Florida Department of
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

March 1, 2012

Ms. Sine Murray
Office of Park Planning
Division of Recreation and Parks, Mail Station #525
Tallahassee, Florida 32339-3000

RE: Windley Key Fossil Reef Geological State Park – Lease # 3453

Dear Ms. Murray:

The Division of State Lands, Office of Environmental Services, acting as agent for the Board of Trustees of the Internal Improvement Trust Fund, hereby approves the Windley Key Fossil Reef Geological State Park management plan. The next management plan update is due March 1, 2022.

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

Sincerely,

M. S. Gengenbach

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

MSG/ci

Windley Key Fossil Reef Geological State Park

APPROVED
Unit Management Plan

STATE OF FLORIDA
Department of Environmental Protection

Division of Recreation and Parks
March 1, 2012

TABLE OF CONTENTS

RESOURCE MANAGEMENT COMPONENT

LAND USE COMPONENT

IMPLEMENTATION COMPONENT

TABLES

MAPS

LIST OF ADDENDA

INTRODUCTION

Windley Key Fossil Reef Geological State Park is located in Monroe County (see Vicinity Map); access to the park is from U.S. Highway 1 (see Reference Map) at Mile Marker 85.5. Significant land and water resources located near the park are identified on the Vicinity Map.

On January 17, 1986 the State of Florida Board of Trustees of the Internal Improvement Trust Fund (Trustees) acquired title to the property that later became Windley Key Fossil Reef Geological State Park. The purchase was funded under the Conservation and Recreation Lands program On September 29, 1986, the Trustees leased Windley Key Fossil Reef Geological State Park to the Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP) under Lease No. 3453 (see Addendum 1). Windley Key Fossil Reef Geological State Park contains 36 acres.

At Windley Key Fossil Reef Geological State Park, public outdoor recreation and conservation is the designated single use of the property. There are no legislative or executive directives that constrain the use of this property.

PURPOSE AND SIGNIFICANCE OF THE PARK

The State of Florida acquired the original boundary of Windley Key Fossil Reef Geological State Park in 1986 through funds from the Conservation and Recreation Lands program. Currently, the park boundary now extends to 36 acres. The purpose ofthe acquisition was to preserve, for all time, a representative example of the natural and cultural history of the State of Florida, to protect, develop, operate and maintain the property for public outdoor recreation, conservation, historic and related purposes and to support the tourism industry of Florida.

Park Significance

- Windley Key is best known for its important role in the construction of Henry Flagler's Overseas Railroad, providing the keystone fill for the bed of the railroad. Later it was discovered the fossilized coral rock could be extracted and polished for decorative use.

- The historic channeling machine found at the park played an important role in carefully extracting large 10-ton blocks of fossilized coral from the quarries. The 8-10 foot deep channels cut into the coral literally provide a snapshot 100,000 years into the past when the land currently known as the Florida's Keys were underwater and still living reefs.

- The park's quarry walls are one of only two locations in the continental United States that provides such a significant cross section of ancient coral reef. Samples taken from the walls have helped scientists determine the origin of the reefs and

the Florida Keys. For this reason and their role in the construction of Florida's East Cost Railroad, the quarries at the park are eligible for listing in the National Historic Register.

- In addition to significant geological features, the park also supports several well-developed rare habitats, including a rockland hammock, marine tidal swamp and Keys cactus barren.

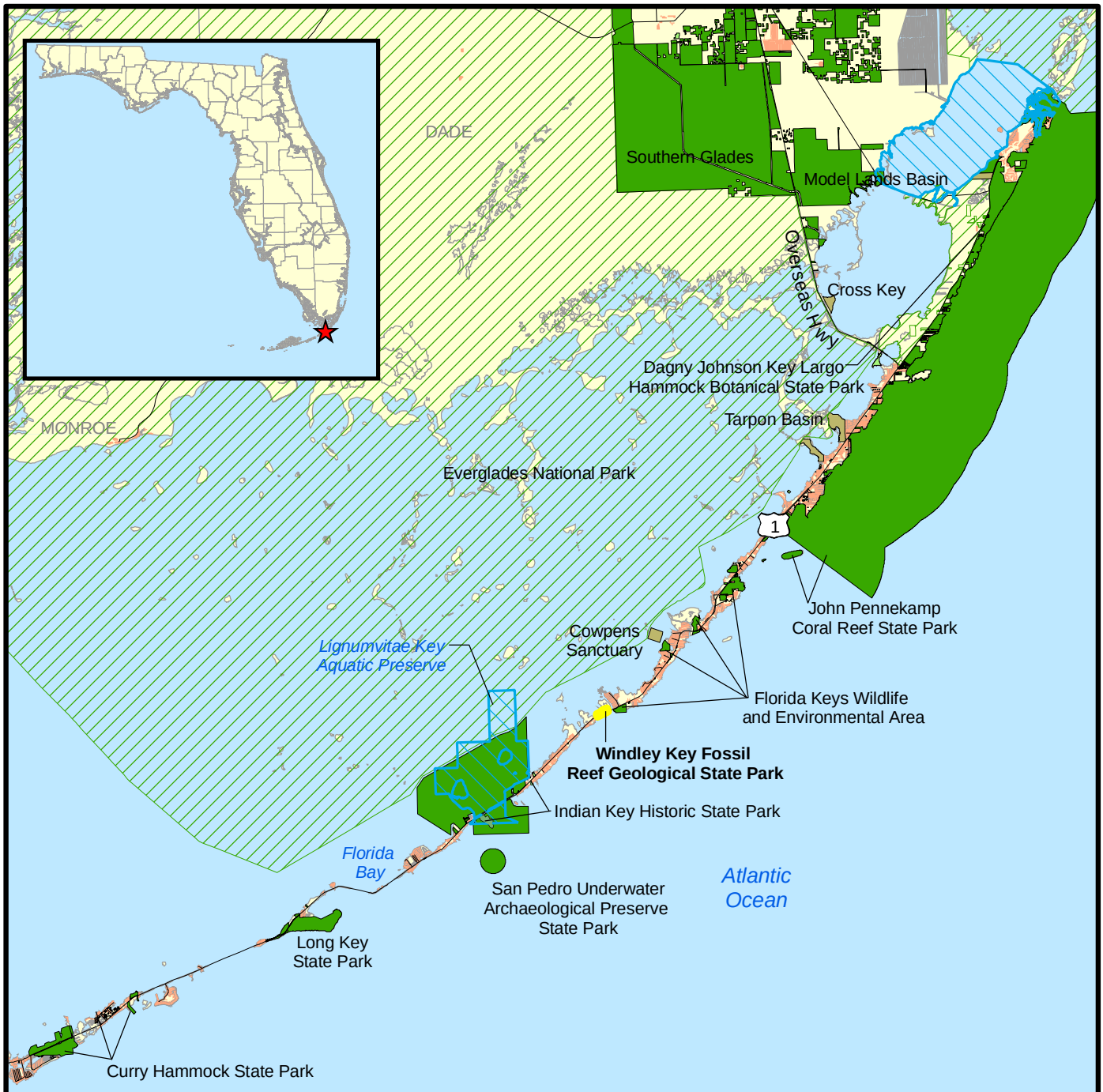
- The park's important natural communities provide habitat for imperiled species including the yellow hibiscus (*Cienfuegosia yucatanensis*), wild hibiscus (*Hibiscus poeppigii*) and the Florida Keys indigo (*Indigofera mucronata* var. *keyensis*).

- The park provides valuable interpretive, educational and outdoor recreational opportunities to Florida's residents and visitors through public access facilities and programs of the geological state park.

Windley Key Fossil Reef Geological State Park is significant not only for its unique geologic features, but also for its important role in early 20th century history. When Henry Flagler began development of the railroad that was to run from Miami to Key West, Windley Key became an important component in the construction process due to its high elevation and location to the railroad construction. Three quarries in the park were dredged to supply rock to the railroad bed and bridge approaches, and later as decorative construction material. Once the railroad was completed, the "Quarry Station" located in the Flagler Quarry was a regular stop for passengers, the delivery of freshwater, and the transportation of the decorative keystone block. Remnants of this station are still present in the park.

Because of the quarry activity, the important geologic features were uncovered and a cross section of ancient coral reefs can now be viewed and studied. Windley Key is part of the string of islands stretching from Soldier Key to Bahia Honda that consist of the geologic formation of Key Largo limestone, ancient reef structures built by coral polyps. These reef formations are similar to the present day reefs offshore and Windley Key has played an important role for geologists to study both the past and the present. As a result of they types of corals that have and have not been identified at Windley Key, geologists have been able to determine that the upper Keys were once a patch reef with the more extensive outer bank reefs having been formed further seaward.

In addition to the geologic feature, Windley Key also supports a well-developed rockland hammock, marine tidal swamp, and Keys cactus barren plant communities. Keys cactus barren is a rare habitat in the Florida Keys and at Windley Key, it provides habitat for imperiled species including yellow hibiscus, wild hibiscus, and Florida Keys indigo.



WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 1.25 2.5 5 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks

VICINITY MAP

WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 125 250 500 750 1,000 Feet

FL DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF RECREATION AND PARKS

REFERENCE MAP

Windley Key Fossil Reef Geological State Park is classified as a special feature site in DRP's unit classification system. A "special feature" is a discrete and well-defined object or condition that attracts public interest and provides recreational enjoyment through visitation, observation and study. A state special feature site is an area which contains such a feature, and which is set aside for controlled public enjoyment. Special feature sites for the most part are either historical or archaeological by type, but they may also have a geological, botanical, zoological or other basis. State special feature sites must be of unusual or exceptional character, or have statewide or broad regional significance.

In the management of a special feature site, primary emphasis is placed on protection and maintenance of the special feature for long-term public enjoyment. Permitted uses are almost exclusively passive in nature and program emphasis is on interpretation of the special feature. Development at special feature sites is focused on protection and maintenance of the site, public access, safety and the convenience of the user.

PURPOSE AND SCOPE OF THE PLAN

This plan serves as the basic statement of policy and direction for the management of Windley Key Fossil Reef Geological 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. 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. Upon approval, this management plan will replace the May 23, 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 locate use areas and propose the types of facilities and programs and 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 DRP's implementation progress, (2) timeframes for completing actions and objectives and (3) estimated costs to complete each action and objective.

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

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

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

MANAGEMENT PROGRAM OVERVIEW

Management Authority and Responsibility

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

> It shall be the policy of the Division of Recreation and Parks to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to acquire typical portions of the original domain of the state which will be accessible to all of the

> people, and of such character as to emblemize the state's natural values; conserve these natural values for all time; administer the development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them; to contribute materially to the development of a strong mental, moral, and physical fiber in the people; to provide for perpetual preservation of historic sites and memorials of statewide significance and interpretation of their history to the people; to contribute to the tourist appeal of Florida.

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

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

Park Management Goals

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

1. Provide administrative support for all park functions.
2. Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.
3. Restore and maintain the natural communities/habitats of the park.
4. Maintain, improve or restore imperiled species populations and habitats in the park.
5. Remove exotic and invasive plants and animals from the park and conduct needed maintenance-control.
6. Protect, preserve and maintain the cultural resources of the park.
7. Provide public access and recreational opportunities in the park.
8. Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

Management Coordination

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

The Florida Fish and Wildlife Conservation Commission (FFWCC), assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. The Florida Department of State (FDOS), Division of Historical Resources (DHR) assists staff to ensure protection of archaeological and historical sites. The DEP, Office of Coastal and Aquatic Managed Areas (CAMA) 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 Line. In addition, the Bureau of Beaches and Coastal Systems aid the staff in the development of erosion control projects.

Public Participation

The DRP provided an opportunity for public input by conducting a public workshop and an Advisory Group Meeting to present the draft management plan to the public. These meetings were held on Wednesday, October 26, 2011 and Thursday, October 27, 2011, respectively. Meeting notices were published in the Florida Administrative Weekly, October 14, 2011 Volume 37, Issue 41, 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

Windley Key Fossil Reef Geological State Park is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and it is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by DEP.

