campground.

The coastal berm in this zone also supports a host of wildlife including white-crowned pigeon, white-eyed vireo (*Vireo griseus*), palm warbler, prairie warbler (*Dendroica discolor*), northern mockingbird (*Mimus polyglottos*), great crested flycatcher (*Myiarchus crinitus*), peanut snail (*Cerion incanum*), green anole (*Anolis carolinensis*), six-lined racerunner (*Cnemidopherus sexlineatus*), land crab (*Cardisoma guanhumi*), golden orb weaver (*Nephila clavipes*), spinybacked orb weaver (*Gasteracantha cancriformis*), silver argiope (*Argiope argentata*), land crab, many species of resident and migrating birds, and a suite of butterfly and moth species.

The Miami Blue butterfly (*Cyclargus thomasi bethunebakeri*), once common throughout the Florida Keys, was believed to be extirpated from the Keys until a population was discovered in Bahia Honda in 1999. The University of Florida's Maguire Lab, under the direction of Dr. Jaret Daniels, established monitoring protocols and regularly surveyed for individuals in the park. Unfortunately, due to several factors, including the residual impacts from the cold snap in January 2010, the Miami blue was once again extirpated. The Maguire Lab has continued to work with the US Fish and Wildlife Service and the Florida Park Service on a captive breeding program. In an effort to conserve this species, it has been reintroduced at Bahia Honda and at Long Key State Park.

General management measures: In order to maintain or achieve the desired future condition of the coastal berm habitats in the park, continual exotic plant and animal species need to be addressed. Exotic plant species in the park are at a maintenance level so periodic follow-up treatment is necessary to treat or remove species that recruit in from outside sources. In areas where tides wash debris ashore, particularly in zone BH-03, regular shoreline clean-ups should be conducted. Unauthorized access needs to be prevented in order to maintain the integrity of the plant community and the protection of the imperiled species found in this habitat.

Keys Tidal Rock Barren – 0.54 acres

Desired Future Condition: Keys tidal rock barren is a flat rockland in the supratidal zone with much exposed and eroded limestone and a sparse cover of stunted halophytic herbs and shrubs, and it is inundated by salt water only during the extreme spring high tides. Patches of low, salt-tolerant herbaceous species will include bushy seaside oxeye (*Borrichia frutescens*), perennial glasswort (*Sarcocornia perennis*), saltwort (*Batis maritima*), saltgrass (*Distichlis spicata*) and seashore dropseed. Buttonwood (*Conocarpus erectus*) will be the dominant woody plant. It varies from stunted, sprawling, multi-stemmed shrubs to tree size. Other typical woody species are red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and christmasberry (*Lycium carolinianum*). At the transition to upland vegetation, buttonwood may be joined by a variety of shrubs and stunted trees of inland woody species, including saffron plum (*Sideroxylon celastrinum*), wild cotton (*Gossypium hirsutum*), blackbead, wild dilly (*Manilkara jaimiqui*), poisonwood and joewood. Keys tidal rock barren occurs above the daily tidal range but is subject to flooding by seawater during extreme tides and storm events. Salt spray from coastal winds, as well as shallow soils, may limit height growth of woody plants. Aside from bare rock substrate, discontinuous patches of thin marl soils may be present. Depressions with deeper peat and mud soils support mangrove swamp and salt marsh communities, dominated respectively by mangroves or Gulf cordgrass.

Description and assessment: Keys tidal rock barren occurs in Management Zone BH-01 on Little Bahia Honda Key approximately ¼ mile southwest of Bahia Honda. This island was scarified during Hurricane Georges in 1998 and only a few black mangrove trees had recruited onto the island. It was again impacted in 2017 by Hurricane Irma. The island is low in elevation so it is exposed to more frequent tidal influences and saltwater inundation than typical Keys tidal rock barren habitats and small mollusks including bleeding tooth nerite (*Nerita peloronta*), checkered nerite (*Nerita tessellata*), and black horn shell (*Batillaria minima*) are common in the tidal pools.

Little Bahia Honda Key was historically utilized by nesting least terns and a proactive program was in place in the 1990s to encourage their use of the island for nesting. However, due to unauthorized access during the nesting season and lack of regular patrol, nesting success decreased. As a result, the island has ceased to be part of the park's nesting enhancement efforts and because of the impacts of Hurricane Georges, it is no longer considered suitable to support bird nesting.

General management measures: Sediment accumulation and establishment of herbaceous vegetation will restore this island to its former conditions. Ensuring that exotic species do not become established on Little Bahia Honda Key will be necessary in order to maintain the desired future condition of this habitat.

Mangrove Swamp – 146.38 acres

Desired Future Condition: Typically a dense forest occurring along relatively flat, low wave energy, marine and estuarine shorelines. The dominant overstory includes red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood. These four species can occur either in mixed stands or often in differentiated, monospecific zones based on varying degrees of tidal influence, levels of salinity, and types of substrate. Red mangroves typically dominate the deepest water, followed by black mangroves in the intermediate zone, and white mangroves and buttonwood in the highest, least tidally influenced zone. Mangroves typically occur in dense stands (with little to no understory) but may be sparse, particularly in the upper tidal reaches where salt marsh species predominate. When present, shrub species can include seaside oxeye (*Borrichia arborescens, B. frutescens*) and gray nickerbean (*Caesalpinia bonduc*), and vines including coinvine (*Dalbergia ecastaphyllum*), and rubbervine (*Rhabdadenia biflora*), and herbaceous species such as saltwort (*Batis maritima*), shoregrass (*Monanthocloe littoralis*), perennial glasswort (*Sarcocornia perennis*), and giant leather fern (*Acrostichum danaeifolium*) can be found along the edges of the mangrove swamp. Soils are generally anaerobic and are saturated with brackish water at all times, becoming inundated at high tides. Mangrove swamps occur on a wide variety of soils, ranging from sands and mud to solid limestone rock. Soils in South Florida are primarily calcareous marl muds or calcareous sands and along Central Florida coastlines, siliceous sands. In older mangrove swamps containing red mangroves, a layer of peat can build up over the soil from decaying plant material (primarily red and black mangrove roots).

Description and assessment: Mangrove swamp is found throughout the park. It is the shoreline habitat on the north side of the island; occurs within the lagoon in zones BH-02 and BH-04; on the backside of zone BH-05; in zone BH-06 on either side of the entrance channel to the lagoon; in zone BH-03 to the west of the lagoon; throughout zone BH-08 and on the fringe of the upland area where the cabins are located; and in zone BH-07 in the Buttonwood campground and the habitat surrounding the smaller marina. Most of these areas were impacted during Hurricane Irma and there has been a major die-off due to both wind damage and the deposition of wrack on the mangrove roots. However, red mangrove new propagule recruitment has been observed.

In the early 1990s, an old road on the southeast side of BH-02 was removed and the topography restored to its historic elevation. This area has recruited in with red mangroves and black mangrove

pneumatophores and although the footprint of the old road is obvious in that the adjacent habitat is denser, this has become part of the overall functional mangrove swamp. The mangrove swamp in BH-05 occurs on either side of the road that leads to two residences. Culverts under the road allow for connectivity of water flow, but the culverts will need to be maintained in order for the habitats to remain in good condition.

Two areas of mangrove swamp had been in fair condition due to the disruption of tidal movement. The first is in BH-08 on the road leading to the ranger residence. The fill material that was installed in order to provide access to the residence area had never had adequate culverts, so the tidal flow has been disrupted since the road installation. There was also a berm to the northwest of the road past a sparsely vegetated salt pan that had added to the disruption of tidal flow. Restoration of this mangrove swamp was completed in 2019 with funding from the Keys Restoration Fund and will be monitored for success and recovery of the habitat.

The second area is on the bayside leading from the Buttonwood camping to the bridge underpass in zone BH-07. This site consisted of a mangrove creek that led from the bayside through a mangrove habitat ending behind the Assistance Park Managers residence. When this creek was dredged, the elevation at the end leading into the Gulf of Mexico was excavated at a higher elevation than the rest of the mangrove creek preventing adequate tidal movement. The culvert under the bridge was not an adequate size when installed so over time there had been a decrease in tidal movement and an increase in sediment accumulation. Restoration of this mangrove swamp was completed in 2018 with funding from the Keys Restoration Fund and will be monitored for success and recovery of the habitat. Water flow through this mangrove creek has improved but will require maintenance when extreme high tides wash in wrack or other debris.

General management measures: In order to achieve or maintain the condition of the mangrove swamp along the shoreline, debris washed in by the tides needs to continually be removed. In the area adjacent to the ranger residence and in the Buttonwood campground, exotic species particularly portia and Brazilian pepper (Schinus terebinthifolia) need to be managed.

Salt Marsh – 52.64 acres

Desired Future Condition: Expanses of grasses, rushes and sedges along coastlines of low wave-energy and river mouths. Smooth cordgrass (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*) are indicator species that typically form dense stands and will be delineated by elevation. Smooth cordgrass can tolerate daily inundation and dominates at lower elevations while black needlerush is found where the marsh floods less frequently. Other common plants will include saltwort (*Batis maritima*), glassworts (*Salicornia bigelovii* and *S. perennis*), bushy seaside oxeye (*Borrichia frutescens*), saltgrass (*Distichlis spicata*), and seashore paspalum (*Paspalum vaginatum*). Soils will range from saturated to inundated and vary considerably from deep mucks to fine sands but always contain a high salt content limiting biodiversity of plants

Description and assessment: Salt marsh is found on the east side of zone BH-02, and on the west side of the lagoon in zone BH-03. Persisting on slightly higher elevation than the adjacent mangrove

swamp and slightly lower elevations than the adjacent coastal berm, the salt marsh habitat is in excellent condition and was not adversely impacted by Hurricane Irma in 2017. The salt marsh in zone BH-02 was part of a restoration project in the early 1990s when an old road and surrounding fill were removed once that section of the island came into state ownership. Species found in both locations include Christmas berry (*Lycium carolinianum*), sea purslane (*Sesuvium portulacastrum*), sea ox-eye daisy, chaff flower (*Alternanthera flavescens*), saltwort and buttonwood. A variety of insects include silver argiope, spinybacked orb weaver, Cassius blue butterfly (*Leptotes cassius theonus*), West Indian buckeye (*Junonia evarete*), and mangrove skipper (*Phocides igmalion*) as well as fiddler crab (*Uca pugilator*) and marsh rabbit (*Sylvilagus palustris*).

General management measures: The salt marsh has achieved its desired future condition. However, to maintain this status, it will be necessary to continue to conduct exotic plant species removal.

Composite Substrate

Desired Future Condition: Marine composite substrate will consist of a combination of natural communities including seagrass beds, consolidated substrate and unconsolidated substrate. Because composite substrate is a combination of community types, floral and faunal components from any of these communities may be found in the composite substrate habitat, so species diversity is often times greater than the surrounding habitats.

Description and assessment: The composite substrate community forms a mosaic with associated submerged communities dependent upon depth, substrate composition and floral and faunal species composition. Therefore, the composite substrate community represents an ecotonal community where plant and animal species diversity is high. At Bahia Honda, the composite substrate community is in excellent condition and extends along the north side of the park. It is a mixture of seagrass, macroalgae and open, sandy substrate and includes species such as thorny starfish (*Echinaster sentus*), variegated urchin (*Lytechinus variegates*), West Indian sea biscuit (*Meoma ventricosa*), mantis shrimp (*Pseudosquilla ciliata*), shrimp (*Palaemonetes spp.*), blue crab (*Callinectes sapidus*), chicken liver sponge (*Chondrilla nucula*), vase sponge (*Ircinia campana*), upside down jellyfish (*Cassiopeia xamachana*), golfball coral (*Favia fragum*), finger coral (*Porites furcata*), turtle grass (*Thalassia tedtudinum*), shoal grass (*Halodule wrightii*), and fern algae (*Caulerpa sertularioides*).

General management measures: The habitat needs to be protected from the physical damage of boat grounding events.

Consolidated Substrate

Desired Future Condition: Consolidated substrate is characterized by Key Largo limestone substrate with minimal sediment accumulation. This habitat is also known as hardbottom and often times consist of a combination of macroalgae, octocoral and stony coral species. Because there is minimal sediment accumulation, seagrass does not thrive in this environment.

Description and assessment: The consolidated substrate at Bahia Honda is found in the submerged land southwest of zone BH-01. This is an important community because it provides a foundation for the development of other marine communities. Since seagrass does not thrive in this habitat, it is dominated by macroalgae including *Penicillus spp.*, *Halimeda spp.* and *Acetabularia sp.* Other species found in this habitat include golfball coral, finger coral, pink-tipped anemone (*Condylactis gigantean*), massive starlet coral (*Siderastrea siderea*), and Queen conch (*Strombus gigas*) as well as a variety of fish species common in the shallow waters off the Florida Keys.

General management measures: The consolidated substrate at Bahia Honda is in good condition. However, there is the potential for impact particularly to the stony coral species in this habitat. Such impacts would be a result of physical damage from boat vessels, canoes or kayaks accessing the island, or by park visitors walking on or touching the corals. In order to achieve the desired future condition, regular surveys will be necessary to monitor the condition of the coral species including monitoring for disease, coral bleaching and damage from physical impacts. Noting changes in water quality and long-term sea surface temperature shifts will add to protection of the species found in the consolidated substrate.

Seagrass Bed – 18.20 acres

Desired Future Condition: Seagrass beds are typically characterized as expansive stands of vascular plants and are one of the most productive communities in the world. Seagrass beds will occur in clear, coastal waters where wave energy is moderate. The three most common species of seagrasses in Florida are turtle grass, manatee grass (*Syringodium filiforme*), and shoal grass. Other seagrasses of the genus Halophila may be intermingled, but species of this genus are considerably less common. Seagrass beds require unconsolidated substrate in order to establish their underground biomass root structure. They will typically be found in waters ranging from 20° to 30°C (68° to 86°F) and require clear water for photosynthesis. Seagrass beds will not thrive where nutrient levels are high because of increased turbidity and competition of undesirable algal species.

Seagrass beds provide important habitat for a host of commercially and recreationally important species. Most species spend part or all of their life cycle in the seagrass, which provides food, oxygen and shelter. Seagrass blades trap suspended sediment in the water allowing clear water to be transported to the offshore coral reefs during tidal movement.

Most species migrate between the coral reef, seagrass beds and mangrove communities on a diurnal, seasonal, or life cycle pattern, which provides food, oxygen and shelter. Seagrass stabilize sediment in the water allowing clear water to be transported to the offshore coral reefs during tidal movement.

Description and assessment: The majority of the seagrass bed at Bahia Honda is in good condition with most of this habitat located on the outer edge of the unconsolidated substrate in a clear delineation where park visitors have not waded into the nearshore, shallow waters. Here there have been impacts from propeller scars where vessels travel too close to the shoreline in water that is too shallow for the draft of the vessel. The other site where seagrass is found is in the interior of the lagoon mixed with unconsolidated substrate.

The three species of seagrass found in the park are turtle grass, shoal grass, and manatee grass. Turtle grass is the climax species while shoal grass and manatee grass are the pioneer species and first to colonize into open and/or disturbed sites. Shoal grass has a greater tolerance for salinity and temperature fluctuations and is therefore typically found in areas where extreme conditions occur nearshore and in areas of minimal water depth. The morphology of its root structure enables shoal grass to colonize open or disturbed areas stabilizing the sediment for the heavier rooted turtle grass. Manatee grass can be found in association with the other two species but is less common in the park.

Macroalgae are found in association with the seagrass community although they are not as abundant in a climax seagrass bed that is predominantly a monoculture of turtle grass. These include *Penicillus spp.*, *Halimeda spp.*, *Udotea spp.*, *Acetabularia sp.*, *Caulerpa spp.* and *Batophora sp.* Several non-reef building species of coral are found in this habitat including golfball coral, rose coral (*Manicina areolata*), and finger coral. Massive starlet coral is also found in the seagrass beds in the park, but it is considered a major reef building coral in the offshore coral reef habitat. These coral species are adapted to the higher salinity and temperature conditions of a seagrass bed, and are able to survive in water with higher suspended sediment than is typical of the offshore coral species. Other animals found in the seagrass include echinoderms, crustaceans, fish, worms, sponges, and epiphytic species that attach themselves to the turtle grass blades.

General management measures: In order to achieve the desired future conditions, the seagrass habitat needs to be protected from boat grounding events. Keeping motorized vessels out of shallow water will ensure that no physical impact occurs to this habitat. The seagrass bed in the interior of the lagoons will achieve its desired future condition by improved flushing by currents and tides on both sides of U.S. Highway 1. Because the alteration of this lagoon system neither side is able to successfully flush out providing an adequate exchange of water. This leads to an increase in salinity and sea surface temperatures that has compromised the functionality of these ecosystems.

Unconsolidated Substrate – 135.15 acres

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

Description and assessment: The unconsolidated substrate occurs in zones BH-02 and BH-04 and in the nearshore waters on the Atlantic side of the island that are not included in the natural communities map. The unconsolidated substrate in zones BH-02 and BH-04 are part of the interior lagoon system. Prior to the development of U.S. Highway 1 in the early 1930s, this lagoon was one large ecosystem. Road construction bisected the lagoon into two smaller ecosystems. This has had an impact on the health of these two areas as the tidal movement on each side has been compromised. In zone BH-02

on the north side of U.S. 1, the mangrove creek that tidally connected to the lagoon has become overgrown so water flow has decreased. On the south side of U.S. 1 in zone BH-04, the only area of tidal exchange is through a small creek that flows underneath the bridge leading to the east end of the island. Due to sediment movement, the entrance to this creek is often times blocked not only with sandy substrate, but also with large amount of wrack material. This wrack line eventually disperses with changes in currents and tides.

The unconsolidated substrate is also found in the channels on the east and west side of the island and in the nearshore waters because of use by park visitors enjoying the subtropical marine environment. Snorkeling in the seagrass beds is a favorite activity along with enjoying the warm waters by the beach. Because of physical impact, the seagrass beds that once occurred close to the shoreline have been replaced by the sandy unconsolidated substrate.

General management measures: The unconsolidated substrate at Bahia Honda has achieved is desired future condition; however, the lagoon ecosystem has been comprised due to the decreased tidal flow. The lagoons used to be productive ecosystems that supported a diversity of wading birds, fish and other organisms that moved in with the tides. In order to restore the habitats to their desired future conditions the two lagoons need to be reconnected to improved tidal flow.

Clearing – 0.96 acres

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

Description and assessment: The only cleared area in the park is behind the residences at the east end of the island. This area has been disturbed and was historically utilized as a deposition site for coconut palm fruits and fronds. As a result, a monoculture of coconut palms has become established, however park staff have been conducting exotic removal projects at this site in order to restore the coastal berm habitat. The surrounding coastal berm habitat includes many imperiled species including Cuban clustervine, small flowered lily thorn, silver palm and Garber's spurge.

General management measures: Coconut palms and associated debris will need to be removed. This will enhance the coastal berm habitat that supports several imperiled plant species that are limited in their range throughout the Florida Keys and the mainland U.S.

Developed – 72.38 acres

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

Other management measures include proper stormwater management and development guidelines that are compatible with prescribed fire management in adjacent natural areas.

Description and assessment: The developed areas of the park include the Sandspur camping area and Sandspur day use in zones BH-05 and BH-06; the west end of the park in zone BH-07 which includes the Administration Building, Nature Center, Concession and two marina facilities, Buttonwood campground, shop, two residences and the bridge embankment to the Old Bahia Bridge, zone BH-08 which includes the cabins and primitive camping including a borrow pit, and the ranger residences and two residences at the west end of the island in zone BH-05.

When Hurricane Irma made landfall in September 2017, much of the infrastructure in the park was damaged or destroyed including:

- A Park Ranger resident at the east end of the island
- The Sandspur Campground
- The Sandspur day use area
- The bathhouse in the Buttonwood Campground
- The bathroom facility by the Administration Building
- The Nature Center and residence
- The Administration Building
- The Concession

As of 2020, the Sandspur day use and Sandspur Campground are being redeveloped, the Park Ranger residence at the east of the island has been replaced by a recreational vehicle, the bathhouse in the Buttonwood Campground has been rebuilt, the bathroom facility the Administration Building has been rebuilt, the Nature Center has been repaired, the Concession has been repaired, and the residence above the Nature Center is being repaired.

General management measures: Maintenance of exotic plant and animal species will be necessary in order to achieve the desired future condition of the developed areas in the park. It will also be necessary to evaluate the water quality and sediment accumulation in the second marina where the Florida Keys National Marine Sanctuary vessels are maintained. The poor water flow into this marina has resulted in increased sedimentation and anoxic conditions on the marina floor.

Natural Communities Management

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

The DRP practices natural systems management. In most cases, this entails returning fire to its natural role in fire-dependent natural communities. Other methods to implement this goal include large-scale restoration projects as well as smaller scale natural communities' improvements.