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

RESOURCE MANAGEMENT COMPONENT

INTRODUCTION

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

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

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

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

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

Table 1: Management Zones

MANAGEMENT ZONE	ACREAGE	MANAGED WITH PRESCRIBED FIRE
WDK-01	34.94	N/A
WDK-02	.73	N/A
WDK-03	12.81	N/A
WDK-04	.09	N/A

RESOURCE DESCRIPTION AND ASSESSMENT

Natural Resources

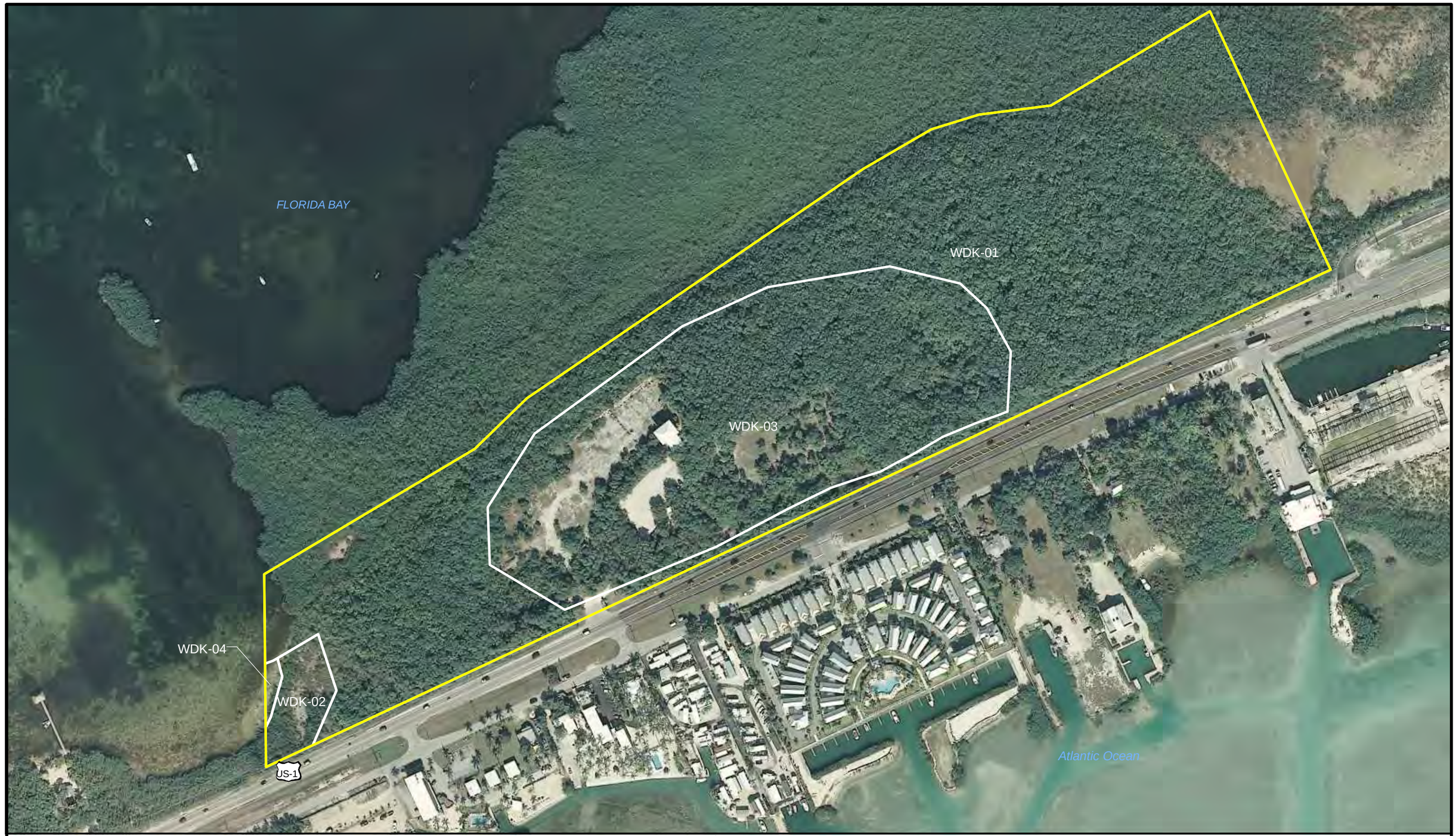
Topography

Windley Key Fossil Reef Geological State Park is part of the geographic region of high coral keys. The edge of the continental shelf parallels the Keys approximately seven miles offshore. Maximum elevation at Windley Key is 18 feet, which is the highest natural elevation in the Florida Keys. Solution holes created by the dissolution of the limestone by rainfall form depressions in the limestone, and are a few inches to a few feet in depth and scattered throughout the hammock. Elevations in the submerged resources of the park are less than 5 feet below mean sea level.

Since the early 1900s, this site has been subjected to intensive topographic alteration from quarrying activities. Three quarries were excavated starting in the early 1900s for the construction of Flagler's railroad. Once that was completed, the limestone was used in construction, and later as the decorative keystone for the facades of buildings and monuments. These quarries are approximately ten feet in depth.

Geology

The upper layer geologic formation of the Florida Keys from Soldier Key to Bahia Honda 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. Sea level has been as much as 25 feet higher and 300 feet lower than the present. Approximately 120,000 year 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, this limestone provides the necessary substrate for new growth of the 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).



WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 125 250 500 Feet

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

MANAGEMENT ZONES MAP

Soils

Information published in the U.S. Department of Agriculture's (USDA) Classification and Correlation of Soils of Monroe County Keys Area Florida identifies three soil types at Windley Key Fossil Reef Geological State Park. They are Pennekamp gravelly muck; Lignumvitae marl and Udorthents-Urban land complex (see Soils Map).

Pennekamp gravelly muck is found in the upland hammock areas typically at the highest elevations. It is characterized by a thin layer of organic debris and leaf layer over the limestone rock. Soil in this unit is well drained. Pennekamp gravelly muck is found in association with the poorly drained Lignumvitae marl that is found at lower elevations. This soil type is found in mangrove swamps and is subject to daily flooding by tides. Udorthents-Urban land complex includes constructed upland areas where land has been altered by dredging and filling for development. Addendum 4 contains detailed soil descriptions.

Management activities will comply with those practices that will best prevent erosion in order to conserve the soil resources of this site. This includes preventing erosion that would impact the water resources of the Florida Keys National Marine Sanctuary.

Minerals

Key Largo limestone is the major mineral deposit at Windley Key Fossil Reef Geological State Park. Minor mineral deposits in the park are 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 in 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.

WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 125 250 500 Feet

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

SOILS MAP

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 of each natural community and identifies the actions that will be required to bring the community to its desired future condition (DFC). Specific management objectives and actions for natural community management, exotic species management, imperiled species management are discussed in the Resource Management Program section of this component.

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

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

The park contains four distinct natural communities as well as ruderal and developed areas (see Natural Communities Map). A list of known plants and animals occurring in the park is contained in Addendum 5.

ROCKLAND HAMMOCK

Desired future condition: Rockland hammock is a rare tropical hardwood forest on upland sites and occurs on a thin layer of highly organic soil covering limestone. This habitat does not regularly flood, but it is dependent upon a high water table to maintain reservoirs in solution holes in the limestone to keep humidity levels high.

Rockland hammocks typically have larger more mature trees in the interior, while the margins are dense with growth of smaller shrubs, trees and vines. There are differences in species composition between rockland hammocks found on the mainland and in the Florida Keys. Even within the Florida Keys, there is variation and some species are found only in the upper Keys, while others are found only in the lower Keys. This is due to elevation, geology and rainfall differences between the two regions. Typical canopy and understory species include, gumbo limbo (*Bursera simaruba*), wild tamarind (*Lysiloma latisiliquum*), pigeon plum (*Coccoloba diversifolia*), mastic (*Sideroxylon foetidissimum*), strangler fig (*Ficus aurea*), poisonwood (*Metopium toxiferum*), several species of stoppers (*Eugenia* spp.), thatch palms (*Thrinax* spp.), torchwood (*Amyris elemifera*), marlberry (*Ardisia escallonioides*), satinleaf (*Chrysophyllum oliviforme*), and blackbead (*Pithecellobium keyense*) Vines and herbaceous vegetation are less common and include greenbrier (*Smilax havanensis*) and bamboo (*Lasiacis divaricata*). Epiphytes, including orchids, ferns, and bromeliads can be found on larger trees.

Description and assessment: The rockland hammock at Windley Key Fossil Reef Geological State Park occurs in areas of highest elevations. It consists of West Indian hardwood hammock species with minimal soil development overtop of limestone substrate. Hammock species found here include Florida thatch palm (*Thrinax radiata*), poisonwood (*Metopium toxiferum*), milkbark (*Drypetes diversifolia*), pigeon plum (*Coccoloba diversifolia*), strangler fig (*Ficus aurea*), mastic (*Sideroxylon foetidissimum*), blolly (*Guapira bicolor*), Spanish stopper (*Eugenia foetida*), Everglades velvetseed (*Guettardia elliptica*), and white ironwood (*Hypelate trifoliata*), a rare Key's species. Solution holes can be found throughout the hammock but they do not retain freshwater for any length of time.

Although the park was purchased for its unique geologic feature, the rockland hammock at Windley Key is in excellent condition. It sustained minor damage from the 2004 and 2005 hurricane seasons mostly in the form of downed limbs with a few uprooted trees including a large mastic. The few canopy gaps that were a result of the storms have allowed for the recuitment of herbaceous vegetation which will eventually be shaded out by the recovery of the tree canopy. Windthrows from previous storm events can be found throughout the hammock. Also of interest in the hammock are two pieces of railroad rail that are remains of Flagler's railroad. It is thought that these rails were used as anchors for the winches that were needed to move the equipment and the blocks of limestone.

There are three nature trails that wind through the hammock, one of which leads the park visitor along the ecotone between the hammock and the mangrove tidal swamp. Here species such as buttonwood (*Conocarpus erectus*), blackbead (*Pithecellobium keyense*), cat's claw (*P. unguis-cati*), barbed-wire cactus (*Acanthocereus tetragonus*), joewood (*Jacquinia keyensis*) and butterfly orchid (*Encyclia tampensis*) are the more dominant species because of their greater salt tolerance.

WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 125 250 500 Feet

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

NATURAL COMMUNITIES MAP

Disturbance to the hammock is a result of the quarry activities that began in the early 1900s. The Russell quarry was the first to be quarried and as a result, has recruited in with both pioneer hammock species and some exotic species. The Flagler quarry and the Windley Key quarry are more open. The hammock along the upper edge of the quarry walls is exposed creating an edge effect, and just like hammocks that are fragmented, these edges are more vulnurable to adverse impacts from storm events, cold temperatures and wind.

The rockland hammock provides important habitat for numerous species of birds, insects, and reptiles including white-crowned pigeon (*Patogioenas leucocephala*) and a Western spindalis (*Spindalis zena*) a rare occurrence in south Florida that was observed in the park several years ago.

General maintenance measures: Several exotic removal projects have been conducted both by park staff and by contractors, so exotic infestation in the rockland hammock is minimal. However, follow-up treatment is necessary to treat exotics including Australian pine (*Casuarina equisetifolia*), Brazilian pepper (*Schinus terebinthifolius*), night blooming cereus (*Hylocereus undatus*), and Guinea grass (*Panicum maximum*) to prevent their establishment in the hammock and to achieve the desired future condition. An infestation of Brazilian pepper has been treated in the ecotonal edge on the Sunset Trail and follow-up treatment here is ongoing. The edge of the rockland hammock that borders the fence line adjacent to U.S. Highway 1 is also subject to invasion by lead tree (*Leucaena leucocephala*) but regular monitoring and follow-up treatment is conducted by park staff.

MANGROVE SWAMP

Desired future condition: Mangrove swamp consists of dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave-energy along Florida's coasts, generally south of the normal freeze-line. The dominant plants include red mangroves *(Rhizophora mangle*) (occupying the deeper zones), black mangroves (*Avicennia germinans*) (occupying the middle zones), and white mangroves (*Languncularia racemosa*) and buttonwood (occupying the uppermost zones). The tree canopy is typically dense with little to no understory. Where present, the understory can include sea ox-eye daisy (*Borrichia arborescens*), coinvine (*Dalbergia ecastophyllum*), saltwort (*Batis maritima*), perennial glasswort (*Salicornia perrinis*), and giant leather fern (*Acrostichum danaeifolium*). Soils are saturated to inundated and vary considerably from deep mucks to fine sands but always contain a high salt content limiting plant diversity.

Mangrove habitats play an important role in providing a nursery for many species of fish and invertebrates, acting as a buffer for upland habitats, their root systems act as important filtration systems, and they provide roosting and loafing areas for birds.

Description and assessment: The mangrove swamp at Windley Key is in excellent condition. It occurs on the east, north and west sides of the park bordering the rockland hammock and the Keys cactus barren. Mangrove swamp also occurs on the north side where the rockland hammock grades to lower elevation. This area is unlike the other sections of mangrove swamp in that it is a mosaic of dwarf red mangrove trees in association with an overwash plain or saltpan. The overwash plain consists of areas of exposed caprock with thick marl deposits and algal mats in depressions. Most of the area is low-lying and is inundated by saltwater during high tide providing an important habitat for wading birds.

The mangrove swamp throughout the rest of Windley Key consists of red mangroves that are established along the shoreline with their prop roots submerged in the water. These provide important substrate for a host of organisms that live on and amongst the prop roots including snapper (*Lutjanus* spp.), mosquitofish (*Gambusia affinis*), fiddler crabs (*Uca pugilator*), and oysters. Black mangroves are typically found just behind the red mangrove zone in the intertidal zone. They are the most salt tolerant of the three species found in south Florida. Black mangroves withstand salinity fluctuations and anaerobic soil by producing pneumatophores that extend above the surface of the soil and aid in oxygen exchange. White mangroves are found behind the black mangrove zone where they are not subjected to daily tidal influences. They can also produce pneumatophores if necessary, but they are modified versions of the black mangroves' and do not persist as long. Other species found in this zone include buttonwood (*Conocarpus erectus*), saltwort, sea ox-eye daisy, sea daisy (*Borrichia frutescens*), and epiphytic organisms including orchids and bromeliads.

General management measures: The mangrove swamp is in the desired future condition. However, in order to maintain this status, regular monitoring of and treatment for exotic species infestation is necessary to prevent their establishment.

KEYS CACTUS BARREN

Desired future condition: Keys cactus barren is an open, primarily herbaceous community with scattered shrubs on rocky areas of Key Largo limestone with little soil or leaf litter. The vegetation consists of a wide variety of herbaceous and succulent species that characteristically include cacti, agaves, and several rare herbs. Such rare species include Yucatan flymallow (*Cienfuegosia yucantaensis*), skyblue clustervine (*Jacquemontia pentanthos*), and Florida Keys indigo (*Indigofera mucronata* var. *keyensis*). These frequently occur with grasses and sedges, such as green sprangletop (*Leptochloa dubia*), coral panicum (*Panicum chapmanii*) and royal flatsedge (*Cyperus elegans*). Spiny species, particularly the rare three-spined pricklypear (*Opuntia triacanthos*), are characteristic but their abundance is variable. Other spiny species include false sisal (*Agave decipiens*), barbed-wire cactus (*Acanthocereus tetragonus*), and pricklypear cactus (*Opuntia stricta*). Scattered clumps of stunted trees may be present, including gumbo-limbo, buttonwood, Spanish stopper *(Eugenia foetida*), and cat's claw.