Prescribed Fire Management: Prescribed fire is used to mimic natural lightning-set fires, which are one of the primary natural forces that shaped Florida's ecosystem. Prescribed burning increases the abundance and health of many wildlife species. A large number of Florida's imperiled species of plants and animals are dependent on periodic fire for their continued existence. Fire-dependent natural communities gradually accumulate flammable vegetation; therefore, prescribed fire reduces wildfire hazards by reducing these wild land fuels. Bahia Honda State Park does not contain any fire adapted communities so prescribed fire is not a resource management tool utilized at this park.

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

Examples that would qualify as natural community restoration, requiring annual restoration plans, include large mitigation projects, large-scale hardwood removal and timbering activities, roller-chopping and other large-scale vegetative modifications. The key concept is that restoration projects will go beyond management activities routinely done as standard operating procedures such as routine mowing, the reintroduction of fire as a natural process, spot treatments of exotic plants, small-scale vegetation management.

Other than the hydrologic restoration mentioned above to restore seagrass and mangrove tidal swamp, there are currently no natural communities restoration projects necessary at Bahia Honda.

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

Objective: Conduct natural community/habitat improvement activities on 10 acres of coastal berm, beach/dune and mangrove communities.

Action 1. Continue exotic plant and animal species removal programs.
Action 2. Continue to monitor visitor activity in natural communities surrounding public use areas.

Natural community improvement at Bahia Honda State Park will be achieved through continued exotic plant and animal species removal program discussed below. Maintenance of these communities also entails monitoring and managing public activities on the trails, and natural communities adjacent to public use areas particularly the Sandspur campground.

Imperiled Species

Imperiled species are (1) tracked by FNAI as critically imperiled (G1, S1) or imperiled (G2, S2); or (2) listed by USFWS, FWC, or FDACS as endangered, threatened or of special concern.

Bahia Honda supports a host of imperiled plant species several of which are found in only a few other locations in the Florida Keys including small-flowered lilythorn, manchineel, Cuban jacquemontia and yellow wood. Protecting the habitat from exotic species encroachment and unauthorized access will protect most of the imperiled species in the park, however, specific measures have been taken to enhance, augment or reintroduce imperiled species in the park.

In 1996 a conservation project to augment the population of yellow wood in the coastal berm hammock was initiated in partnership with Fairchild Tropical Botanic Garden. Historically the population of yellow wood on the island was abundant, but only four trees remained. Park development in the 1960s, including the construction of park roads, resulted in the destruction of most of the yellow wood trees. Yellow wood is historically native to the lower Florida Keys including the Marquesas, the West Indies, the Bahamas, Cuba, Puerto Rico, St. Lucia, the Greater Antilles and Bermuda. Due to habitat destruction throughout its limited range and the use of the wood for furniture production, yellow wood is now a rare tree and persists in the wild only at Bahia Honda State Park and in the Key West National Wildlife Refuge. This species is dioecious, meaning that male and female flowers are borne on separate trees. The four remaining trees at Bahia Honda were female, flowers were not being pollinated so the fruits were sterile. The conservation project was initiated to augment the population from fruits collected from the Key West National Wildlife Refuge and from a tree on the Key West Golf Course on Stock Island. The goal of the project was to establish a self-sustaining population, as well as to understand the biology, morphology, phenology and seed storage capabilities of yellow wood. Seeds were collected over several collecting trips to both islands, maintained in the nursery at Fairchild Tropical Botanic Garden, and outplanted in 1999, 2001 and 2002. The individuals were monitored every quarter for growth rate, reproductive status and overall condition. Of the fifty-seven that were outplanted twenty-nine were persisting in August 2017.

According to the literature, yellow wood reaches reproductive maturity at seven years, however the first flowers did not develop until May 2017 on an individual in close proximity to the National Champion. This tree produced male flowers, so there was a high likelihood for pollination of the National Champion tree.

When Hurricane Irma made landfall in September 2017, eleven of the twenty-five outplanted individuals survived. Unfortunately, post Irma clean-up removed all but two of these individuals. The National Champion is the only one of the four original wild individuals that survived the storm.
Prior to 1998 when Hurricane Georges hit the Florida Keys, one sea lavender plant persisted on the west end of the island near the Administration Building. Nine months post Hurricane Georges, the population spread throughout the island particularly on the beach on the oceanside. Prior to Hurricane Irma, there were over 400 individuals in the park, but many were destroyed by the storm. As of 2020, many sea lavender have recruited in along the length of the shoreline and it is once again, an abundant species.

Cuban jacquemontia was found along the outer edge of the dune in zone BH-06, in the coastal berm in zone BH-05 and BH-06, and along the park drive in zone BH-06. The only other population of this species in the Florida Keys is in north Key Largo in Dagny Johnson Key Largo Hammock Botanical State Park. Both populations were mapped using a Trimble GPS unit.

When Hurricane Irma made landfall, it altered the habitat where Cuban jacquemontia was thriving. Surveys conducted in the coastal berm habitat in Management Zone BH-05 documented a resurgence of this population.

Bahia Honda supports the largest silver palm hammock in the Florida Keys. The primary and secondary dunes that support the coastal berm habitat are rare for the Florida Keys since very few naturally occurring beaches are found along the shoreline. Mangroves are the dominant shoreline habitat due to the protection of the offshore coral reefs resulting in low energy wave action from the coral reef to the water's edge.

Although the coastal berm habitat was impacted during Hurricane Irma, and many silver palm trees were knocked over, the silver palm population remains in good condition.

West Indian mahogany (*Swietenia mahagoni*) and lignum vitae (*Guajacum sanctum*) are outside their historic range of the upper Florida Keys and are therefore considered cultivated in the park. Efforts should be made to remove the mahogany trees since they have the potential to adversely impact the natural communities in the park. The lignum vitae is a specimen tree by the entrance.

All naturally occurring imperiled plant species have been mapped using a Trimble GPS unit. These were recorded as either individual occurrences, or as polygons occurring within a natural community where population size is significant. This information will be updated when significant alterations to the habitat occur such as tropical storm or hurricane events, or when impacts to individual populations from other sources are observed such as disease or damage from human impacts.

A population of the Miami blue butterfly (*Cyclargus thomasi bethunebakeri*) was discovered at Bahia Honda in 1999 and later expanded to several distinct colonies. Except for a few records from the Bahamas, the Miami blue butterfly is endemic to South Florida. Though occasionally found further north and further inland, this species was once abundant in coastal areas from Hillsborough and Volusia Counties south through the Florida Keys. It is believed that habitat destruction and fragmentation as well as application of mosquito spraying have resulted in the extirpation of the Miami blue throughout most of its range, so the discovery of the population in the park was very significant. Once discovered, researchers from the University of Florida, park staff, and Florida Fish and Wildlife Conservation Commission regularly monitored the population. However, the cold weather event of early 2010 severely impacted many populations of butterflies and the Miami blue had not been documented since July 2010.

The Florida Park Service took on a more active role in the protection of this species including establishing interagency partnerships and hiring a short-term Miami blue butterfly biologist. The role of the Miami blue biologist was to manage the habitat where the butterfly had persisted, remove exotic

plant and animal species, draft a Miami Blue Butterfly Management Plan and to conduct regular surveys for the Miami Blue as well as other butterfly species that were once more common in the park. The Miami Blue Butterfly Management Plan can be found in Addendum 9. The Maguire Lab at the University of Florida continued to partner with these agencies as well as with the US Fish and Wildlife Service on the conservation of the Miami blue butterfly. The Lab received funding for and established a captive breeding program. In 2019, there was enough genetic stock to reintroduce the Miami blue at Bahia Honda State Park and at Long Key State Park.

The imperiled massive starlet coral and other coral species are found in the hardbottom communities particularly around Little Bahia Honda Key in zone BH-01. Regular monitoring should be conducted to evaluate colony condition, presence of coral bleaching, coral disease or physical impacts.
Park staff survey the beach daily from March through October for nesting sea turtle activity. Each successful nest is marked and screened against predators. False crawls are flagged and monitored for potential activity. Post hatchling evaluations are conducted to determine clutch size, rate of successful hatchlings and number of unhatched eggs.

Although sea turtle nest numbers are not high due to the length and width of the beach at Bahia Honda, loggerhead sea turtles account for most of the nests. Hawksbill turtles have been documented for the park in 2000, 2002, 2004, 2006, 2009, 2014 and 2016 and typically nest on the bayside. It is important to note that Bahia Honda has been documented for having the most frequent nesting occurrences of hawksbill turtles in the continental United States. The principle nesting sites for hawksbill are in Mexico, Puerto Rico, Barbados and Panama.

In April 2009, a green sea turtle was discovered nesting at the park. This was the first documentation of this species for Bahia Honda. A second nest was documented in 2015. In 2016, a leatherback sea turtle was discovered as having nested only as the young were emerging. Of the 65 eggs, only 7 hatched, likely due to saltwater inundation from abnormal high tides.

Quarterly shorebird surveys have been conducted since 1990 to document presence, species abundance and activity. Other shorebird surveys include the annual winter surveys, quarterly non-breeding surveys and monthly nesting shorebird surveys conducted between March and August. Least terns and Wilson's plovers once nested at Bahia Honda at Little Bahia Honda Key and on the spits located adjacent to the cabins. Little Bahia Honda Key is no longer suitable for nesting. Unauthorized access and predation were issues on the spits by the cabins in zone BH-08 so a fence was erected, and the area was closed during nesting season. In the late 2000s the substrate was enhancement in an effort to provide suitable habitat. Due to the continual problem of unauthorized access, predators, and mangrove recruitment, this site no longer supports suitable habitat.

In 2018, 15 least tern nests were documented in Management Zone BH-06 when that section of the park was closed post Hurricane Irma. By the August 2018 Florida Shorebird Alliance survey, over 140 adults and juveniles were documented in this management zone.

An American crocodile (*Crocodylus acutus*) was observed in 2006 and is only occasionally documented in the park.

A Key deer (*Odocoileus virginiamus clavium*) was observed post Hurricane Irene in 1999 but only for a short period. No Key deer have been observed since this occurrence.

Table 3 contains a list of all known imperiled species within the park and identifies their status as defined by various entities. It also identifies the types of management actions that are currently being taken by DRP and identifies the current level of monitoring effort. The codes used under the column headings for management actions and monitoring level are defined following the table. Explanations for federal and state status as well as FNAI global and state rank are provided in Addendum 7.