Keys cactus barren is confined to the Florida Keys on limestone bedrock (Key Largo limestone) and is known from only six sites.

Description and assessment: There is a small Keys cactus barren on the southwest side of the park. It grades into rockland hammock to the east, marine composite substrate to the west, and mangrove tidal swamp to the north and west. Due to recent storm activity, particularly Hurricane Wilma in 2005, the rockland hammock vegetation to the south of the Keys cactus barren has died off increasing the size of this habitat and the vegetative components found here. Species found here include prickly cordgrass (*Spartina spartinae*), Key's grass (*Monanthochloe littoralis*), false foxglove (*Agalinis maritima*), and sky-blue morning glory. This habitat also supports populations of yellow hibiscus, wild hibiscus (*Hibiscus poeppigii*) and Florida Keys' indigo, rare species that are only found in a few areas of the Florida Keys. Brazilian pepper had been a problem in this habitat but has been removed and the Keys cactus barren at Windley Key is now in excellent condition.

In the 2003 approved management plan, this habitat was described as marine tidal marsh. The 2009 Florida Natural Areas Inventory updated habitat descriptions and has further defined this habitat as Keys Cactus Barren.

General management measures: The Keys cactus barren at Windley Key is in excellent condition and has achieved the desired future condition. In order to maintain this status, it will be necessary to conduct regular surveys to monitor for and treat exotic species so that they do not become established.

MARINE COMPOSITE SUBSTRATE

Desired future conditions: Marine composite substrate forms a mosaic with associated submerged communities including seagrass beds, consolidated substrate and unconsolidated substrate. Because composite substrate is a combination of community types representing an ecotonal community, species diversity is often times greater than the surrounding habitats.

Description and assessment: The marine composite substrate habitat that falls within the boundary of Windley Key is small and is located on the west side of the park in the submerged land adjacent to the Keys cactus barren and the marine tidal swamp. Because this habitat is not accessible by land and is in a remote area so that access by boaters is limited, it is in excellent condition. Plant and animal species found here include worms, anemones, Shaving brush algae (*Penicillus* spp.), Oatmeal algae (*Halimenda* spp.), sea cucumber (*Holothuria floridana*), and sponges.

General maintenance measures: The marine composite substrate at Windley Key is in excellent condition and has achieved the desired future condition. Limited access to this

submerged community helps to ensure the continued protection of the marine composite substrate.

RUDERAL

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

Description and assessment: The ruderal areas at Windley Key include the Russell quarry, the Flagler quarry and the Windley Key quarry. The Russell quarry was the first to be quarried to supply rock for the railroad bed and the bridge approaches. This is the smallest of the three quarries and has since recruited in with pioneer species including Jamaica dogwood, poisonwood, lantana and white indigo berry. It is also an area that has been subjected to exotic removal projects to eradicate Australian pine, Brazilian pepper, lead tree and night blooming cereus. Sapodilla (*Manilkara zapota*) was recently discovered on the western edge of the quarry and will be included in exotic removal treatments. On the east side of the quarry is the remains of a freshwater well that is part of an old homesite.

The Flagler quarry was the next to be quarried. There are a few scattered trees in the interior of the quarry with most of the vegetation occurring along the southern side. The southeast edge of the quarry is approximately seven feet deeper than the rest of the quarry and during heavy rains, will retain freshwater. There is a dense population of giant leather fern in this section of the quarry. Exotic species including Australian pine and Brazilian pepper have been treated and will require follow-up treatment. The west corner of this low lying area also has a dense population of Zoysia (*Zoysia tenuifolia*) an exotic turf grass. Fill material was placed in the Flagler Quarry in the late 1990s to level out the quary and allow for groundcover vegetation to grow. Picnic tables are scattered throughout the quarry and it is used for festivals and other special events.

Windley Key became a dumping ground after the cessation of the quarrying activities in the early 1960s and prior to the acquisition of the property by the state. Large mounds of dirt, debris, cars and exotic infestations were prevalent throughout this site. Once the State acquired Windley Key from the Florida East Coast Railroad, it took many years to remove all of the trash and exotic plants so that the plans for the park development could proceed.

Many geologists, students and researchers have utilized Windley Key Fossil Reef Geological State Park to study the remains of the ancient coral reef. This research has provided important scientific data for the understanding of the present reef system

offshore, portions of which are found in John Pennekamp Coral Reef State Park. Coral species that make up the majority of the wall include brain coral (*Diplora* spp.), mountainous star coral (*Montastrea* spp.) and mustard hill coral (*Porites astreoides*). Minor components that make up the interstitial spaces are calcareous algae including *Halimeda* spp., shell fragments and the remains of numerous marine animals including barnacles, mussels and clams. The west end of the quarry is lower in elevation and retains freshwater after heavy rainfall. Red mangroves and saltmarsh cordgrass are found in this section along with other herbaceous vegetation including false foxglove. Woody vegetation in the rest of the quarry is scattered and is located mainly along the edges with herbaceous vegetation growing on the quarry floor. A small butterfly garden was established along the south edge of the quarry wall as an interpretive tool for the public to understand about butterflies and their host plants.

General management measures: In order to maintain the desired future condition of the three quarries, it will be necessary to continue with follow-up exotic removal projects to prevent the re-establishment of these species.

DEVELOPED

Desired future conditions: 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.

Description and assessment: The developed areas at Windley Key include the Alison Fahrer Visitor Center, the entrance road and parking lot, the nursery and the shed. The Visitor Center is located on the upper wall at the southeast end of the Windley Key quarry. Here visitors can learn about the geologic make-up of the Florida Keys, the species found here as well as the historical significance of the quarry as it relates to Henry Flagler's railroad.

General management measures: In order to maintain the desired future condition of the developed areas within the park, regular monitoring for exotic species recruitment will be conducted along the edge of the parking lot, in the area of the Visitor Center, and in the nursery.

Imperiled Species

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

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

The Keys cactus barren supports several rare species that are found in only a few areas of the Florida Keys including yellow hibiscus, Florida Keys indigo and wild hibiscus. Continuation of the exotic removal program will protect the imperiled species that occur in the rockland hammock and in the Keys cactus barren.

Sea lavender does not naturally occur at Windley Key but was planted in the butterfly garden since it is a great species for butterflies. Plans are to remove this individual from the butterfly garden and plant appropriate species that are native to the park.

Red stopper and Lignum vitae do not naturally occur at Windley Key but were planted as part of the landscape plan when the Visitor Center was constructed. These species should be considered for removal and park appropriate species be planted in their place.

Table 2: Imperiled Species Inventory

COMMON & *SCIENTIFIC NAME*	**IMPERILED SPECIES STATUS**				**MANAGEMENT ACTIONS**	**MONITORING LEVEL**
	FFWCC	**USFWS**	**FDACS**	**FNAI**		
PLANTS						
Blue mist flower *Ageratum littorale*			LE	G2,G3, S3	2	Tier 3
Sea lavender – cultivated *Argusia gnaphalodes*			LE	G4,S3	14	Tier 5
Yellow hibiscus *Cienfuegosia yucatanensis*			LE	G4?,S1	2	Tier 3
Milkbark *Drypetes diversifolia*			LE	G4,S2	2	Tier 3
Red stopper – cultivated *Eugenia rhombea*			LE	G5, S1	14	Tier 5
Princewood *Exostema caribaeum*			LE	G5,S2	2	Tier 3
Lignum vitae - cultivated *Guajacum sanctum*			LE	G2, S1	14	Tier 5

COMMON & *SCIENTIFIC NAME*	**IMPERILED SPECIES STATUS**				**MANAGEMENT ACTIONS**	**MONITORING LEVEL**
	FFWCC	**USFWS**	**FDACS**	**FNAI**		
Prickly apple cactus *Harissia simpsonii*			LE	G2,S2	2	Tier 3
Wild hibiscus *Hibiscus poeppigii*			LE		2	Tier 3
White ironwood *Hypelate trifoliata*			LE	G4,S1	2	Tier 3
Florida Keys' indigo *Indigofera mucronata* var. *keyensis*			LE	G5?T1 Q, S1	2	Tier 3
Sky blue morning glory *Jacquemontia pentanthos*			LE	G4G5, S2	2	Tier 3
Joewood *Jacquinia keyensis*			LT	G4,S3	2	Tier 3
Wild dilly *Manilkara jaimiqui* ssp. e*marginata*			LT	G4, S3	2	Tier 3
Florida boxwood *Schaefferia frutescens*			LE	G5,S2	2	Tier 3
West Indian mahogany *Swietenia mahagoni*			LT	G3G4, S3	2	Tier 3
Florida thatch palm *Thrinax radiata*			LE	G4G5, S2	2	Tier 3
BIRDS						
Peregrine falcon *Falco peregrinus*				G4, S2	13	Tier 1
American kestrel *Falco sparverius*	LT			G5T4, S3	13	Tier 1
Magnificent frigatebird *Fregata magnificens*				G5,S1	13	Tier 1
White-crowned pigeon *Patogioenas leucocephala*	LT			G3,S3	13	Tier 1
Roseate Spoonbill *Platalea ajaja*				G5,S2	13	Tier 1
Least tern *Sterna antillarum*	LT			G4,S3	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 & Education
14. Other

Monitoring Level:

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

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

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

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

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

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

Exotic 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.

When the quarrying activity ceased in the 1960s the site was left vacant, although it was still owned by the East Coast Railroad. The site disturbance provided the ideal conditions for invasion of exotic species especially Australian pine and Brazilian pepper. In addition to the exotics, the site was also subjected to a massive amount of dumping of all kinds of debris.

After the park was developed, exotic plant removal projects continued with Australian pine being the most prevalent exotic species, particularly in the quarries. Because of follow-up treatment, the exotic species problem in the park is now in a maintenance phase. A 2008 exotic removal contract project enabled the contractors to conduct a sweep of the entire 36 acres, although only about four acres needed treatment. The main problem species in the park are Australian pine, Brazilian pepper, and lead tree. Periodic follow-up treatment is conducted by park staff.

Table 3 contains a list of the Florida Exotic Pest Plant Council (FLEPPC) Category I and II invasive, exotic plant species found within the park (FLEPPC, 2009). The table also identifies relative distribution for each species and the management zones in which they are known to occur. An explanation of the codes is provided following the table. For an inventory of all exotic species found within the park, see Addendum 5.

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

COMMON & *SCIENTIFIC NAME*	**FLEPPC CATEGORY**	**DISTRIBUTION**	**MANAGEMENT ZONE**
PLANTS			
False sisal *Agave sisalana*	II	0	
Umbrella sedge *Cyperus involucratus*	II	2	3
Egyptian grass *Dactyloctenium aegyptium*	II	2	3
Lead tree *Leucaena leucocephala*	II	0	
Sapodilla *Manilkara zapota*	I	2	3
Natal grass *Melinis repens*	I	2	3

Guinea grass *Panicum maximum*	II	0	
Bowstring hemp *Sansevieria hyacinthoides*	II	0	
Brazilian pepper *Schinus terebinthifolius*	I	0	
Nettle-leaf porterweed *Stachytarpheta cayennensis*	II	2	3
Puncture vine *Tribulus cistoides*	II	0	

Distribution Categories (FNAI):

0 No current infestation: All known sites have been treated and no plants are currently evident.

1 Single plant or clump: One individual plant or one small clump of a single species.

2 Scattered plants or clumps: Multiple individual plants or small clumps of a single species scattered within the gross area infested.

3 Scattered dense patches: Dense patches of a single species scattered within the gross area infested.

4 Dominant cover: Multiple plants or clumps of a single species that occupy a majority of the gross area infested.

5 Dense monoculture: Generally, a dense stand of a single dominant species that not only occupies more than a majority of the gross area infested, but also covers/excludes other plants.

6 Linearly scattered: Plants or clumps of a single species generally scattered along a linear feature, such as a road, trail, property line, ditch, ridge, slough, etc. within the gross area infested.

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

Exotic animal species found at Windley Key the park include green iguana (*Iguana iguana*), Cuban tree frog (*Hyla septentrionales*) northern curly-tailed lizard (*Leiocephalus carinatus*) and domestic cats (*Felis domesticus*). Their presence in the park adversely affects native species, for example, free roaming cats pose a major threat to songbirds,

the northern curly-tailed lizard is a recent arrival to the Florida Keys and is outcompeting native lizard populations, and the Cuban tree frog has successfully displaced the native tree frog in areas where it has become abundant. Green iguanas pose a threat to plant species dynamics particularly by their predation on flowers. Removal of exotic animal species will be consistent with the approved removal methods as outlined in DRP's Operations Manual.

Five green iguanas have been removed from Windley Key by park staff since the approval of the last management plan. Management will pursue the feasibility of contracting with the USDA to remove both the green iguanas and feral cats from the park.

Detailed management goals, objectives and actions for management of invasive exotic plants and exotic and nuisance animals are discussed in the Resource Management Program section of this component.

Special Natural Features

The exposed cross section of the ancient coral reef is the special natural feature at Windley Key.

Cultural Resources

This section addresses the cultural resources present in Windley Key Fossil Reef Geological 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 7 contains the FDOS, Division of Historical Resources (DHR) management procedures for archaeological and historical sites and properties on state-owned or controlled properties; the criteria used for evaluating eligibility for listing in the National Register of Historic Places, and the Secretary of Interior's definitions for the various preservation treatments (restoration, rehabilitation, stabilization and preservation).

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

Condition Assessment

Evaluating the condition of historic structures and landscapes 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 cause for concern. Poor describes an unstable condition where there is palpable, accelerating decline, and physical integrity is being compromised quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action is needed to reestablish physical stability.

Level of Significance

Applying the criteria for listing in the National Register of Historic Places involves the use of contexts as well as an evaluation of integrity of the site. Every cultural resource's significance derives from historical, architectural or archaeological contexts. Evaluation 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.

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

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

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 (FMSF) lists the Windley Key quarry (MO01961) as the only cultural site within the park. This site encompasses the Windley Key Quarry, the Flagler Quarry and the Russell Quarry.

As noted above, the Russell Quarry was the first to be excavated to supply rock for Henry Flagler's overseas railroad. Development of this site began when the Russell family sold the parcel to the Florida East Coast Railway in the early 1900s and construction of the railroad that was to extend from Miami to Key West began. On the east side of the quarry is the remains of a freshwater well that is part of an old home site.

Flagler Quarry was the second excavation to be opened. The "Quarry Station" was established on the south side of Flagler quarry, becoming a regular stop for local passengers, freshwater delivery and the transport of the excavated keystone. What remains of the station are a few of the cement cradles that held the giant water tanks, and the remnants of the station. Close to the middle of the quarry is a section of limestone block that was not transported away, due to its high porosity.

Once the railroad was, completed, architects and builders became interested in the limestone because of its interesting coral patterns and began using the "keystone" for the faces of buildings and monuments. The method of extracting the material was then altered to lessen the damage to the limestone that was removed. One can see the differences in the quarry wall faces particularly between the Flagler quarry and the Windley Key quarry. As a result, Windley Key quarry is the best site to view the ancient coral reef, both along the quarry walls and on the quarry floor where herbaceous vegetation has not become established. The Windley Key quarry is the largest of the three and still has some of the machinery that was used to remove the keystone rock.

The rock cutter or channeling machine is located at the northeast end of the quarry just outside of the Visitor Center. The machine operated with a series of steel rods that repeatedly dropped to make a continuous cut in the limestone. This machine was moved on a rail and could be relocated so that the limestone could be cut along perpendicular lines that then allowed for the cut blocks to be wedged out of place. The actual removal was accomplished using the gin pole, a mechanism that is now located at the west end of the quarry. The gin pole was also used for lifting the heavy stone to the stonecutter or to the railroad cars. What remains of the stonecutter is located on the south end of the quarry on a concrete slab. This area was enclosed by an aluminum building where the large blocks were cut into smaller pieces to make transportation easier and safer. The metal building was removed when it became a hazardous structure due to age and disrepair.

Condition Assessment: Within the Windley Key quarry (MO01961) the three quarries are in good condition. Historically geologists collected core samples from the quarry walls, but this practice ceased when the site became a state park. The quarry walls are subject to vegetative growth and roots anchoring into the limestone substrate. With little to no soil in the rockland hammock, native vegetation has adapted by finding the interstitial spaces in the limestone to send out their roots. Exposure to rainfall will affect

the quarry walls and quarry floor as the limestone is dissolved, percolates into the porous limestone and resolidifies as smooth caprock.

The machinery associated with the active quarry period, particularly the rock-cutting machine, is in fair condition due to their constant exposure to the elements.

Level of Significance: The Windley Key quarry (MO01961) is considered eligible for listing in the National Register of Historic Places for several reasons. It is significant historically for the information it provides as to early twentieth-century quarrying of stone and its connection with the Florida East Coast (FEC) Railroad. The quarry is also significant as a geologic study area due to the large number and types of fossilized coral that are visible on the quarry walls. For instance, scientists have determined from the absence of elkhorn and staghorn coral in the fossilized coral walls here that the Florida Keys were once a patch reef system with the more extensive spur and groove reefs being found further seaward. Patch reefs are characterized by their dome shape with the larger boulder corals typically found in the center of the reef.

General management measures: Management of the three quarries consists of protecting the quarry walls from physical impact or damage and control of exotic plant species, as discussed in the Resource Management Program section of this plan. A Cyclical Maintenance Plan needs to be developed for the quarry machinery, as discussed below. This will guide park management in the methodologies necessary to protect the machinery from further degradation. . The park should implement the recommendations of the 2004 Datanet Engineering report to treat the historic machinery in the quarry.

Collections

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

Description: The park's collections consist of the quarry machinery – the rock cutting or channeling machine, the gin pole machine, the machine that cut the stone into smaller pieces, and the spikes in the rockland hammock that were believed to have been used to anchor winches to move equipment and stone. The collection that is housed in the Visitor Center includes displays that interpret both the fossil reef and the historic quarrying activities that occurred on this site.

Condition Assessment: The collections housed in the Visitor Center are located in display cabinets in a climate controlled environment and are in good condition. The quarry machinery is in fair condition as discussed above. Some of these objects have

been exposed to environmental elements including hurricanes and tropical storms since the early 1900s while others objects were not employed on site until the early 1960s.

Level of Significance: The collections housed in the Windley Key Visitor Center are significant because they interpret several aspects that are both geologically and historically important. The construction of Flagler's Railroad was a monumental accomplishment due to harsh conditions and difficult terrain, but it provided an important avenue for access for both visitors and residents of the Florida Keys. The railroad provided a much easier and quicker form of transportation of people, water and agricultural products, all of which was beneficial to the local economy. What remains of this activity, the quarries, the quarry machinery and evidence of Quarry Station, allows the park visitor to better understand the scale of the tasks difficulties involved in creation of the Overseas Railroad and in the subsequent quarrying of architectural stone.

General management measures: A Scope of Collections Statement cataloging the park's collections needs to be completed in order to achieve the desired future condition and a cyclical maintenance plan needs to be established for the protection and preservation of the quarry machinery.

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

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

SITE NAME & FMSF #	CULTURE/PERIOD	DESCRIPTION	SIGNIFICANCE	CONDITION	TREATMENT
Windley Key Quarry MO01961	American – 20th Century	Archaeological Site	NR	G	P

Significance:

NRL National Register listed
NR National Register eligible
NE Not evaluated
NS Not significant

Condition

G Good
F Fair
P Poor

Recommended Treatment:

RS Restoration
RH Rehabilitation
ST Stabilization
P Preservation
R Removal

RESOURCE MANAGEMENT PROGRAM

Management Goals, Objectives and Actions

Measurable objectives and actions have been identified for each of DRP's management goals for Windley Key Fossil Reef Geological State Park. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While, DRP utilizes the ten-year management plan to serve as the basic statement of policy and future direction for each park, a number of annual work plans provide more specific guidance for DRP staff to accomplish many of the resource management goals

and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire management, exotic plant management and imperiled species management. Annual or longer- term work plans are developed for natural community restoration and hydrological restoration. The work plans provide DRP with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system.

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

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

Natural Resource Management

Hydrological Management

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

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

Objective: Continue cooperative efforts with the Florida Department of Transportation (FDOT) to improve stormwater management protection for the park along the U.S. 1 right-of-way.

There are no hydrological restoration needs in the park. The construction of drainage and navigational canals both on the mainland and in the Florida Keys, along with the increased population in south Florida, has resulted in a lower regional water table. This has altered the amount of freshwater retained in the solution holes in the park. This scale of hydrological disruption is beyond DRP's control. Natural community alteration at Windley Key is a result of the quarry activity that did not disrupt the natural hydrology here, given the extreme porosity of the fossil coral reef that underlies the park.

The close proximity of the park boundary to the edge of Flagler Quarry poses problems in that there is little room for the construction of stormwater swales along this section of the U.S. Highway 1. DRP staff has discussed the issue with staff of the FDOT, and will continue to work with that agency to improve hydrological protection of the state park when improvements are made to the state highway.

Natural Communities Management

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

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

Natural community alteration at Windley Key is the result of the quarry activities from the early 1900s through the 1960s. However, the quarries are of significance as a cultural resource and as a geological site for study of ancient coral reefs. There are no plans to restore them to the original topography of the surrounding rockland hammock.

There are no fire-dependent natural communities at the park, and prescribed fire management activity is neither necessary nor appropriate here.

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

Objective: Continue the maintenance of 21 acres of rockland hammock and 0.73 acres of Keys cactus barren communities in good condition.

Natural community improvement at Windley Key Fossil Reef Geological State Park will be achieved through the continuation of the exotic plant species removal program discussed below. Maintenance of these communities also entails monitoring and managing public activities on the trails, and assessing and addressing damage from

occasional intrusions along the highway right of way and from storm impacts to the park's vegetation.

Imperiled Species Management

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

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

In the preparation of this management plan, DRP staff consulted with staff of the FFWCC's Imperiled Species Management Section 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 FFWCC, USFWS, FDACS and FNAI as part of their ongoing research and monitoring programs will be reviewed by park staff periodically to inform management of decisions that may have an impact on imperiled species at the park.

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

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

All naturally occurring imperiled plant species have been mapped using a Trimble GPS unit. These were recorded either as individual occurrences, or as polygons occurring within a natural community. This data will be updated when significant events occur

such as a tropical storm or hurricane, which would potentially impact population distribution and density.

Imperiled animal species within the park are updated as new sightings are recorded by park staff and park visitors.

Objective: Reintroduce the endangered Keys tree cactus at Windley Key.

Continue to collaborate with researches from Fairchild Tropical Botanic Garden (FTBG) on reintroducing the endangered Keys tree cactus at Windley Key. Site selection has been conducted including elevation measurements, soil samples and canopy cover. This project is a coordinated effort between FTBG, the Florida Park Service (FPS), and the U.S. Fish and Wildlife Service. Fruits have been collected from multiple sites on public lands in the Florida Keys and once there is sufficient maternal stock from each genotype (100/genotype), then the individuals will be out planted in the park. Monitoring will be conducted by FTBG and FPS staff. A reintroduction plan submitted by park staff has been approved by the Bureau of Natural and Cultural Resources and District 5 Administration.

Objective: Study the potential impact of green iguanas on imperiled plant species.

In recent years, the population of green iguanas in the Florida Keys has increased. Because they eat leaves, flowers and fruits, their potential impact to imperiled species is unknown, but of great concern.

Exotic Species Management

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

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

Objective: Annually treat 2 1/4 acre of exotic plant species in the park.

Due to the minimal level of infestation of exotic species at Windley Key, the objective will be to conduct periodic surveys for treatment of species that may have resprouted or recruited into the park. This should account for approximately 2 1/4-acre requiring follow-up treatment. Target species include Australian pine, Brazilian pepper, sapodilla and lead tree.

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

Control of green iguanas and feral cats will be addressed as they are observed within the park. Guidelines for removal methods will follow those outlined in the Operations

Manual. Management will investigate the feasibility of contracting the USDA to conduct this removal.

Special Management Considerations

Timber Management Analysis

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

Arthropod Control Plan

All Division lands are designated as "environmentally sensitive and biologically highly productive" in accordance with Ch. 388 and Ch. 388.4111. If a local mosquito control district proposes a treatment plan, the Division responds within the allotted time and reaches consensus with the mosquito control district. By policy of the Department since 1987, no aerial adulticiding is allowed, but larviciding and ground adulticiding (truck spraying in public use areas) is typically allowed. The Division does, not authorize new physical alterations of marshes through ditching, or water control structures. Mosquito control plans temporarily may be set aside under declared threats to public or animal health, or during a Governor's Emergency Proclamation.

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 Windley Key Fossil Reef Geological 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, 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: Assess and evaluate one of one recorded cultural resource in the park.

1. The only recorded cultural resource in the park encompasses the Windley Key Quarry, the Flagler Quarry and the Russell Quarry. In order to ensure the integrity of the quarry walls, only non-invasive geologic research will be permitted in the park. The quarry walls will continue to be protected from physical damage and/or vandalism.

2. The quarry walls are subject to potential impacts from root damage and rainfall. The dissolution of the limestone from rainfall results in the percolation of the dissolved limestone into the porous substrate. Over time, this will lead to the formation of cap rock that forms a smooth layer on the surface eliminating the original structure of the coral polyp formations. Because this is a natural process that will slowly alter the fossilized coral remnants, it is an opportunity for interpretation and should not be prevented.

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

A Scope of Collections Statement will need to be completed for Windley Key.

Objective: Bring one of one recorded cultural resources into good condition.

The three quarries within the Windley Key quarry (Mo01961) are in good condition. The park should implement the recommendations of the 2004 Datanet Engineering report to treat the historic machinery in the quarry.

Resource Management Schedule

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

Land Management Review

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

Windley Key Fossil Reef Geological State Park has not been subjected to a land management review.

LAND USE COMPONENT

INTRODUCTION

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

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

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

EXTERNAL CONDITIONS

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

Windley Key Fossil Reef Geological State Park is located within Monroe County, about 2.5 miles southeast of the Islamorada Village of Islands in the southern part of the state.

Existing Use of Adjacent Lands

Adjacent lands are primarily in mixed commercial and residential land uses on Windley Key and the islands north and south. An aquatic theme park and a major resort are located less than one mile south of the park.

Planned Use of Adjacent Lands

There are no major changes in land uses expected for the adjacent properties. Traffic congestion along U.S. Highway 1, air and noise pollution are the main impacts of adjacent uses on the state geological state park. Untreated storm water runoff may enter the park from the U.S. Highway 1 right of way. Design and construction of remediation measures should be included in any future work on the highway. The Florida Keys Overseas Heritage Trail is planned for the right of way across the state park frontage. When that project is completed, non-vehicular access to the state park will be greatly enhanced. Increases in park visitation may be a result of the trail project in the future. Unfortunately, the Windley Key portion of the trail project is not funded or scheduled for design and construction at this time.