Table 3. Imperiled Species Inventory

Common and Scientific Name	Imperiled Species Status				Management Actions	Monitoring Level
	FWC	USFWS	FDACS	FNAI		
PLANTS						
Locustberry *Byrsonima lucida*			LT	G4G5, S3	2,10	Tier 3
Small-flowered lilythorn *Catesbaea parviflora*			LE	G3?, S1	2,10	Tier 3
Garber's spurge *Chamaesyce garberi*		LT	LE	G1,S1	2,10	Tier3
Silver palm *Coccothrinax argentata*			LT	G4,S3	2,10	Tier 3
Rhacoma *Crossopetalum rhacoma*			LT	G5,S3	2,10	Tier 3
Milkbark *Drypetes diversifolia*			LE	G4,S2	2,10	Tier 3
Lignum vitae - cultivated *Guajacum sanctum*			LE	G2,S1		Tier 1
Sea lavender *Heliotropium gnaphalodes*			LE	G4,S3	2,10	Tier 4
Manchineel *Hippomane mancinella*			LE	G5.S2	2,10, 13	Tier 3
Cuban jacquemontia *Jacquemontia havanensis*			LE	G5,S1	2,10	Tier 3
Sky blue morning glory *Jacquemontia pentanthos*			LE	G4G4, S2	2,10	Tier 3
Joewood *Jacquinia keyensis*			LT	G4,S3	2,10	Tier 3
Key thatch *Leucothrinax morrisii*			LE	G4G5,S 2	2,10	Tier 3
West Indian mahogany - cultivated *Swietenia mahagoni*			LT	G3G4, S3		Tier 1
Florida thatch palm *Thrinax radiata*			LE	G4G5, S2	2,10	Tier 3
Yellow wood *Zanthoxylum flavum*			LE	G4?, S1	2, 3, 10,13	Tier 4

Table 3. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
INVERTEBRATES						
Massive starlet coral *Siderastrea siderea*				G4,S2	10, 13	Tier 1
Spottail goby *Ctenogobius stigmaturus*				G2,S2	10	Tier 2
Florida white *Appias drusilla*				G5, S2S3	10	Tier 2
Miami Blue butterfly *Cyclargus thomasi bethunebakeri*	ST			G3G4, T1	2,10, 12,13, 14	Tier 3
Malachite *Siporeta stelenes*				G5,S2	2,10	Tier 2
REPTILES						
American crocodile *Crocodylus acutus*	FT	LT		G2,S2	10, 13	Tier 1
Atlantic loggerhead *Caretta caretta*	FT	LT		G3,S3	8,10, 13	Tier 2
Green turtle *Chelonia mydas*	FT	LT		G3,S3	8,10, 13	Tier 2
Leatherback turtle *Dermochelys coriacea*	FE	FE		G2S2	10, 13	Tier 2
Hawksbill turtle *Eretmochelys imbricata*	FE	LE		G3,S1	8,10, 13	Tier 2
BIRDS						
Great White Heron *Ardea herodias occidentalis*				G5T2, S2	10, 13	Tier 2
Piping Plover *Charadrius melodus*	FT	LT		G3,S2	10, 13	Tier 2
Little Blue Heron *Egretta caerulea*	ST			G5,S4	10, 13	Tier 2
Reddish Egret *Egretta rufescens*	ST			G5,S2	10, 13	Tier 2
Tricolored Heron *Egretta tricolor*	ST			G5,S4	10, 13	Tier 2
Merlin *Falco columbarius*				G5,S2	10, 13	Tier 2
Peregrine Falcon *Falco peregrinus*				G4,S2	10, 13	Tier 2
American Kestrel *Falco sparverius*	ST			G5T4, S3	10, 13	Tier 2
Magnificant Frigatebird *Fregeta magnificans*				G5,S1	10, 13	Tier 2
Caspian Tern *Hydroprogne caspia*				G5,S2	10, 13	Tier 2

Table 3. Imperiled Species Inventory						
Common and Scientific Name	**Imperiled Species Status**				**Management Actions**	**Monitoring Level**
	FWC	**USFWS**	**FDACS**	**FNAI**		
Woodstork *Mycteria americana*	ST	FT		G4,S2	10, 13	Tier 2
Sooty Tern *Onychoprion fuscatus*				G5,S1	10, 13	Tier 2
White-crowned Pigeon *Patagioenas leucocephala*	ST			G3,S3	10, 13	Tier 2
Roseate spoonbill *Platalea ajaja*	ST			G5,S2	10, 13	Tier 2
Least tern *Sternulla antillarum*	ST			G4,S3	10, 13	Tier 2
Sandwich tern *Thalasseus sandvicensis*				G5,S2	10, 13	Tier 2
MAMMALS						
Key Deer (accidental) *Odocoileus virginianus clavium*	FE	LE		G5T1, S1	10, 13	Tier 1
West Indian Manatee *Trichechus manatus latirostris*	FT	LT		G2,S2	10, 13	Tier 1

Management Actions

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

Monitoring Level

Tier 1. Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches).

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

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

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

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

Imperiled Species Management

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

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

In the preparation of this management plan, DRP staff consulted with staff of the FWC's Imperiled Species Management or that agency's Regional Biologist and other appropriate federal, state and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant species, DRP staff consulted with FDACS. Data collected by the USFWS, FWC, FDACS and FNAI as part of their ongoing research and monitoring programs will be reviewed by park staff periodically to inform management of decisions that may have an impact on imperiled species at the park.

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

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

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

Action 1. Continue to implement monitoring for six imperiled animal species

The Miami blue butterfly was reintroduced to the park in 2019 and monitoring is conducted by staff from the University of Florida Maguire Lab. Park and District staff will continue to work cooperatively on an interagency level to protect this species in the park. A Florida Fish and Wildlife Conservation Commission Imperiled Species Management Plan has been drafted. In addition, a Florida Park Service Miami Blue Butterfly Management Plan can be found in Addendum 9.

Continue to monitor nesting sea turtle nesting and evaluate nests post emergence. Continue to conduct nesting shorebird surveys to monitor for presence of focal species in the park. Continue to conduct non-breeding shorebird surveys. Continue to conduct quarterly shorebird surveys. Continue to conduct U.S. Fish and Wildlife Service annual census for piping plovers. Annually monitor the stony coral species particularly around Little Bahia Honda Key in zone BH-01 for adverse impacts from physical contact, disease and bleaching.

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

Action 1. Continue yellow wood conservation project
Action 2. Monitor imperiled plant species

Continue the long-term yellow wood conservation project. Of the fifty-seven that were outplanted in 1999, 2001 and 2002, twenty-five were persisting prior to Hurricane Irma. One flower in May 2017 was a male plant. However, this individual was destroyed in Irma. Of the eleven that survived the Hurricane, all but two were destroyed by contractor cleanup. Quarterly monitoring is conducted to measure growth, reproductive status and overall condition. The goal of this project is to establish a self-sustaining population within the park.

All imperiled species have been mapped using a Trimble GPS unit. This project will be updated as needed, particularly after major events like tropical storms or hurricanes, which may significantly alter the population size and distribution.

Exotic and Nuisance Species

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

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

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

The threat of exotic plant infestations at Bahia Honda comes from species found on the island in the ranger residence area and the DOT right-of-way, and from those spread by birds, mammals, wind and

water. The most serious threats to the park are beach naupaka, Brazilian pepper, portia, latherleaf, coconut palm (*Cocos nucifera*) and lead tree (*Leucaena leucocephala*). The seeds of beach naupaka and latherleaf float so they drift in with tides and storm events and will always require follow-up surveys particularly on the beach in zones BH- 04, BH-05, BH-06 and BH-07. Lead tree is an Exotic Pest Plant Council Category II species that is especially problematic in the Florida Keys and ranks as a Category I with the Florida Keys Invasive Exotic Task Force. It is difficult to kill, and the seeds can persist in the seed bank for at least seven years. Numerous exotic removal projects have been conducted at Bahia Honda including Bureau of Invasive Plant Management contractor projects, Resource Management Team projects, exotic removal technicians and park and district staff projects. Since the approval of the last UMP for the park in 2003, over 176 acres have been treated.

The population of green iguanas throughout the Florida Keys has significantly increased in the last five years. The concern with this population explosion is the potential impacts on the native plant recruitment if iguanas eat flowers, thus preventing fruits from forming. This is especially critical for the imperiled species within the park. Feral and domestic cats are also prevalent in the Florida Keys and adversely impact songbirds and nesting birds. Black rats are abundant throughout the Keys and are found in the park. Northern curly tailed lizards (*Leiocephalus carinatus armouri*) have also been expanding throughout the Florida Keys, and are found at Bahia Honda. This exotic reptile is fast moving and difficult to capture. Lionfish have also become abundant throughout the Florida Keys. Several workdays have been organized to eradicate this species, but it will be an ongoing effort. When exotic animals are observed in the park, they are removed according to the protocols established in the Operations Manual. Over 1,000 exotic animals have been removed since 2003.

Table 4 contains a list of the Florida Exotic Pest Plant Council (FLEPPC) Category I and II invasive and exotic plant species found within the park. The table identifies relative distribution for each species and the management zones in which they are known to occur. An explanation of the codes follows the table. For an inventory of all exotic species found within the park, see Addendum 5.