PROPERTY ANALYSIS

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

Recreation Resource Elements

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

Land Area

The upland area at the park contains one of the finest hardwood hammocks in the Keys. It also has one of the highest elevations in the Keys, reported to be 18 feet above sea level. Undisturbed wetlands and transition areas border three sides of the property. An unexcavated, but heavily disturbed area between the Windley Quarry and the federal highway provides approximately two acres of disturbed land within which the park's major improvements for educational and interpretive activities have been located.

Shoreline

There is approximately two-thirds of a mile of shoreline at the park, which are primarily mangroves. This limits access to the shoreline, and visitor access should not be encouraged.

Natural Scenery

Although the tropical hardwood hammock of this property is aesthetically pleasing, the sheer faces of fossil coral revealed along the quarry walls are the outstanding visual attraction of this park.

Significant Wildlife Habitat

The park's hardwood hammock is considered one of the highest-quality examples of that community in the Florida Keys. The sightings of rare plants and animals are important parts of many visitors' experiences at the park and public access as been planned with careful attention to minimizing human disturbances to the hammock and mangrove communities, which are the park's primary wildlife areas. The access provided for visitors to these communities is an important component of the environmental education programs at the park.

Natural Features

The outstanding natural feature of the park is the fossil coral reef exposed by the keystone quarry operations. This is the main attraction for most of the park's visitors and the focal point for many of the unit's educational activities. The nearly pristine tropical hammock is the second important feature, followed closely by intact transition vegetation and the solid mangrove/buttonwood shoreline on Florida Bay. Together, these features provide an opportunity to interpret the entire natural history of the Florida Keys because they reveal a complete cross section of a typical island.

Archaeological and Historical Features

The cultural features as described in the resource management component include the quarries, the remnants of the quarry station , and the abandoned quarrying machinery, an Indian midden area, conch house remnants and a well enclosure. Each of these resources is included in park interpretive materials or programs. Again, the revealed history of keystone quarrying and the connection of this site to the Flagler railroad are the leading cultural features of the state park.

Assessment of Use

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

Past Uses

The dominant past use of the property is quarrying of fossil coral rock, which began around 1908 and ended in the 1960s. Since the quarrying operation first began,

geologists and geology students have studied the fossil reef revealed in the walls and floors of the quarries. In the more recent past, the Windley Quarry was used as a staging area during the construction of the new bridges on U.S. Highway 1.

Future Land Use and Zoning

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

The Future Land Use as listed in the 2010 Monroe County comprehensive plan is conservation. This designation does not create any conflict with the planned use of Windley Key Fossil Reef Geological State Park.

Current Recreational Use and Visitor Programs

Since the completion of the Environmental Education Center at Windley Key, interpretation and education programs have been the primary activity of this state park. Nearly 1.4 miles of nature trails exploring both the Windley and Flagler Quarries and portions of the hammock have been created utilizing volunteer labor.

Windley Key Fossil Reef Geological State Park recorded 15,557 visitors in FY 2010/2011. By DRP estimates, the FY 2010/2011 visitors contributed over $770,716 in direct economic impact and the equivalent of 15.4 jobs to the local economy (Florida Department of Environmental Protection, 2011).

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 Windley Key Fossil Reef Geological State Park the entire property been designated as a protected zone, with the exception of the areas currently developed for the visitor center, parking and storage (see Conceptual Land Use Plan).

WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 125 250 500 Feet

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

BASE MAP

Existing Facilities

Recreation Facilities

Environmental Education Center
Quarry Wall Walk (0.2 mi.)
Flagler Trail (0.3 mi.)
Hammock and Sunset Trail (0.9 mi.)

Support Facilities

Entrance and parking (25 cars)
Storage shed
Nursery

CONCEPTUAL LAND USE PLAN

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

The conceptual land use plan described here is the long-term, optimal development plan for the park, based on current conditions and knowledge of the park's resources, landscape and social setting. The development plan will be reassessed during the next update of the park management plan, and modified to address new conditions, as needed.

During the development of the management plan, DRP assessed potential impacts of proposed uses or development on the park resources and applied that analysis to decisions on the future physical plan of the park as well as the scale and character of proposed development. Potential impacts are more thoroughly identified and assessed as part of the site planning process once funding is available for facility development. At that stage, design elements (such as existing topography and vegetation, sewage disposal and stormwater management) and design constraints (such as imperiled species or cultural site locations) are more thoroughly investigated. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Stormwater management systems are designed to minimize impervious surfaces to the greatest extent feasible, and all facilities are designed and constructed using best management practices to avoid impacts and to mitigate those that cannot be avoided. Federal, state and local permit and regulatory requirements are met by the

SUPPORT FACILITY

OVERSEAS HERITAGE TRAIL

LEGEND

- PARK BOUNDARY
- PROTECTED ZONE
- PROPOSED FACILITIES
- VISITOR CENTER
- OVERSEAS HERITAGE TRAIL

WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 62.5 125 250 375 500 Feet

FL DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF RECREATION AND PARKS

CONCEPTUAL LAND USE PLAN

final design of the projects. This includes the design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, the park staff monitors conditions to ensure that impacts remain within acceptable levels.

Potential Uses

Public Access and Recreational Opportunities

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

The existing recreational activities and programs of this state park are appropriate to the natural and cultural resources contained in the park and should be continued.

Objective: Maintain the park's current recreational carrying capacity of 240 users per day.

The park will continue to provide opportunities for visitor access to the visitor center and nature trails at the park.

Objective: Continue to provide the current repertoire of 17 interpretive, educational and recreational programs on a regular basis.

The current interpretive/education program includes Ranger-led tours twice daily, three times a week on Windley Key. This program will be continued with other tours to be on a case-by-case basis depending on current staffing and time frame of request. There are no plans for expanding the repertoire of interpretive or educational programs due to staff cuts.

The success of programs at the state park should be enhanced in the future by expanding programs that provide guided tours, periodic renewal and updating of interpretive displays and materials offered by the Environmental Education Center, and expansion of programs offering lectures, directed studies and university-level research. These improvements will require either the expansion of park staff, or the continued support and development of the parks Citizen Support Organization, volunteer interpreter programs, and funding to support outside researchers.

Proposed Facilities

Capital Facilities and Infrastructure

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

The existing facilities are considered optimum for the interpretive and recreational programs of the state park. No new facilities for public use are proposed by this plan.

The existing facilities of this state park are appropriate to the natural and cultural resources contained in the park and should be maintained. New construction, as discussed further below, is recommended to improve the quality and safety of the recreational opportunities that visitors enjoy while in the park, to improve the protection of park resources, and to streamline the efficiency of park operations. The following is a summary of new facilities needed to implement the conceptual land use plan for Windley Key Fossil Reef Geological 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 the visitor center, trails and support areas of the park, as needed.

Repair projects for park facilities may be accomplished within the 10-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).

Objective: Construct one new support facility.

An administration facility is needed to provide office space and space for maintenance work and equipment storage. A two-bay shop building should be located in the southeast corner of the parking area to meet this support need.

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.

Existing Use and Recreational Carrying Capacity

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

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

Table 5--Existing Use and Recreational Carrying Capacity

	Existing Capacity		Proposed Additional Capacity		Estimated Recreational Capacity	
Activity/Facility	**One Time**	**Daily**	**One Time**	**Daily**	**One Time**	**Daily**
Environmental Center	40	160			40	160
Trails						
Nature Trails	20	80			20	80
TOTAL	**60**	**240**	**0**	**0**	**60**	**240**

Optimum Boundary

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

Identification of lands on the optimum boundary map is solely for planning purposes and not for regulatory purposes. A property's identification on the optimum boundary map is not for use by any party or other government body to reduce or restrict the lawful right of private landowners. Identification on the map does not empower or require any government entity to impose additional or more restrictive environmental land use or zoning regulations. Identification is not to be used as the basis for permit denial or the imposition of permit conditions. The optimum boundary map reflects lands identified for direct management by DRP as part of the park. These parcels may include public as well as privately owned lands that improve the continuity of existing park lands, provide additional natural and cultural resource protection, and/or allow for future expansion of recreational activities.

The optimum boundary for this unit includes a 291-acre parcel that lies on the upper end of Windley Key. It is located on the bay side of U.S. Highway 1, with about 2,660 feet of shoreline on Snake Creek. The property consists of approximately 136 acres of uplands and wetlands and 155 acres of submerged land. There are nearly four acres of relatively undisturbed rockland hammock community on the property. A band of transitional vegetation separates the hammock from the wetlands. If acquired the site could be managed for natural resource preservation and interpretive purposes.

Florida Bay

Plantation Key

US-1

Wilson Key

Atlantic Ocean

LEGEND
Optimum Boundary
Park Boundary

WINDLEY KEY FOSSIL REEF GEOLOGICAL STATE PARK

N

0 250 500 1,000 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks

OPTIMUM BOUNDARY MAP

IMPLEMENTATION COMPONENT

The resource management and land use components of this management plan provide a thorough inventory of the park's natural, cultural and recreational resources. They outline the park's management needs and problems, and recommend both short and long-term objectives and actions to meet those needs. The implementation component addresses the administrative goal for the park and reports on the Florida Department of Environmental Protection (DEP), 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 Windley Key Fossil Reef Geological State Park in 2003, significant work has been accomplished and progress made towards meeting 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 DRP.

Acquisition

- No land was acquired as part of Windley Key Fossil Reef Geological State Park

Park Administration and Operations

- Permanent staff was increased by one position.

Resource Management

Natural Resources

- Removed 4.5 Acres of invasive exotic plants

Recreation and Visitor Services

- Annual Windley Key Day event held

Park Facilities

- Installed new fence along park boundary
- Upgraded park entrance sign

MANAGEMENT PLAN IMPLEMENTATION

This management plan is written for a timeframe of ten years, as required by Section 253.034 Florida Statutes. The Ten-Year Implementation Schedule and Cost Estimates (Table 6) summarize the management goals, objectives and actions that are recommended for implementation over this period, and beyond. Measures are identified for assessing progress toward completing each objective and action. A period

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 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 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 DRP's annual legislative budget requests. When preparing these annual requests, 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, DRP pursues supplemental sources of funds and staff resources wherever possible, including grants, volunteers and partnerships with other entities. DRP's ability to accomplish the specific actions identified in the plan will be determined largely by the availability of funds and staff for these purposes, which may vary from year to year. Consequently, the target schedules and estimated costs identified in Table 6 may need to be adjusted during the ten-year management planning cycle.

Table 6
Windley Key Fossil Reef Geological State Park Ten-Year Implementation Schedule and Cost Estimates

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

Goal I: Provide administrative support for all park functions.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Continue day-to-day administrative support at current levels.**	Administrative support ongoing	C	**$123,879**
Objective B	**Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.**	Administrative support expanded	LT	**$1,600**
Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Continue cooperative efforts with the Florida Department of Transportation (FDOT) to improve stormwater management protection for the park along the U.S. 1 right-of-way.**	# Acres restored or with restoration underway	C	**$4,000**
Goal III: Restore and maintain the natural communities/habitats of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Continue the maintenance of 21 acres of rockland hammock and 0.5 acres of marine composite substrate communities in good condition.**	# Acres maintained	LT	**$53,920**
Action 1	Monitor and manage public activities on the trails	# Acres monitored	C	$7,530
Action 2	Assess and address damage from occasional intrusions along the highway right of way and from storm impacts to the park's vegetation.	# Acres monitored	C	$46,750
Goal IV: Maintain, improve or restore imperiled species populations and habitats in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Update baseline imperiled species occurrence inventory lists for plants and animals, as needed.**	List updated	C	**$400**
Objective B	**Monitor and document 17 selected imperiled plant species in the park.**	# Species monitored	C	**$400**
Action 1	Update data for imperiled plant species in the park when significant events occur such as a tropical storm or hurricane, to document impact to population, dstribution and density.	Data updated	ST	$400
Objective C	**Reintroduce endangered Keys tree cactus on .25 acres of Windley Key.**	Species introduced	LT	**$10,000**
Objective D	**Study the impact of the green iguana on imperiled plant species**	Study conducted	ST	**$6,000**

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

Table 6
Windley Key Fossil Reef Geological State Park Ten-Year Implementation Schedule and Cost Estimates
Sheet 2 of 3

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

Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintaince-control.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Annually treat 2 1/4 acres of exotic plant species in the park.**	# Acres treated	C	**$15,440**
Action 1	Update exotic plant management annual work plan.	Plan Updated	C	$1,000
Action 2	Implement annual work plan by treating 2 1/4 acres in park, annually, and continuing maintenance and follow-up treatments, as needed.			$14,440
Objective B	**Implement control measures on 3 exotic and nuisance animal species in the park.**	# Species for which control measures implemented	C	**$16,430**
Action 1	Monitor black rats, green iguanas and free-roaming or feral cats within the park boundary, and remove them according to procedures outlined in the operations manual when encountered.			$16,430
Goal VI: Protect, preserve and maintain the cultural resources of the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Assess and evaluate 1 of 1 cultural resources in the park.**	Documentation complete	LT	**$30,000**
Objective B	**Develop scope of collections statement for Windley Key.**	Documentation complete	ST	**$10,000**
Objective C	**Maintain the 1 of 1 cultural resources in the park in good condition.**	# Sites in good condition	UFN	**$60,000**
Objective D	**Preserve and maintain the historic quarry machinery**	Machinery preserved	UFN	**$90,000**
Action 1	Assess and evalate the condition of the historic quarry machinery		UFN	$60,000
Action 2	Develop and implement a cyclical maintenance plan		UFN	$30,000
Goal VII: Provide public access and recreational opportunities in the park.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain the park's current recreational carrying capacity of 160 users per day.**	# Recreation/visitor opportunities per day	C	**$628,760**
Objective B	**Continue to provide the current repertoire of 17 interpretive, educational and recreational programs on a regular basis.**	# Interpretive/education programs	C	**$16,840**
Goal VIII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.		**Measure**	**Planning Period**	**Estimated Manpower and Expense Cost* (10-years)**
Objective A	**Maintain all public and support facilities in the park.**	Facilities maintained	C	**$46,700**
Objective B	**Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.**	Plan implemented	LT	**$1,750**
Objective C	**Construct one new shop/storage building.**	# Facilities	UFN	**$190,000**
Objective D	**Expand maintenance activities as existing facilities are improved and new facilities are developed.**	Facilities maintained	C	**$93,400**

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

Table 6
Windley Key Fossil Reef Geological State Park Ten-Year Implementation Schedule and Cost Estimates
Sheet 3 of 3

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

Summary of Estimated Costs

Management Categories		Total Estimated Manpower and Expense Cost* (10-years)
Resource Management		**$296,590**
Administration and Support		**$125,479**
Capital Improvements		**$191,750**
Recreation Visitor Services		**$645,600**
Law Enforcement Activities[1]		**$0**
	[1]Law enforcement activities in Florida State Parks are conducted by the DEP Division of Law Enforcement and by local law enforcement agencies.	

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

Addendum 1 — Acquisition History

Purpose and Sequence of Acquisition

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) acquired Windley Key Fossil Reef Geological State Park to develop, operate and maintain the property for outdoor recreation, park, conservation, historic and related purposes.

The initial acquisition of the park took place on January 17, 1986, when the Trustees purchased the property. On September 29, 1986, the Trustees leased Windley Key Fossil Reef Geological State Park to the Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP)under Lease No. 3453. This lease is for a period of fifty (50) years and will expire on September 28, 2036. The park consists of 36 acres.

According to the Trustees lease, the DRP manages Windley Key Fossil Reef Geological State Park only for the development, conservation and protection of natural and cultural resources of the park and for resource-based public outdoor recreation that is compatible with the conservation and protection of the property.

Title Interest

The Trustees hold fee simple title to Windley Key Fossil Reef Geological State Park.

Special Conditions on Use

Windley Key Fossil Reef Geological State Park is designated single-use to provide resource-based public outdoor recreation and other related uses. Uses such as water resource development projects, water supply projects, storm-water management projects and linear facilities and sustainable agriculture and forestry (other than those forest management activities specifically identified in the park's unit management plan) are not consistent with this management plan.

Outstanding Reservations

There are no outstanding rights, reservations and encumbrances that apply to Windley Key Fossil Reef Geological State Park.

Addendum 2—Advisory Group Members and Report

Windley Key Fossil Reef Geological State Park Advisory Group Members

Elected Officials

Honorable Michael Reckwerdt, Mayor
Islamorada Village Council
86800 Overseas Highway
Islamorada, FL 33036

Represented by:
Honorable Ted Blackburn
Islamorada Village Council
86800 Overseas Highway
Islamorada, FL 33036

Honorable Heather Carruthers, Mayor
Monroe County Board of
County Commissioners
530 Whitehead Street
Key West, FL 33040

Agency Representatives

Melba Nezbed, Park Manager
77200 Overseas Highway
Islamorada, Florida 33036

Sean Morton, Superintendent
Florida Keys National Marine Sanctuary
Upper Keys Region Office
95230 Overseas Highway
Key Largo, Fl. 33037

Represented by:
John Halas
Florida Keys National Marine
Sanctuary
Upper Keys Region Office
95230 Overseas Highway
Key Largo, Fl. 33037

Mark Torok
Department of Agriculture and
Consumer Services
Florida Forest Service
3315 S.W. College Ave
Davie, FL 33314

Randal T. Grau
Florida Fish and Wildlife
Conservation Commission
P.O. Box 430541
Big Pine Key, FL 33043

Represented by:
Ricardo Zambrano
Florida Fish and Wildlife
Conservation Commission
8535 Northlake Boulevard
West Palm Beach, FL 33412

Mike Wisenbaker
Florida Division of Historical Resources
500 South Bronough Street,
Mail Station 8
Tallahassee, Florida 32399-0250

S. Cooper McMillan, Chair
South Dade Soil And Water
Conservation District
1450 N. Krome Avenue,
Suite 104
Florida City, FL 33034

Represented by:
L.T. "Sonny" Clayton
South Dade Soil And Water
Conservation District
1450 N. Krome Avenue,
Suite 104
Florida City, FL 33034

Environmental Representatives

Peter Frezza
Audubon of Florida
115 Indian Mound Trail
Tavernier, FL 33070

Volunteers
Karen Sunderland Strobel
Friends of Islamorada Parks
168 Plantation Drive
Plantation Key, Fl 33070

User Group Representatives
Frank Woll
104050 Overseas Highway
Key Largo, Florida 33037

Historical Preservation Society Representative
Jerry Wilkenson
38 East Beach Road
Tavernier, Florida 33070

Adjacent Landowners
Nick Tagliareni
32 Park Road
Islamorada, FL 33035

Sue Miller
151 Columbus Drive
Islamorada, Fl 33036

The Advisory Group meeting to review the proposed land management plan for the Islamorada Area State Parks was held at the Allison Fahrer Environmental Education Center at Windley Key Fossil Reef Geological State Park on October 27, 2011 at 9:00 AM.

The Honorable Michael Reckwerdt of the Village Council of the Islamorada Village of Islands was represented by The Honorable Ted Blackburn. Mr. Sean Morton of the Florida Keys National Marine Sanctuary was represented by Mr. John Halas. Mr. S. Cooper McMillan of the South Dade South and Water Conservation District was represented by Mr. L.T. "Sonny" Clayton. The Honorable Heather Carruthers (Monroe County Board of County Commissioners), Mr. Randal Grau (Florida Fish and Wildlife Conservation Commission), Mr. Mike Wisenbaker (Florida Division of Historical Resources), Mr. Frank Woll, and Mr. Jerry Wilkinson (Historical Preservation Society of the Upper Keys) were not in attendance. Attending staff were Mr. Paul Rice, Mr. Lew Scruggs, Mr. Ernest Cowan, Ms. Melba Nezbed, Ms. Janice Duquesnel, and Mr. Joe Blazina. All other Advisory Group members were in attendance.

Mr. Blazina began the meeting by explaining the purpose of the Advisory Group and reviewing the meeting agenda. He provided a brief overview of the Division's planning process and summarized public comments received during the previous evening's public workshop. He then asked each member of the advisory group to express his or her comments on the plans.

Summary of Advisory Group Comments

Mr. Frezza addressed the unimproved boat ramp on Indian Key Fill. He recommended that the ramp needs to be addressed, and was glad to see it in the management plan. Mr. Frezza stated that he did not know the ramp was managed by the Division of Recreation and Parks, adding that as a local user, he has seen the operational issues that it presents, and recommended that the Division assess a fee if the ramp is improved. He said that if the ramp cannot be improved, it should be closed to motorized boats and used for paddling access due to its location and access to Lignumvitae Key. He discussed Horseshoe Key, recommending that the nearshore area around it be closed to fishers due to heavy use by nesting shorebirds and frigate birds. Mr. Frezza concluded by commending the Park Staff on their work to protect the parks' shallow water habitats and seagrass beds, adding that their signage and outreach programs are a model for other submerged land managers.

Mr. Halas began his comments adding to Mr. Frezza's concerns regarding the boat launching facilities on Indian Key Fill. He agreed that the ramp should definitely be renovated and managed with better rule enforcement, adding that with a better boat ramp will come even more traffic; as a result the parking should be reconfigured and improved as well. Mr. Halas concluded his comments commending the plans for being very well written and comprehensive.

Mr. Tagliareni addressed the entrance to Windley Key Fossil Reef Geological State Park. He suggested that the Division should work with DOT in the future to establish a right turn lane into the park, since a lot of people do not realize where the entrance to the park is until they drive past it. Mr. Tagliareni asked about paddling access to Indian Key, as the current dock is difficult to access from a kayak. Melba Nezbed responded that both Indian Key and Lignumvitae Key now have kayak landings.

Mr. Blackburn said that he was thrilled with all four of the parks, and what the park staff do to to manage them. He added to the Indian Key Fill boat ramp comments, discussing the traffic issues along US 1 with trucks and boat trailers stopping traffic to enter and exit the boat launching area. Mr. Blackburn added to Mr. Tagliareni's comments, letting Division Staff know that DOT had recently conducted public hearings regarding widening the shoulder of US 1 on Upper Matecumbe Key, suggesting the Division work with DOT to get a right turn lane into Windley Key Fossil Reef Geological State Park included in that project. Mr. Blackburn discussed the Village of Islamorada's progress in establishing wastewater treatment in the area.

Mr Blackburn also asked about the status of the proposed dinosaur theme park development at Windley Key Fossil Reef Geological State Park. Mr. Scruggs responded that division staff met with the interested parties to discuss the idea, and requested a detailed business plan and specific site plans to further explain the proposal. He explained that no formal proposal has been received by the Division to date. He explained if any such proposal is received in the future, and if the Division were interested in exploring the idea, then a public workshop would be held in the local area to ensure the involvement of local residents and stakeholders, and that an amendment to the park's management plan would be required.

Ms. Miller agreed that there should be a fee to use the boat ramp on Indian Key Fill, adding that the traffic congestion in the area is a safety hazard. She commented that there needs to be more signs in Robbie's Marina, pointing visitors to where they are supposed to go to buy tickets to gain access to Indian Key and Lignumvitae Key. Ms. Miller commended the park staff on their terrific job with educational outreach and interpretation of the parks, and encouraged them to expand their efforts further so that future generations understand the significance of the state parks in their area. She suggested establishing a kayak trail in the canal system near the land base, noting that the mangrove-lined canals are fantastic, and people should be able to enjoy them. Ms.

Miller noted that allowing visitors to kayak in the waters surrounding the islands would not have a negative impact on the sensitive resources on the islands themselves. Ms. Miller concluded her comments discussing the Choate Tract and the DOT picnic area adjacent to it. She suggested the Division work with DOT to establish a restroom, or fence the park boundary to manage access to the property.

Ms. Sunderland Strobel began her discussion asking if Robbie's Marina had a formal concession contract with the Division, adding that Robbie's should be required to provide better signage so that visitors know where to go to purchase tickets to gain access to the islands. She continued her comments discussing the option to rent kayaks, adding that the rentals provide income to the Parks. Ms. Sunderland Strobel agreed with Ms. Miller that there should be a restroom located at the Choate Tract if people are going to be allowed to picnic adjacent to it. She also said that the boat ramp area on Indian Key Fill should have a restroom, especially with the potential for sewer to come in the future. Ms. Sunderland Strobel concluded her comments stating that the plans are excellent and very well written.

Mr. Clayton began his comments stating that he grew up in the Islamorada area, and that the State Parks are very important to him. He added that the South Dade Soil and Water Conservation District provides education outreach to local schools, agreeing that education of young people is very important. Mr. Clayton concluded his comments stating that the plans are very well done, and he will continue to review them and submit further comments following the Advisory Group Meeting.

Mr. Torok commented that the plans are well written, adding that he is familiar with the parks through the Champion Tree Program. He asked park staff if the Champion Trees located on Lignumvitae Key are signed or interpreted to visitors. Janice Duquesnel responded that the Champion Trees are deep within the hammock of the island, and not accessible from the main trail that goes around the island, so signing the trees is not necessary.

Summary of Written Comments

Mr. Wisenbaker was not able to attend the advisory group meeting, but did submit written comments regarding the plans. His comments included typographical and editorial changes to the plans, as well as discussion. Mr. Wisenbaker commended the Division of Recreation and Parks in its efforts to preserve and protect Florida's irreplaceable historical resources. He recommended the Division to continue its efforts to nominate Windley Key Fossil Reef Geological State Park to the National Register of Historic Places. He also added that staff at the Division of Historical Resources who may be able to assist with the nomination process, as well as treating and restoring the historic quarrying machinery. He asked if a cyclical maintenance plan has been developed for the historical machinery found on Lignumvitae Key, and what the

schedule was. Mr. Wisenbaker commended the Division for their continued work to preserve, protect, and interpret Indian Key Historic State Park, and the work to develop a cyclic maintenance plan for the ruins there. He concluded by suggesting the mention of San Pedro Underwater Archaeological Preserve State Park as 1 of 11 archaeological preserves in the State of Florida, and commended the plan for being well researched and written.

Mr. Wilkinson was not able to attend the advisory group meeting, but did submit written comments regarding the plans. Mr. Wilkinson's comments included discussion regarding the origin of the names of the quarries and the names discussed in the management plan. Mr. Wilkinson recommended that whichever names are used in the management plan and interpretation at the park should be labeled on a map so that anyone reading the plan can understand their locations, uses and significance.

Staff Recommendations

Suggestions received from the Advisory Group meeting resulted in revisions to the draft management plan. The Resource Management Component has been updated to include the most recent natural and cultural resource management. Division staff will continue to monitor impacts of nearshore fishing activities around Horseshoe Key, and consider Mr. Frezza's comments. In the Land Use Component, additional language was included regarding the coordination of the appropriate managing agencies to determine what level of parking and road improvements are feasible in the boat launch area on Indian Key Fill. Division staff also considered the feasibility of restroom facilities on the Choate Tract and Indian Key Fill, but determined it would be unable to properly manage them. The Division will continue to work to protect the boundaries of all park lands to manage access. Minor cartographic, typographical and grammatical changes and corrections were also completed as a result of the public workshop and Advisory Group review.