Table 4. Inventory of FLEPPC Category I and II Exotic Plant Species

Common and Scientific Name	FLEPPC Category	Distribution	Management Zone(s)
PLANTS			
Sisal hemp *Agave sisalana*	II	0	BH-07
Green shrimp plant *Blechum pyramidatum*	II	2	BH-07
Coconut palm *Cocos nucifera*	II	2	BH-05, BH-06, BH-07, BH-08
Latherleaf *Colubrina asiatica*	I	2	BH-02, BH-04, BH-05, BH-06
Egyptian grass *Dactyloctenium aegyptium*	II	3	BH-05, BH-06, BH-07, BH-08
Pothos *Epipremnum pinnatum*	II	2	BH-08
Laurel fig *Ficus microcarpa*	I	2	BH-08

Table 4. Inventory of FLEPPC Category I and II Exotic Plant Species			
Common and Scientific Name	**FLEPPC Category**	**Distribution**	**Management Zone(s)**
Life plant *Kalanchoe pinnata*	II	2	BH-08
Lead tree *Leucaena leucocephala*	II	2	BH-06, BH-07, BH-08
Guinea grass *Panicum maximum*	II	2	BH-02
Bowstring hemp *Sansevieria hyacinthoides*	II	2	BH-05
Beach naupaka *Scaevola sericea*	I	2	BH-05, BH-06, BH-07
Brazilian pepper *Schinus terebinthifolia*	I	2	BH-05, BH-07, BH-08
Porterweed *Stachytarpheta cayennensis*	II	0	BH-05, BH-06, BH-08
Tropical almond *Terminalia catappa*	II	0	BH-05
Portia *Thespesia populnea*	I	2	BH-02, BH-08
Oyster plant *Tradescantia spathacea*	II	2	BH-08
Puncture vine *Tribulus cistoides*	II	2	BH-07, BH-08
Washington palm *Washingtonia robusta*	II	0	BH-08
ANIMALS			
Brown anole *Anolis sagrei*			All upland
Rock dove *Columba livia*			All upland
Domestic cat *Felix dometicus*			Developed
Green iguana *Iguana iguana*			All upland
Northern curly-tailed lizard *Leiocephalus carinatus armouri*			Developed
Cuban tree frog *Osteopilus septentrionalis*			All upland
Lionfish *Pterois volitans*			Submerged
Black rat *Rattus rattus*			All upland
Norway rat *Rattus norvegicus*			Developed
Eurasian collared dove *Streptopelia decaocto*			All upland
Ringed turtle dove *Streptopelia risoria*			Developed

Distribution Categories

0 No current infestation: All known sites have been treated and no plants are currently evident.
1 Single plant or clump: One individual plant or one small clump of a single species.
2 Scattered plants or clumps: Multiple plants or small clumps of a single species within the gross area infested.
3 Scattered dense patches: Dense patches of a single species scattered within the gross area infested.
4 Dominant cover: Multiple plants or clumps of a single species that occupy a majority of the gross area infested.
5 Dense monoculture: Generally, a dense stand of a single dominant species that not only occupies more than a majority of the gross area infested, but also covers/excludes other plants.
6 Linearly scattered: Plants or clumps of a single species generally scattered along a linear feature.

Exotic Species Management

Goal: Remove exotic and invasive species and conduct needed maintenance control.

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

Objective A: Annually treat 0.2 acres of exotic plant species in the park.

Action 1. Continue to conduct exotic plant removal in the park.

Park staff, district staff and Resource Management Team projects will conduct exotic removal treatment for Category I and II species. The goal will be to treat exotic species that either have re-sprouted or have recruited into the site following previous exotic removal treatments. The park will treat approximately 0.2 acres of invasive exotic plants annually. Hand pulling target species is the desired method of exotic control and is attainable at Bahia Honda with follow-up treatment. Regular patrols along the beach in zones BH-05, BH-06 and BH-07 will control any invasive species that are brought in by tides or storms, particularly beach naupaka. All invasive exotic species need to be removed from the ranger residence area.

Objective B: Implement control measures on five exotic animal species in the park.

Action 1. Actively remove iguanas and other exotic animal species in the park.

Staff and volunteers will continue to remove iguanas from the park according to the approved protocols found in the Operations Manual. Feral and free roaming cats must be removed from the park to prevent adverse impacts to native wildlife including imperiled bird species. Nuisance raccoons are removed from the park as needed. Regular surveys and removal of lionfish are conducted. Staff is encouraged to report sighting by park visitors. Black rats are removed from residence areas.

Cultural Resources

This section addresses the cultural resources present in Bahia Honda State Park that may include archaeological sites, historic buildings and structures, cultural landscapes, and collections. The Florida Department of State (FDOS) maintains the master inventory of such resources through the Florida Master Site File (FMSF). State law requires that all state agencies locate, inventory and

evaluate cultural resources that appear to be eligible for listing in the National Register of Historic Places. Addendum 8 contains the management procedures for archaeological and historical sites and properties on state-owned or controlled properties, the criteria used for evaluating eligibility for listing in the National Register of Historic Places and the Secretary of Interior's definitions for the various preservation treatments (restoration, rehabilitation, stabilization and preservation). For the purposes of this plan, significant archaeological site, significant structure and significant landscape means those cultural resources listed or eligible for listing in the National Register of Historic Places. The terms archaeological site, historic structure or historic landscape refer to all resources that will become 50 years old during the term of this plan.

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

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

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

Pre-Historic and Historic Archaeological Sites

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

Description: The Florida Master Site File lists one archaeological site (8MO02117) at Bahia Honda. This site has been found to contain 20th century historic refuse including ceramics and a railroad mechanic's button and is associated with a natural spring that was once located on the south shore prior to erosion of the eastern end of the island.

In 2013 a predictive model was completed for the upland portions of Bahia Honda State Park excluding the submerged resources of the park. A digital elevation model (DEM) was incorporated from aerial LiDAR data in order to determine the potential for additional cultural resources. Ground-truthing surveys were then conducted using GPS and camera equipment in order to determine prospective cultural resources.

An archaeological sensitivity model was developed for Bahia Honda State Park. This model included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys or recordation of sites within the park vicinity. Matrix variables present in the park included coastal relationship, soils, and negative factors that are associated with drainage. Cultural factors included the presence of NRHP eligible sites and resource travel corridors.

In Bahia Honda State park, the previously recorded sites both within the park boundaries and those that are associated with the Florida Keys Overseas Heritage Trail, are captured in the high sensitivity areas of the park's models. The sensitivity model found that of the 341.21 upland acres within Bahia Honda, 110.47 acres or 32.24% were considered to be high sensitive areas for cultural resources. Zero acres were considered to be medium sensitive areas for cultural resources, and 230.75 acres or 67.76% were considered to be low sensitive areas for cultural resources (Collins, et.al 2013).

Condition Assessment: The natural spring associated with the Bahia Honda 1 site (8MO02117) is no longer believed to be functional. Artifacts associated with this site, the noted button and the pottery, had been collected and sent to Division of Historic Resources (DHR). Any additional artifacts, if discovered, should be left in place and reported to DHR.

General management measures: Protection of the coastal berm habitat will potentially protect any additional artifacts discovered at this site. Since the function of the Natural Spring has been altered by the alteration of the Biscayne Aquifer, little can be done to restore the site.

Historic Structures

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

Description: The historic bridge known as the Old Bahia Honda Bridge (8MO1311), is part of a resource group known as the Overseas Highway Railway Bridges and is managed by the DEP Florida Keys Overseas Heritage Trail. However, the section of the old bridge that is connected to the rest of

the island, is within the boundary of Bahia Honda State Park. A trail enables park visitors to view the Old Bahia Honda Bridge and the surrounding waters. There are nine other recorded historic structures recorded at the park that are actively used for recreational and staff support purposes. These include Administrative Office/Apartment (8MO03368), Nature Center (8MO03369), Nature Center Storage Building (8MO03370), Bayside Picnic Shelter 1 (8MO03371), Bayside Picnic Shelter 2 (8MO03372), Bayside Picnic Shelter 3 (8MO03373), Bayside Picnic Shelter 4 (8MO03374), Bayside Picnic Shelter 5 (8MO03375), and Maintenance Shop (8MO03376).

Condition Assessment: The section of site 8MO1311 that is within the park's boundary is in fair condition. A recent survey found that there was a compromise to the structural integrity, particularly towards the terminus, and the bridge has been cordoned until repairs can be conducted. All other sites, except for sites 8MO03371, 8MO03372, and 8MO03373, are in good conditions. These three picnic pavilions are in fair to poor condition as a result of impacts from Hurricane Irma.

General management measures: Bridge repairs will be necessary in order to maintain the structural integrity of the Old Bahia Honda Bridge that is within the park's boundary. Repairs should be made to historic structures damaged by Hurricane Irma, unless removal is deemed necessary.

Collections

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

Description: Collections associated with the natural history of the park include bird displays, specimen shells, display shells, marine mollusk egg casings, sea beans and an aquarium all located in the Sand and Sea Nature Center. Most of the specimens were obtained from within the park boundaries including the fish that were collected from the nearshore waters. The overall square footage of the Sand and Sea Nature Center is approximately 400ft² and the collections are maintained within this square footage.

Condition Assessment: The collections in the Sand and Sea Nature Center are in good condition. Materials such as shells and other items that are easily collected from the park and are replaced when the existing ones become damaged. The Nature Center building is old and in need of repair. It is also subjected to impacts from storm events more so from flooding than from potential wind damage. The birds are displayed in Plexiglas cases, and most of the specimen shells and sea beans are displayed behind two glass cases. The educational and hands on shells are displayed for public access.

Level of Significance: The collections in the Sand and Sea Nature Center interpret various aspects of the natural resources of the park. There is also interpretive information about the Flagler Railroad including brochures and a place where park visitors can view movies related to the natural and cultural resources of the park and the Florida Keys. There is a live video camera mounted on the old Bahia Honda Bridge that transmits sea life activity on a monitor in the Nature Center.

General management measures: The collections are maintained in a climate-controlled environment. Several of the collections are contained within Plexiglas providing them with further protection. The biggest threat to the collections in the park comes from damage to the building in the event of a tropical storm or hurricane.

Table 5 contains the name, reference number, culture or period, and brief description of all the cultural sites within the park that are listed in the Florida Master Site File. The table also summarizes each site's level of significance, existing condition and recommended management treatment. An explanation of the codes is provided following the table.

Table 5. Cultural Sites Listed in the Florida Master Site File

Florida Master Site File Site Name & Number	Culture/Period	Description	Significance	Condition	Treatment
8MO1131 Old Bahia Honda Bridge	American, 20th Century	Bridge	NR	F	ST
8MO02117 Bahia Honda 1	American, 20th Century	Natural spring, minimal artifacts	NE	NE	N/A
8MO03368 Admin Office	American, 20th Century, 1961	Admin office & apartment	NE	G	P
8MO03369 Nature Center	American, 20th Century, 1961	Nature center, apartment, & office building	NE	G	P
8MO03370 Nature Storage	American, 20th Century, 1961	Nature center storage building	NE	G	P
8MO03371 Picnic 1	American, 20th Century, 1961	Picnic pavilion	NE	F	P
8MO03372 Picnic 2	American, 20th Century, 1961	Picnic pavilion	NE	F	P
8MO03373 Picnic 3	American, 20th Century, 1961	Picnic pavilion	NE	P	P
8MO03374 Picnic 4	American, 20th Century, 1961	Picnic pavilion	NE	G	P
8MO03375 Picnic 5	American, 20th Century, 1961	Picnic pavilion	NE	G	P
8MO03376 Shop	American, 20th Century, 1969	Maintenance shop	NE	G	P

Significance
NRL National Register listed
NR National Register eligible
NE Not Evaluated
NS Not Significant

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

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

Cultural Resource Management

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

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

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

Florida law further requires that DRP consider the reuse of historic buildings in the park in lieu of new construction and must undertake a cost comparison of new development versus rehabilitation of a building before electing to construct a new or replacement building. This comparison must be accomplished with the assistance of DHR.