With these changes, DRP staff recommends approval of the proposed management plans for the following State Parks:
Indian Key Historic State Park
Lignumvitae Key Botanical State park
San Pedro Underwater Archaeological Preserve State park
Windley Key Fossil Reef Geological State Park

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

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

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

November 2, 2011

Addendum 3—References Cited

Florida Department of Environmental Protection. 2011. Division of Recreation and Parks. Florida State Park System Economic Impact Assessment for Fiscal Year 2010/2011. Tallahassee, Florida.

Florida Natural Areas Inventory and the Florida Department of Natural Resources, 2009. Guide to the Natural Communities of Florida. Tallahassee, Fl. 111 99.

Florida Natural Areas Inventory, 1998. Florida Conservation Lands.

Florida Natural Areas Inventory, 2009. Tracking lists of special plants and lichens, invertebrates, vertebrates, and natural communities of Florida.

Hoffmeister, John E., 1974. Land from the Sea. University of Miami Press.

Humann, Paul, 1993. Reef Coral Identification. Jacksonville, Florida: New World Publications, Inc.

Littler, Diane S., M.M. Littler, K.E. Bucher, and J.N. Norris, 1989. Marine Plants of the Caribbean. A Field Guide from Florida to Brazil. Smithsonian Institution Press, Washington, D.C.

Long, R.W. and O. Lakela, 1978. A Flora of Tropical Florida. Miami, Florida: Banyan Books.

Minno, Marc C. and T.C. Emmel. 1993. Butterflies of the Florida Keys. Scientific Publishers, Gainesville, Florida.

Nelson, Gil, 1994. The Trees of Florida. Sarasota, Florida: Pineapple Press, Inc.

Peterson Field Guide, 1980. Field Guide to the Birds East of the Rockies. Houghton Mifflin Company, Boston.

Peterson Field Guide, 1975. Shells of the Atlantic. Broughton Mifflin Company, Boston.

United State Department of Agriculture, Natural Resources Conservation Service, 1995. Soil Survey of Monroe County, Keys Area, Florida.

Voss, Gilbert, 1976. Seashore life in Florida and the Caribbean. Miami, Florida: E.A. Seemann Publishing, Inc.

Wunderlin Richard P. 1998. Guide to the Vascular Plant of Florida. University Press of Florida.

Addendum 4—Soil Descriptions

(**2) Pennekamp gravelly muck, 0 to 2 percent slopes, extremely stony –** The Pennekamp series consists of well drained soils that are shallow to rippable coral limestone bedrock. The depth to bedrock is 4 to 16 inches. These soils formed in material weathered from the coral limestone bedrock. They generally have a thin overburden of sapric material. They are on uplands. Slopes range from 0 to 2 percent. The taxonomic class is loamy-skeletal, carbonatic, isohyperthermic Lithic Rendolls.

This soil is on tropical hammocks in the upland of the upper keys. About 10 percent of the surface of this soil is covered with stones that are dominantly 10 to 20 inches in diameter. Individual areas are subject to rare flooding from hurricanes and other tropical storms. Elevations are dominantly 5 to 15 feet above sea level, according to National Geodoetic Vertical Datum of 1929. the mean annual temperature is about 78 degrees F, and the mean annual presipitation is about 50 inches.

The Pennekamp soil is dominant in this map unit. Soils in area on the keys between Upper Matecumbe Key and Big Pine Key are more sandy than the Pennekamp soil; however, uses and interpretations are the same as those of the Pennekamp soil. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Soils that are associated with the Pennekamp soil are the moderately well drained, organic Matecumbe soils in the slightly lower position on the landscape and the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils and very portly drained, organic Islamorada, Keylargo, and Tavernier soils in the significantly lower positions on the landscape.

The Pennekamp soil is well drained. It has a seasonal high water table at a depth of 3.5 to 5.0 feet during the wet periods of most years. Permeability is moderately rapid.

Most areas of this soil support native vegetation and are used as habitat for tropical hammock species. Some areas have been developed for residential, urban or recreation use. Characteristic vegetation for the soils in the survey area include; poisonwood, wild tamarind, gumbo limbo, strangler fig and wild coffee.

Depth to bedrock and the flooding are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and salinity facilities.

(7) Udorthents-Urban land complex – This map unit is constructed upland areas adjacent to areas of water throughout the keys. Individual areas are subject to rare flooding from hurricanes and other tropical storms. Elevation vary, depending on the thickness of the fill material, but they are dominantly 3 to 10 feet above sea level, according to National Geodetic Vertical Datum of 1929.

The Udorthents dominantly consist of crushed oolitic limestone or coral bedrock that has been spread over the original soil material. They commonly are about 32 inches of extremely gravelly sand underlain by about 40 inches of marl. The marl is underlain by coral bedrock. Other areas of soils are underlain by muck and other soil material. Houses and other urban structures cover up to 40 percent of most areas of the Udorthents; however, the soils can still be observed.

Soils that are associated in this map unit are all of the other soils that are in the Keys.

The Udorthents are moderately well drained. They have a seasonal high water table at a depth of 2 to 4 feet during wet periods of most years. Permeability is variable.

This map unit generally supports no vegetation. The stones and droughtiness are severe limitations affecting any kind of landscaping activity. The Udorthents were developed for urban use, and many areas are being used for this purpose.

The stones, seepage, and the wetness are moderate or severe limitations affecting most uses of this map unit, including most kinds of building site and recreational development.

(9) Lignumvitae marl – The Lignumvitae series consists of poorly drained soils that are moderately deep to rippable coral of oolitic limestone bedrock. Depth to bedrock is 20 to 35 inches but can ranger from 20 to 40 inches. These soils formed in calcareous marl. They are in tidal areas. Slopes are 0 to 1 percent. The taxonomic class is coarse-silty, carbonatic, isohyperthermic Tropic Fluvaquents.

This soil is dominantly on the middle and lower keys in mangrove swamps. Individual areas are frequently flooded by tides. Elevations are dominantly at sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 75 to 78 degrees F., and the mean annual precipitation ranges from 40 to 50 inches.

The Lignumvitae soil is dominant in this map unit. Areas that have different uses and interpretation are rare and generally are adjacent to the boundaries of the map unit.

Soils that are associated with the Lignumvitae soil are the well drained, mineral Keyvaca and Pennekamp soils, moderately well drained, organic Matcumbe soils, and somewhat poorly drained, marly Saddlebunch soils in the higher positions on the landscape; the poorly drained, marly Cudjoe and Keywest soils in landscape positions similar to those of the Lignumvitae soil; and the very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

The Lignumvitae soil is poorly drained. The seasonal high water table is within a depth of 6 inches during wet periods of most years. Permeability is moderate or moderately rapid.

Most areas of this soil support native vegetation and are used s habitat for wetland wildlife. Some areas have been developed for residential, urban, or recreational use. Characteristic vegetation for the soils in the survey area include red mangrove, black mangrove, white mangrove, buttonwood, and glasswort.

Depth to bedrock, the flooding, and the wetness are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities.

Addendum 5—Plant and Animal List

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

PTERIDOPHYTES

Giant leather fern .....*Acrostichum danaeifolium*

ANGIOSPERMS

MONOCOTS

Barb-wire cactus .....*Acanthocereus tetragonus* 12
Christmas palm *.....*Adonidia merillii*
Bushy bluestem .....*Andropogon glomeratus var. pumilus*
False sisal.....*Agave decipiens*
Sisal hemp *.....*Agave sisalana*
Pitted bluestem * .....*Bothriochloa pertusa*
Coastal sandbur.....*Cenchrus incertus*
Day flower.....*Commelina erecta*
Bermuda grass * .....*Cynodon dactylon*
Umbrella sedge * .....*Cyperus involucratus*
False saw grass .....*Cyperus ligularis*
Umbrella sedge.....*Cyperus planifolius*
Nutgrass *.....*Cyperus rotundus*
Egyptian grass *.....*Dactyloctenium aegyptium*
Saltgrass.....*Distichlis spicata*
Goose grass *.....*Eleusine indica*
Butterfly orchid .....*Encyclia tampensis*
Gophertail lovegrass * .....*Eragrostis ciliaris*
Lovegrass.....*Eragrostis elliottii*
Grassleaf spurge * .....*Euphorbia graminea*
Finger grass.....*Eustachys petraea*
Prickly apple cactus .....*Harrisia simpsonii* 12
Hurricane grass *.....*Fimbristylis cymosa*
Chestnut sedge .....*Fimbristylis spadicea*
Night-blooming cereus *.....*Hylocereus undatus*
Spider lily +.....*Hymenocallis latifolia*
Key grass .....*Monanthochloe littoralis*
Ground orchid * .....*Oeceoclades maculata*
Prickly-pear cactus.....*Opuntia stricta*
Guinea grass *.....*Panicum maximum*
Coral panicum .....*Paspalidium chapmanii*

* **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Blue paspalum	*Paspalum caespitosum*	
Winged paspalum *	*Paspalum fimbriatum*	
Salt joint grass	*Paspalum setaceum*	
Salt joint grass	*Paspalum vaginatum*	
Natal grass *	*Rhynchelytrum repens*	
Bowstring hemp *	*Sansevieria hyacinthoides*	
Bluestem	*Schizachyrium sanguineum*	
Foxtail grass	*Setaria parviflora*	
Prickly cordgrass	*Spartina spartinae*	
Coral dropseed grass	*Sporobolus domingensis*	
Dropseed *	*Sporobolus indicus var. indicus*	
West Indian dropseed *	*Sporobolus indicus var.pyramidalis*	
Coastal dropseed	*Sporobolus virginicus*	
St. Augustine grass *	*Stenotaphrum secundatum*	
Spanish moss	*Tillandsia usneoides*	
Dominican panicum	*Urochloa adspersa*	
Turf grass *	*Zoysia tenuifolia*	
DICOTS		
Indian mallow	*Abutilon permolle*	
False foxglove	*Agalinis maritima*	
Bluemink *	*Ageratum houstonianum*	
Blue-mist flower +	*Ageratum littorale*	81,82
Chaff flower	*Alternanthera flavescens*	
Common ragweed	*Ambrosia artemisiifolia*	
Torchwood	*Amyris elemifera*	
Marlberry	*Ardisia escallonioides*	
Mexican poppy	*Argemone mexicana*	
Sea lavender +	*Argusia gnaphalodes*	81
Blodgett's silverbush	*Argythamnia blodgettii*	
Black mangrove	*Avicennia germinans*	
Salt bush	*Baccharis halimifolia*	
Water hyssop	*Bacopa monnieri*	
Saltwort	*Batis maritima*	
Spanish needle	*Bidens alba var. radiata*	
Samphire	*Blutaparon vermiculare*	
Red spiderling	*Boerhavia diffusa*	
Sea ox-eye daisy	*Borrichia arborescens*	

* Non-native Species

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Sea oxeye	*Borrichia frutescens*	
Bahama strong bark	*Bourreria succulenta*	
Gumbo limbo	*Bursera simaruba*	
Gray nicker-bean	*Caesalpinia bonduc*	
Jamaica caper	*Capparis cynophallophora*	
Limber caper	*Capparis flexuosa*	
Goatweed	*Capraria biflora*	
Balloon vine	*Cardiospermum corindum*	
Australian pine *	*Casuarina equisetifolia*	
Madagascar periwinkle *	*Catharanthus roseus*	
Blodgett's spurge	*Chamaesyce blodgettii*	
Graceful sandmat	*Chamaesyce hypericifolia*	
Hyssopleaf sandmat	*Chamaesyce hyssopifolia*	
Roadside sandmat *	*Chamaesyce lasiocarpa*	
Florida hammock sandmat	*Chamaesyce ophthalmica*	
	Chamaesyce porteriana	
Snowberry	*Chiococca alba*	
Jack-in-the-bush	*Chromolaena odorata*	
Yellow hibiscus	*Cienfuegosia yucatanensis*	75
Sorrel vine	*Cissus trifoliata*	
Pigeon plum	*Coccoloba diversifolia*	
Seagrape	*Coccoloba uvifera*	
Buttonwood	*Conocarpus erectus*	
Dwarf horseweed	*Conyza canadensis var. pusilla*	
Cordia	*Cordia globosa*	12
Geiger tree *	*Cordia sebestena*	
Rattlebox	*Crotalaria pumila*	
Milkweed	*Cynanchum angustifolium*	
Fragrant milkweed	*Cynanchum northropiae*	
Virgate mimosa	*Desmanthus virgatus*	
Beggarweed	*Desmodium incanum*	
Florida begger weed *	*Desmodium tortuosum*	
False-mint	*Dicliptera sexangularis*	
Southern crabgrass	*Digitaria ciliaris*	
Milkbark	*Drypetes diversifolia*	12
Guiana plum	*Drypetes lateriflora*	12
False daisy *	*Eclipta prostrata*	
Black torch	*Erithalis fruticosa*	12
Beach creeper	*Ernodea littoralis*	