Objective A: Annually assess and evaluate 11 recorded cultural resources in the park.

Any notable changes to the condition of these historical resources will be reported in an update to the Florida Master Site File. Any artifacts that are found in the vicinity of these sites or elsewhere at the park will be reported to DHR.

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

There are no known sites at Bahia Honda that need to be added to the Florida Master Site File

Objective C: Bring 3 of 11 recorded cultural resources into good condition.

The section of the Old Bahia Honda Bridge that is managed by the park needs to be stabilized so that its structural integrity enables park visitors to access the terminus.

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.

A timber management analysis was not conducted for this park since its total acreage is below the 1,000-acre threshold established by statute. Timber management will be re-evaluated during the next revision of this management plan.

Coastal/Beach Management

DRP manages over 100 miles of sandy beach, which represents one-eighth of Florida's total sandy beach shoreline. Approximately one-quarter of Florida's state parks are beach-oriented parks and account for more than 60 percent of statewide park visitation. The management and maintenance of beaches and their associated systems and processes is complicated by the presence of inlets and various structures (jetties, groins, breakwaters) all along the coast. As a result, beach restoration and nourishment have become increasingly necessary and costly procedures for protecting valuable infrastructure. All of these practices affect beaches for long distances on either side of a particular project. DRP staff needs to be aware of and participate in the planning, design and implementation of these projects to ensure that park resources and recreational use are adequately considered and protected. Bahia Honda supports three miles of beach on the Atlantic Ocean and approximately 1/8 mile on the Gulf of Mexico side of the park. A narrow section of beach on the west side of zone BH-07 has been reinforced by large boulders.

Erosion is not a problem for most of the east side of the island in zones BH-05 and BH-06 since there is a functional dune system. However, there has historically been an erosion problem in several areas in zone BH-07. The narrow beach along the park drive where it is reinforced by boulders, is subject to major erosion in storm events. Damage to the park road has been an issue during several hurricanes since 1998.

The beaches at Bahia Honda support nesting sea turtles and shorebirds. Because the wrack line is maintained, there is a significant food source for shorebirds and many species are found foraging through the natural debris that washes ashore.

The beach at Bahia Honda is one of the few naturally occurring beaches in the Florida Keys. Due to the minimal wave action, a result of the coral reefs offshore, the natural shoreline is predominantly mangroves. The three miles of beach provides a popular tourist destination and visitor use can be heavy during the summer or holiday weekends, and during the winter months when the population of the Keys increases due to the influx of seasonal residents. This heavy use impacts natural resources including dune vegetation, damage to seagrass beds, shorebird disturbance and unauthorized collection of marine organisms. Offshore issues include incompatible visitor use such as boating and kite surfing that can impact the park visitors' ability to safely enjoy the nearshore waters.

In addition to management of the beach at Bahia Honda, the park also manages the 400ft of submerged land from the mean high water mark. This is most important on the oceanside where impacts from boat access has the potential to damage the submerged resources of the park, particularly the seagrass beds in the nearshore waters and the coral in the vicinity of Little Bahia Honda Key. Establishing “No Motor Zone” areas would minimize the potential damage.

Sea Level Rise

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

Additional Considerations

Due to the population of Miami Blue butterfly at Bahia Honda, the Florida Park Service entered into an agreement with the Florida Fish and Wildlife Conservation Commission to allow ground mosquito spraying at Bahia Honda only at the discretion of the park manager, and only in certain areas of the park. Spraying is limited to the shop and the ranger residence area. It is the responsibility of the park staff to ensure that the Monroe County Mosquito Control follow the established protocols for spraying within the park.

Land Management Review

Section 259.036, Florida Statutes, established land management review teams to determine whether conservation, preservation and recreation lands titled in the name of the Board of Trustees are being managed for the purposes for which they were acquired and in accordance with their approved land management plans. The managing agency shall consider the findings and recommendations of the land management review team in finalizing the required update of its management plan (see Addendum 8).

Bahia Honda State Park was subject to a land management review on January 25, 2000. The review team made the following determinations:

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

Land Use Component

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

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

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

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

Bahia Honda State Park is located in Monroe County, about 9.5 miles southwest of Marathon and about 5.5 miles east of Big Pine Key in the Florida Keys. Approximately 31,250 people live within 30 miles of the park (Census 2013). The population of Monroe County is relatively diverse in terms of demographic characteristics. According to the U.S. Census Data (Census 2013), approximately 32% of residents in the county identify as black, Hispanic or Latino, or another minority group. Over one-third (39%) of residents can be described as youth or seniors (Census 2013). 71% of the population is of working age (16 to 65) (Census 2013). Monroe County ranked 3rd statewide in per capita personal income at $57,829 (above the statewide average of $41,497) (U.S. BEA 2014).

The park is located in the Southeast Vacation Region, which includes Broward, Miami-Dade, Monroe, and Palm Beach counties (Visit Florida 2013). According to the 2013 Florida Visitor Survey, approximately 17.3% of domestic visitors to Florida visited this region. Roughly 87% visitors to the region traveled to the Southeast for leisure purposes. The top activities for domestic visitors were beach/waterfront and culinary/dining experiences. Summer was the most popular travel season, but visitation was generally spread throughout the year. Most visitors traveled by air (60%), reporting an average of 4.4 nights and spending an average of $186 per person per day (Visit Florida 2013).

The table below identifies significant resource-based recreation opportunities within 15 miles of Bahia Honda State Park.

Table 6. Resource-Based Recreational Opportunities Near Bahia Honda State Park

Name *(Manager)*	Biking	Hiking	Swimming/ Beach Access	Boating/ Paddling	Fishing	Wildlife Viewing	Overnight Stay
Coupon Bight Aquatic Preserve ***(FDEP)***			✓	✓	✓	✓	
Crane Point Museum and Nature Center ***(Private)***		✓		✓		✓	
Florida Keys National Marine Sanctuary ***(NOAA)***			✓	✓	✓	✓	
Florida Keys Overseas Heritage Trail ***(FDEP)***	✓				✓	✓	
Great White Heron National Wildlife Refuge ***(USFWS)***				✓	✓	✓	
National Key Deer Refuge ***(USFWS)***		✓				✓	
Pigeon Key ***(Monroe County)***			✓	✓	✓	✓	
Veteran's Memorial Park ***(Monroe County)***			✓		✓		✓

Florida's Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicates that participation rates in this region for saltwater beach activities, visiting archaeological and historic sites, nature study, picnicking, and bicycle riding are higher than the state average with demand for additional facilities increasing through 2020 (FDEP 2013).

Existing Use of Adjacent Lands

Bahia Honda State Park encompasses the entirety of Bahia Honda Key except for the FDOT right-of-way bisecting the park from the northeast to the southwest. Existing land uses near Bahia Honda Key include a commercial RV camping development to the northeast on Ohio Key. The islands immediately southwest of Bahia Honda Key, the Spanish Harbor Keys, are uninhabited. Big Pine Key lies further south, with residential and commercial developments alongside conservation lands.

Planned Use of Adjacent Lands

Monroe County is a relatively small county in terms of population in Florida with around 74,000 residents (BEBR). With the inherent environmental limitations on growth present in the Florida Keys, multiple environmental and social conflicts arise when increasing demand for development places a heavy burden on limited land. The vulnerability of the Florida Keys to tropical storm events has encouraged officials to address evacuation efforts throughout Monroe County. By managing growth in Monroe County and thereby preventing too much pressure on the Overseas Highway as the main means of evacuation, officials hope to ensure safe evacuation times for County residents and visitors when threatened by a tropical storm event. County officials have adopted a series of land use regulations that aim to focus growth in areas that are in a better position to support more development. In addition, these regulations deter future growth from occurring in sensitive natural areas that protect numerous listed plant and animal species. This approach also supports efforts to maintain and enhance water quality throughout the Florida Keys National Marine Sanctuary (Monroe County 2000).

In light of the unique balancing act between development and conservation that permeates daily life in the Florida Keys, future growth adjacent to Bahia Honda Key should be expected to meet maximum allowable densities within the near future, if they have not already. Land uses surrounding the park are not expected to change in the near future. The future land use designation for Bahia Honda Key is Recreation. On the keys to the northeast and southwest of Bahia Honda Key, Conservation, Institutional, Residential Conservation, and Mixed Use/Commercial are designated future land uses (Monroe County 2013).

Migration to, and tourism in, the Florida Keys is expected to remain popular, and the impacts of residential and resort development, including loss of wildlife habitat, water quality impacts, noise, and traffic congestion along U.S. Highway 1 will continue to affect the state park. Division staff should be involved in the development of Monroe County land use regulations and land development ordinances. Staff should also stay well informed about development plans in the surrounding area. Staff will request to be included by the local planning agency in the review of development proposals that may affect the natural, cultural, or recreational resources of the park.

Florida Greenways and Trails System

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

In some cases, existing or planned priority trails run through or are adjacent to state parks, or they may be in close proximity and can be connected by a spur trail. State parks can often serve as trailheads, points-of-interest, and offer amenities such as camping, showers and laundry, providing valuable services for trail users while increasing state park visitation. Bahia Honda State Park was designated as a component of the Florida Greenways and Trails System in 2002.

Florida Keys Overseas Heritage Trail

The Florida Keys Overseas Heritage Trail (FKOHT) is a multi-use trail that extends from MM 106.5 in Key Largo to MM 0 in Key West parallel to the Overseas Highway. The majority of the trail is located in FDOT right-of-way while the trail is routed across the Florida Keys Historic Bridges, originally constructed by Henry Flagler as part of the East Coast Railroad in the early 1900s, when possible.

The FKOHT is the southernmost segment of the East Coast Greenway, with the northern terminus located in Calais, Maine and the southern terminus in Key West, Florida. The FKOHT passes by numerous exceptional and unique natural communities including rockland hammock, mangroves, Keys tidal rock barren and lagoons. The FKOHT is managed by the DRP in partnership with the FDOT and Monroe County, in addition to communities through which the trail passes (Florida Keys Overseas Heritage Trail Master Plan 2000).

The FKOHT is a critical component of local transportation infrastructure and is still in development. Additions, expansions, trail widening projects, and bridge rehabilitation efforts are currently underway. Where there is a gap in the trail, the trail then merges with the U.S. Highway 1 shoulder. Effort should be made by park management to coordinate trail improvements and management.

The park is an overnight stop along the Florida Circumnavigational Saltwater Paddling Trail that traverses the entire Florida coastline from Big Lagoon State Park in Escambia County on the Gulf coast to Fort Clinch State Park in Fernandina Beach on the Atlantic coast.

Property Analysis

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

Recreational Resource Elements

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

Land Area

The state park contains nearly 500 acres of uplands, wetlands and submerged lands. The average elevation of the park is approximately 5 feet above the mean sea level, with scattered mounds to slightly higher elevations. The major portion of the interior of the island is tidal marsh, tidal swamp and a lagoon with several types of submerged communities, to which visitor access is not provided. US Highway 1 bisects the park along the long northeast to southwest axis.

Over 60 acres of coastal berm and beach dune communities and the surrounding submerged areas are the primary recreational attractions of Bahia Honda State Park. The park contains the largest of the few sandy beaches to be found in the Florida Keys, which provides important beach access for park visitors. The Florida Department of Transportation used the southwestern end of the island as a marina and staging area for construction of the new U.S. Highway 1 bridge across Bahia Honda Channel. Subsequently, the marina areas and the previously developed area at the foot of the old Bahia Honda Bridge were used for development of park facilities.

Water Area

The clear aquamarine waters of the Atlantic Ocean and Florida Bay are the primary recreational attraction for visitors to the park. Public access is provided at the park's three beach use areas, including an area providing rental kayaks and through the marina on the ocean side.

Shoreline

As mentioned above, over 8,000 feet of shoreline at the state park is sand beach providing a rare beach recreation opportunity in the Florida Keys. Mangroves inhabit the sheltered shorelines along Florida Bay and throughout the interior lagoon system of the island. Canoeing, kayaking and snorkeling recreation are available along the ocean and bayside shorelines of the state park.

Natural Scenery

The outstanding visual resource at Bahia Honda State Park is its view of the Atlantic Ocean, Florida Bay and the channels north and south of the island. Views of the historic Bahia Honda Bridge from the southwestern end of the island are attractive to park visitors and highway travelers alike. Most of the disturbed uplands of the island were once covered by Australian pines. An ongoing program of exotic removal, coupled with extensive planting of native species, has eradicated nearly all exotic plant species on the island and restored a natural landscape that contains unique and enjoyable viewing subjects for the park's visitors.

Significant Habitat

The beaches on Bahia Honda Key are important nesting areas for sea turtles. Birds that nest in the area rely on the important loafing and foraging habitat provided by the sandy beaches. Regular surveys are conducted throughout the year with more intensive monitoring during the nesting season.

Natural Features

The expanse of the Atlantic Ocean beach and dunes are the unit's most prominent natural features. Stands of native Silver palms located on the northern third of the island are also considered outstanding features of this park.

Archaeological and Historical Features

The history of the Flagler Railroad is a physical feature of the state park due to the presence of the Old Bahia Honda Bridge connecting the state park to the Spanish Harbor Keys. The bridge is listed on the National Register of Historic Places. Spanning approximately 6,700 feet with steel truss structures across widely spaced concrete piers, the Bahia Honda bridge is unlike any of the other railroad bridges constructed for Flagler's Overseas Railroad in its route from Miami to Key West. Adding to the unusual nature of the Bahia Honda Bridge, is the placement of the original US Highway 1 over the tops of the railroad trusses. Today, weathering and deterioration of the bridge structure, primarily that portion added to convert the bridge from railroad to highway uses, is causing hazards to fishermen, as pieces of the bridge frequently fall to the ocean below it and have caused the bridge and scenic overlook to be closed to the public. The Florida Department of Environmental Protection, the Florida Department of Transportation, and Monroe County are coordinating efforts to evaluate the structural deficiencies of the bridge to help determine the best course of action through the lens of public safety.

Assessment of Use

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

Past Uses

Before state acquisition, Monroe County owned portions of Bahia Honda Key and developed a wayside park at the south end of the island.

Future Land Use and Zoning

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

The park has been designated as Tier I by Monroe County, which is a land use designation meant to discourage future development. Existing zoning designations at Bahia Honda State Park include Native Area (NA), Park and Refuge (PR), and Sparsely Settled (SS). The Native Area designation is meant for areas that are preserved in their natural state. Park and Refuge identifies areas that provide parks, recreation areas and wildlife refuges. The Sparsely Settled designation establishes areas of low-density residential development where the predominant character is native areas or open space.

The Future Land Use designation assigned to the park is Recreation (R). The Recreation (R) category is meant to provide for public and private activity-based and resource-based recreational facilities.

Current land use regulations discourage future development at Bahia Honda State Park, which prohibits the DRP from providing needed park support facilities for Bahia Honda State Park. The DRP is currently discussing issues related to permitting with Monroe County in an effort to provide needed support facilities for the park to continue to function efficiently.

Current Recreational Use and Visitor Programs

The primary recreational uses at the park include the use of the beaches on both the Gulf of Mexico and the Atlantic Ocean and camping. Fishing throughout the near-shore waters around the park is also a popular activity. Kayak rentals are available at the Ranger Station. Opportunities for recreation at the park include swimming, snorkeling, wildlife viewing, fishing, paddling, hiking, and picnicking. The nature trails at the park provide exceptional wildlife viewing opportunities and the park's status as part of the Great Florida Birding and Wildlife Trail attracts many visitors. The FKOHT passes through the park alongside U.S. Highway 1 and will continue to bring visitors to the park by bicycle as it is improved and connected to surrounding communities. The park concessionaire provides equipment rental and boat tours to Looe Key.

Bahia Honda State Park recorded 656,159 visitors in FY 2014/2015. By the DRP estimates, the FY 2014/2015 visitors contributed $56,885,922 in direct economic impact, the equivalent of adding 910 jobs to the local economy (FDEP 2015).

Other Uses

The right-of-way of U.S. Highway 1, which includes the FKOHT, bisects the boundary of the park.

Protected Zones

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

At Bahia Honda State Park all wetlands and floodplain as well as coastal berms and known imperiled species habitat have been designated as protected zones. The park's current protected zone is delineated on the Conceptual Land Use Plan.

Recreation Facilities

The main day use areas at Bahia Honda State Park include the Sandspur Day Use Area, Calusa Beach Day Use Area, and the Loggerhead Beach Day Use Area. The Sandspur Day Use Area contains a bathhouse, parking lot, picnic pavilions, and the Silver Palms Nature Trail. Several small picnic pavilions are located in the Calusa Beach Day Use Area along with a large parking lot and interpretive building. The Loggerhead Beach Day Use Area is home to restrooms, an amphitheater, and the Butterfly Garden Trail.

In addition to the beach day use areas, the Bayside, Buttonwood, and Sandspur Family Camping Areas provide very popular RV and tent camping sites. Three duplex vacation cabins are located in the Cabin Area and a concession operates out of the Concession Area adjacent to the marina.

Support Facilities

Support facilities include a waste water treatment plant, plant nursery, storage, a shop, and residences in the Shop Area; several additional residences in the Bayside and North End Residence Areas; a dump station in the Concession Area; and additional storage in both the Calusa and Loggerhead Beach Day Use Areas (see Base Map).

Bayside Residence Area
Residences (8)

Bayside Family Camping Area
Bayside Campground (8)
Bathhouse

Cabin Area
Duplex Cabins (3)

North End Residence Area
Residences (2)

Calusa Beach Day Use Area
Storage
Restroom
Picnic Pavilions (9)
Interpretive Building

Loggerhead Beach Day Use Area
Amphitheater
Butterfly Garden Trail
Restroom (2)
Storage

Buttonwood Family Camping Area
Buttonwood Campground (48)
Dump Station
Bathhouse

Entrance Area
Entrance Station

Sandspur Family Camping Area
Sandspur Campground (24)
Bathhouse

Sandspur Beach Day Use Area
Picnic Pavilions (3)
Silver Palms Nature Trail
Bathhouse

Shop Area
Residence
Storage
Flammable Storage
Nursery
Shop
Wastewater Treatment Plant

Concession Area
Visitors Center
Marina
Office
Storage
Boat Dump Station
Improved Boat Ramp (2)
Fixed Dock (8 Slips)



BAHIA HONDA STATE PARK

N

0 500 1,000 2,000 Feet

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

BASE MAP PAGE 1 OF 2



BAHIA HONDA STATE PARK

N

0 250 500 1,000 Feet

Florida Departmnet of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2012

BASE MAP PAGE 2 OF 2

Conceptual Land Use Plan

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

During the development of the conceptual land use plan, the DRP assessed the potential impact of proposed uses or development on the park resources and applied that analysis to determine the future physical plan of the park as well as the scale and character of proposed development. Potential resource impacts are also identified and assessed as part of the site planning process once funding is available for facility development. At that stage, design elements (such as existing topography and vegetation, sewage disposal and stormwater management) and design constraints (such as imperiled species or cultural site locations) are investigated in greater detail. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Creation of impervious surfaces is minimized to the greatest extent feasible in order to limit the need for stormwater management systems, and all facilities are designed and constructed using best management practices to limit and avoid resource impacts. Federal, state and local permit and regulatory requirements are addressed during facility development. This includes the design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, park staff monitors conditions to ensure that impacts remain within acceptable levels.

Public Access and Recreational Opportunities

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

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

Objective: Maintain the park's current recreational carrying capacity of 4,444 users per day.

The park will continue to provide opportunities for beach access, shoreline fishing, boating, paddling, camping, picnicking, hiking and nature observation. Interpretive exhibits and programs will continue to be offered at the park. The park's ability to accommodate current visitation levels will be enhanced.

Objective: Expand the park's recreational carrying capacity by 40 users per day.

Two additional picnic shelters in the Calusa Beach Day Use Area and two additional vacation cabins in the Cabin Area are proposed at the park. These improvements will expand the park's recreational opportunities and increase the estimated carrying capacity. As the FKOHT is continually improved, more cyclists will pass by the park and could use park facilities as a rest stop. Encouraging cyclists to visit the park will be an important part of developing a strong relationship between the FKOHT and state parks throughout Monroe County.

Objective: Continue to provide the current repertoire of 40 interpretive, educational and recreational programs on a regular basis.

A variety of ranger-guided programs allow visitors the opportunity to learn about the park and the natural and cultural resources present. Programs such as the Silver Palm Nature Trail Walk, Beach Walk, and History Walk highlight the unique environment of the park. Lectures at the Nature Center address a variety of topics related to park resources including Manatees, Key Deer, Habitats of Bahia Honda, and Sea Turtles.

Other activities include the Kayaking Program, Ranger-led Bicycle Ride, Sand Sculpting Lesson and Building, Sea Shell Craft, Paddleboard Yoga, and the Kid's Paddleboard Camp. Many other programs are offered to Park visitors throughout the year.

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

New programs to be added to the park's repertoire of programs include Sunday Morning Story Time, meant to compliment Campers Coffee, and Hands-on Arts and Crafts, which will provide a unique recreational opportunity to park visitors.

Recreational Carrying Capacity

Carrying capacity is an estimate of the number of users a recreation resource or facility can accommodate and still provide a high-quality recreational experience and preserve the natural values of the site. The carrying capacity of a unit is determined by identifying the land and water requirements for each recreation activity at the unit, and then applying these requirements to the unit's land and water base. Next, guidelines are applied which estimate the physical capacity of the unit's natural communities to withstand recreational uses without significant degradation. This analysis identifies a range within which the carrying capacity most appropriate to the specific activity, the activity site and the unit's classification is selected (see Table 6).

The recreational carrying capacity for this park is a preliminary estimate of the number of users the unit could accommodate after the current conceptual development program has been implemented. When developed, the proposed new facilities would approximately increase the unit's carrying capacity as shown in Table 6.

Table 7. Recreational Carrying Capacity

Recreational Activities & Visitor Facilities	Existing Capacity*		Proposed Additional Capacity		Estimated Recreational Capacity	
	One Time	Daily	One Time	Daily	One Time	Daily
Nature Trail	10	40			10	40
Picnicking	84	168	8	16	92	184
Boat Camping	76	76			76	76
Standard Camping	576	576			576	576
Cabins	36	36	24	24	60	60
Visitor Center	242	484			242	484
Beach & Swimming	1,013	2,026			1,013	2,026
Shoreline Fishing	320	640			320	640
Jetty Fishing	30	60			30	60
Canoeing	25	50			25	50
Boating	4	288			4	288
TOTAL	**2,416**	**4,444**	**32**	**40**	**2,448**	**4,484**

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

Capital Facilities and Infrastructure

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

Bahia Honda State Park is well developed and is one of the most popular state parks in the Florida Keys. Many park facilities are relatively old and will require improvements in order to ensure a quality experience for the parks' many visitors.

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

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

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

Objective: Improve/repair six existing use areas and 1.6 miles of road.

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

Buttonwood Family Camping Area

Within the Buttonwood campground, a general redesign of the campground has been recommended to improve the flow of traffic, improve campsite conditions, and enhance the overall visitor experience.

Concession Area

In the marina adjacent to the park concession, a proposed ADA-compliant canoe/kayak launch will expand recreational opportunities for park visitors with limited mobility.

Calusa Beach Day Use Area

The popular Calusa Beach recreation area attracts a large number of visitors to the park. In order to continue to provide a quality recreation experience for park visitors, several improvements are planned for the area. These include the addition of two small picnic pavilions, replacing the existing restroom facility with an improved restroom facility that will accommodate beach goers, and redesigning the existing parking lot to maximize capacity and address congestion. Around the Old Bahia Honda Bridge, landscape improvements to the terraced slope, repairs to the Old Bahia Honda Bridge Overlook, and improving access to fishing opportunities along the Old Bahia Honda Bridge seawalls are all planned to improve the visitor experience.

Loggerhead Beach Day Use Area

Improvements within the Loggerhead Beach area are focused around providing facilities for wedding and/or memorial service reservations. Additional storage is also proposed for this area.

Cabin Area

Within the Cabin Area, two additional duplex cabins are proposed north of the existing cabins on the western side of the borrow pit. A floating dock adjacent to the existing cabins is also proposed with 10 boat slips to be installed after restoration efforts in the borrow pit are completed.

Parkwide

The main park road is planned to be improved from the Calusa Beach parking lot to the Sandspur Beach parking lot. Improvements will include the repaving and addition of road markings and signage to improve user safety.



BAHIA HONDA STATE PARK

N

0 375 750 1,500 Feet

Florida Department of Environmental Protection
Division of Recreation & Parks
Office of Park Planning
Date of aerial 2011

CONCEPTUAL LAND USE PLAN

Facilities Development

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

Cabin Area
Cabins (2)
Floating dock

Calusa Beach Day Use Area
Small picnic pavilions (2)
Replace restroom
Landscape improvements
Redesign parking lot
Improve fishing platform
Repair Old Bahia Honda Bridge overlook

Concession Area
ADA canoe/kayak launch

Loggerhead Beach Day Use Area
Renovate storage to wedding pavilion

Parkwide
Improve park road

Buttonwood Family Camping Area
Redesign campground

Optimum Boundary

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

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

Several parcels totaling around 40 acres on West Summerland Key, also known as Spanish Harbor Key, to the southwest of the park are identified within the optimum boundary. These parcels include the Spanish Harbor borrow pit and adjacent land to the north of U.S. Highway 1 between MM 34 and MM 35.3. Acquisition of these parcels would provide opportunities to expand recreational opportunities and allow park staff to manage these areas as part of the larger park property through continued exotic species management, natural resource protection and restoration, and monitoring of visitor activities and impacts within the park.



BAHIA HONDA STATE PARK

N

0 500 1,000 2,000 Feet

Florida Department of Environmental Protection
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Date of aerial: 2011

OPTIMUM BOUNDARY MAP

Implementation Component

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

Management Progress

Since the approval of the last management plan for Bahia Honda State Park in 2003, significant work has been accomplished and progress made towards meeting the DRP's management objectives for the park. These accomplishments fall within three of the five general categories that encompass the mission of the park and the DRP.

Resource Management

- Park staff continues to monitor sea turtle nesting activity.
- A part-time biologist position was added to focus on the Miami Blue butterfly project. This includes regular surveys, exotic plant and animal removal, training volunteers, and controlling access to restricted areas.
- District staff continues to conduct Florida Fish and Wildlife Conservation Commission nesting shorebird surveys, non-breeding shorebird surveys, U.S. Fish and Wildlife Service annual winter shorebird surveys and piping plover surveys to document imperiled species utilizing the park.
- District staff continues to conduct quarterly shorebird surveys that have been ongoing since 1990.
- District staff continues to work with the augmentation project of the yellow wood (Zanthoxylum flavum), and imperiled species found in natural habitat only on Bahia Honda and on the Marquesas.
- Park staff continues to conduct exotic plant removal projects with assistance from District staff and AmeriCorps volunteers.
- District and park staff conducted inventory of submerged resources in the park.
- Funding has been approved for the restoration of two mangrove wetlands areas in the park.

Park Facilities

- An improved sewer treatment facility was installed.
- Interpretive signs along the Silver Palm Nature trail were upgraded with additional signage posted along the trail.

Management Plan Implementation

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

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

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

Table 8. Ten-Year Implementation Schedule and Cost Estimates				
Goal I: Provide administrative support for all park functions.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Continue administrative support at current levels	Administrative support ongoing	C	$1,610,000
Objective B	Expand administrative support	Administrative support expanded	C	$15,000
Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.		**Measure**	**Planning Period**	**Estimated Costs**
Objective A	Obtain an assessment of the park's hydrological needs	Assessment conducted	LT	$1,350,000
Action 1	Conduct hydrological assessment of interior lagoon	Assessment conducted	LT	$50,000
Action 2	Develop restoration plan	Plan developed	LT	$25,000
Action 3	Implement restoration plan	Plan implemented	LT	$250,000
Action 4	Develop restoration plan for filling in borrow pits	Plan developed	LT	$25,000
Action 5	Implement restoration of borrow pits to functional seagrass	Plan implemented	LT	$1,000,000
Objective B	Restore natural hydrological conditions and function to approximately eight acres of seagrass, mangrove swamp, and salt marsh natural communities	# of acres restored	LT	$1,350,000
Action 1	Install approximately 219,000 cubic yards of material to restore seagrass habitat	# of yards restored	LT	$1,000,000
Action 2	Install four culverts to restore salt marsh and mangrove swamp	# of acres restored	ST	$350,000

Table 8. Ten-Year Implementation Schedule and Cost Estimates				
Goal III: Restore and maintain the natural communities.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Conduct habitat restoration activities on ten acres of coastal berm, beach/dune, and mangrove swamp natural communities	# of acres restored	C	$10,000
Action 1	Continue exotic plant and animal species removal programs	# of acres treated	C	$10,000
Goal IV: Maintain, improve, or restore imperiled species populations and habitats.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Monitor and document six selected imperiled animal species	# of species monitored	C	$5,000
Action 1	Implement monitoring protocols for six imperiled animal species	# of species monitored	C	$5,000
Objective B	Monitor and document fifteen selected imperiled plant species	# of species monitored	C	$3,000
Action 1	Continue yellow wood conservation project	Project completed	C	$1,500
Action 2	Monitor imperiled plant species	# of species monitored	C	$1,500
Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Annually treat 0.2 acres of exotic plant species	# of acres treated	C	$5,000
Action 1	Continue to conduct exotic removal	# of acres treated	C	$5,000
Objective B	Implement control measures on five exotic and nuisance animal species	# of species monitored	C	$8,000
Action 1	Actively remove iguanas and other exotic animals	# of species removed	C	$8,000

Table 8. Ten-Year Implementation Schedule and Cost Estimates				
Goal VI: Protect, preserve and maintain the cultural resources.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Bring three of eleven recorded cultural resources into good condition	# of sites improved	LT	$3,500,000
Goal VII: Provide public access and recreational opportunities.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Maintain the park's current recreational carrying capacity of 4,444 users per day	# of visitors per day	C	$2,150,000
Objective B	Expand the park's recreational carrying capacity by 40 users per day.	# of visitors per day	ST	$20,000
Objective C	Continue to provide the current repertoire of 40 interpretive programs	# of interpretive programs	C	$200,000
Objective D	Develop two new interpretive programs	# of interpretive programs	ST	$15,000
Goal VIII: Develop and maintain the capital facilities and infrastructure.		**Measure**	**Planning Period**	**Estimated Cost**
Objective A	Maintain all public and support facilities	Facilities maintained	C	$5,375,000
Objective B	Improve and repair six existing facilities and 1.6 miles of road	# of facilities, miles of trail, miles of road improved	LT	$8,000,000
Objective C	Expand maintenance activities	Facilities maintained	C	$50,000

Total Ten-Year Estimated Costs	
Administrative and Support	$1,625,000
Resource Management	$6,231,000
Recreational Visitor Services	$2,170,000
Infrastructure and Capital Improvements	$13,425,000
Total	**$23,451,000**