* **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
White stopper	*Eugenia axillaris*	
Spanish stopper	*Eugenia foetida*	
Red stopper +	*Eugenia rhombea*	12
Dog fennel	*Eupatorium capillifolium*	
Pencil tree *	*Euphorbia tirucallii*	
Seaside gentian	*Eustoma exaltatum*	
Creeping morning glory	*Evolvulus convolvuloides*	75
Princewood	*Exostema caribaeum*	12
Inkwood	*Exothea paniculata*	
Strangler fig	*Ficus aurea*	
Shortleaf fig	*Ficus citrifolia*	
Yellowtop	*Flaveria linearis*	
Milk pea	*Galactia striata*	
Seven-year apple +	*Genipa clusiifolia*	
Lignum vitae +	*Guajacum sanctum*	12
Blolly	*Guapira discolor*	
Everglades velvetseed	*Guettarda elliptica*	
Crabwood	*Gymnanthes lucida*	
Scorpion tail	*Heliotropium angiospermun*	
Seaside heliotrope	*Heliotropium curassavicum*	
Bladder mallow	*Herissantia crispa*	
Wild hibiscus	*Hibiscus poeppigii*	75
White ironwood	*Hypelate trifoliata*	12
Florida Keys indigo	*Indigofera mucronata var. keyensis*	75
Moon-flower	*Ipomoea alba*	
Morning glory	*Ipomoea indica var. acuminata*	
Morning glory *	*Ipomoea triloba*	
Moonvine	*Ipomoea violaceae*	
Bloodleaf	*Iresine diffusa*	
Sky blue morning glory	*Jacquemontia pentanthos*	75
Joewood	*Jacquinia keyensis*	12, 75
Black ironwood	*Krugiodendron ferreum*	
White mangrove	*Languncularia racemosa*	
Lantana *	*Lantana camara*	
Wild lantana	*Lantana involucrata*	
Wild lettuce *	*Launaea intybacea*	
Lead tree *	*Leucaena leucocephala*	
Sea lavender	*Limonium carolinianum*	
Christmas berry	*Lycium carolinianum*	

* **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Wild tamarind	*Lysiloma latisiliquum*	
Galse mallow	*Malvastrum corchorifolium*	
Wild dilly	*Manilkara jaimiqui subsp. emarginata*	12
Mayten	*Maytenus phyllanthoides*	
Marsh elder	*Melanthera nivea*	
Poisonwood	*Metopium toxiferum*	
Cheeseweed	*Morinda royoc*	
Lancewood	*Ocotea coriacea*	
Corky-stemmed passionflower	*Passiflora suberosa*	
Tea-blinkums	*Pectis glaucescens*	
Wild allamanda	*Pentalinon luteum*	
Creeping charlie	*Phyla nodiflora*	
Jamaica dogwood	*Piscidia piscipula*	
Cockspur	*Pisonia aculeata*	
Blackbead	*Pithecellobium keyense*	12
Cat's claw	*Pithecellobium unguis-cati*	
Bushy fleabane	*Pluchea carolinensis*	
Wild poinsettia	*Poinsettia cyathophora*	
Milkwort	*Polygala grandiflora*	
Rustweed	*Polypremum procumbens*	
Purslane	*Portulaca oleracea*	
Purslane	*Portulaca rubricaulis*	
Velvet burr	*Priva lappulacea*	
Wild coffee	*Psychotria nervosa*	
White indigo-berry	*Randia aculeata*	
Darling plum	*Reynosia septentrionalis*	12
Red mangrove	*Rhizophora mangle*	
Least snoutbean	*Rhynchosia minima*	
Rougeberry	*Rivina humilis*	
Annual glasswort	*Salicornia bigelovii*	
Woody glasswort	*Salicornia perennis*	
Soapberry	*Sapindus saponaria*	
Milkweed vine	*Sarcostemma clausum*	
Florida boxwood	*Schaefferia frutescens*	12
Brazilian pepper *	*Schinus terebinthifolius*	
Bahama senna	*Senna mexicana var. chapmanii*	
Sea purslane	*Sesuvium portulacastrum*	
Broomweed	*Sida acuta*	
Saffron plum	*Sideroxylon celastrinum*	

* **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for designated species)
Mastic	*Sideroxylon foetidissimum*	
Willow bustic	*Sideroxylon salicifolium*	
Paradise tree +	*Simarouba glauca*	
Bahama nightshade	*Solanum bahamense*	
Potato tree	*Solanum erianthum*	
Necklace-pod *	*Sophora tomentosa var. occidentalis*	
Buttonweed *	*Spermacoce verticillata*	
West Indian pinkroot	*Spigelia anthelmia*	
Blue porterweed	*Stachytarpheta jamaicensis*	
Porterweed *	*Stachytarpheta urticifolia*	
Pencil flower	*Stylosanthes hamata*	
Sea blite	*Suaeda linearis*	
West Indian mahogany	*Swietenia mahagoni*	12
Yellow elder *	*Tecoma stans*	
Portia *	*Thespesia populnea*	
Florida thatch palm	*Thrinax radiata*	12
Soldier bush	*Tournefortia volubilis*	
Puncture weed *	*Tribulus cistoides*	
Mexican daisy *	*Tridax procumbens*	
Yellow alder *	*Turnera ulmifolia*	
Cow-pea	*Vigna luteola*	
Waltheria	*Waltheria indica*	
Hog-plum	*Ximenia americana*	
Wild lime	*Zanthoxylum fagara*	

* **Non-native Species**

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

INVERTEBRATES

Gulf fritillary	*Agraulis vanillae*	12,81
White peacock	*Anartia jatrophae*	76,81
Peanut snail	*Cerion incanum*	81
Julia	*Dryas iulia*	12,81
Banded forest snail	*Drymaeus multilineatus*	12
Giant noctuid	*Erebus odorata*	4,12
Zebra longwig	*Heliconius charitonius*	12
Oysters	*Isognomon alatus*	76
Liguus tree snail	*Liguus fasciatus*	12
Giant swallowtail	*Papilio cresphontes*	12,81
Mangrove skipper	*Phocides igmalion*	4,76,81
Orange giant sulphur	*Phoebis agarithe*	4,81
Cloudless giant sulphur	*Phoebis sennae*	12,81
Buckeye butterfly	*Precis coena*	12
Preying mantis	*Stagmomantis Carolina*	12,81

ARTHROPODS

Mangrove tree crab	*Aratus pisonni*	76
Silver argiope	*Argiope argentata*	12
Land crab	*Cardisoma guanhumi*	12,81
Land hermit crab	*Coenobita clypeatus*	12,81
Tropical orb weaver	*Eriophora ravilla*	12
Spinybacked orbweaver	*Gasteracantha cancriformis*	12
Mangrove crab	*Goniopsis cruentata*	76
Golden orbweaver	*Nephila clavipes*	12,81
Fiddler crab	*Uca pugilator*	76

AMPHIBIANS

Frogs and Toads

Cuban tree frog *	*Hyla septentrionales*	12,81

REPTILES

Turtles

Florida box turtle	*Terrapene carolina bauri*	12

* Non-native Species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Lizards		
Green anole	*Anolis carolinensis*	12,81
Brown anole	*Anolis sagrei*	12,81
Florida Keys mole skink	*Eumeces egregious egregious*	12,81
Southeastern five-lined skink	*Eumeces inexpectatus*	12,81
Iguana *	*Iguana iguana*	12,81
Ashy gecko	*Spaerodactylus cinereus*	12,81
Snakes		
Southern black racer	*Coluber constrictor priapus*	12
Eastern diamondback rattlesnake	*Crotalus adamanteus*	12
Corn snake	*Elaphe guttata*	12
Mangrove water snake	*Natrix fasciata compressicauda*	76
BIRDS		
Loons		
Common Loon	*Gavia immer*	OF
Cormorants		
Double-crested Cormorant	*Phalocrocorax auritus*	OF
Ducks and Geese		
Lersser scaup	*Aythya affinis*	OF
Red-breasted merganser	*Mergus serrator*	OF
Pelicans		
Brown pelican	*Pelecanus occidentalis*	OF
Gulls		
Herring gull	*Larus argentatus*	75
Laughing gull	*Larus atricilla*	75, OF
Ring-billed gull	*Larus delawarensis*	75
Least tern	*Sterna antillarum*	75
Common tern	*Sterna hirundo*	75
Royal tern	*Sterna maxima*	75
Frigatebirds		
Magnificent frigatebird	*Fregata magnificens*	OF

* **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Herons and Bitterns		
Great blue heron	*Ardea herodias*	68,75,76
Cattle egret	*Bubulcus ibis*	75
Green heron	*Butorides virescens*	75, 76
Great egret	*Casmerodius albus*	75, 76
Little blue heron	*Egretta caerulea*	68,75,76
Reddish egret	*Egretta rufescens*	68
Snowy egret	*Egretta thula*	68
Tricolored heron	*Egretta tricolor*	68,75,76
Yellow-crowned night heron	*Nycticorax violaceus*	68,75,76
Limpkins		
Limpkin	*Aramus guarauna*	75
Ibises and Spoonbills		
Roseate spoonbill	*Ajaia ajaja*	68,75,76
White Ibis	*Eudocimus albus*	68,75,76
Plovers		
Black-bellied plover	*Pluvialis squatarola*	75
Snipes and Sandpipers		
Spotted sandpiper	*Actitis macularia*	75
Ruddy turnstone	*Arernaria interpres*	75
Sanderling	*Calidris alba*	75
Least sandpiper	*Calidris minutilla*	75
Willet	*Catoptrophorus semipalmatus*	75
Killdeer	*Charadrius vociferous*	75
Black-necked stilt	*Himantopus mexicanus*	75
Short-billed dowitcher	*Limnodromus griseus*	75
Sora rail	*Porzano Carolina*	75
Lesser yellowlegs	*Tringa flavipes*	75
Greater yellowlegs	*Tringa melanoleuca*	75
Hawks, Eagles and Kites		
Sharp-shinned hawk	*Accipiter striatus*	12, OF
Broad-winged hawk	*Buteo platyerus*	12, OF
Swanson's hawk	*Buteo swaiinsoni*	12, OF
Red-shouldered hawk	*Buteo lineatus*	12, OF
Northern harrier	*Circus cyaneus*	12, OF
Merlin	*Falco columbarius*	OF

* Non-native Species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Peregrine falcon	*Falco peregrinus tundrius*	OF
American Kestrel	*Falco sparverius*	12, OF
Bald Eagle	*Haliaeetus leucocephalus*	OF
Osprey	*Pandion haliaetus*	OF
Vultures		
Turkey Vulture	*Cathartes aura*	8, 15, OF
Pigeons and Doves		
Common Ground-Dove	*Columbina passerina*	81
White-crowned pigeon	*Patagioenas leucocephala*	12
Mourning dove	*Zenaida macroura*	81
Cuckoos and Allies		
Yellow-billed cuckoo	*Coccyzus americanus*	12,76
Black-billed cuckoo	*Coccyzus erythropthalmus*	12,76
Mangrove cuckoo	*Coccyzus minor*	12,76
Smooth-billed ani	*Crotophaga ani*	12
Goatsuckers		
Chuck-will's-widow	*Caprimulgus carolinensis*	12
Whip-poor-will	*Caprimulgus vociferus*	12
Common Nighthawk	*Chordeiles minor*	OF
Kingfishers		
Belted Kingfisher	*Ceryle alcyon*	75
Woodpeckers		
Yellow-shafted flicker	*Colaptes auratus*	12
Red-bellied woodpecker	*Melanerpes carolinus*	12
Tyrant Flycatchers		
Eastern wood-pewee	*Contopus virens*	12
Eastern kingbird	*Tyrannus tyrannus*	12
Gray kingbird	*Tyrannus dominicensis*	12
Great crested flycatcher	*Myiarchus crinitus*	12
Swallows		
Barn swallow	*Hirundo rustica*	OF
Crows, Jays		

* Non-native Species

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Fish crow	*Corvus ossifragus*	75
Gnatcatcher and Kinglets		
Blue-gray gnatcatcher	*Polioptila caerulea*	12
Ruby-crowned kinglet	*Regulus calendula*	12
Mockingbirds and Thrashers		
Gray catbird	*Dumetella carolinensis*	12,81
Northern Mockingbird	*Mimus polyglottos*	12, 81
Brown thrasher	*Toxostoma rufum*	12,81
Shrikes		
Loggerhead shrike	*Lanius ludovicianus*	12,81
Waxwings		
Cedar waxwing	*Bombycilla cedrorum*	12
Vireos		
Black-whiskered vireo	*Vireo altiloquus*	12
White-eyed vireo	*Vireo griseus*	12
Red-eyed vireo	*Vireo olivaceus*	12
Warblers		
Black-throated blue warbler	*Dendroica caerulescens*	12
Praire warbler	*Dendoirca discolor*	12
Yellow-throated warbler	*Dendroica dominica*	12
Palm warbler	*Dendroica palmarum*	12
Yellow warbler	*Dendroica petechia*	12
Blackpoll warbler	*Dendroica striata*	12
Cape May warbler	*Dendroica tigrina*	12
Common yellowthroat	*Geothylpis trichas*	12
Worm-eating warbler	*Helmitheros vermivorous*	12
Black and white warbler	*Mniotilta varia*	12
Northern parula	*Parula americana*	12
Louisiana waterthrush	*Seiurus motacilla*	12
Northern waterthrush	*Seiurus noveboracensis*	12
American redstart	*Setophaga ruticilla ruticilla*	12
Tennessee warbler	*Vermivora peregrina*	

* **Non-native Species**

Common Name	*Scientific Name*	Primary Habitat Codes (for all species)
Blackbirds and Orioles		
Red-winged Blackbird	*Agelaius phoeniceus*	75,12
Northern oriole	*Icterus galbula*	12
Common Grackle	*Quiscalus quiscula*	12,75
Tanagers		
Scarlet tanager	*Piranga olivacea*	12
Summer tanager	*Piranga rubra*	12
Western spindalis	*Spindalis zena*	12
Weaver Finches		
House sparrow *	*Passer domesticus*	12
Cardinals, Grosbeaks, and Buntings		
Northern Cardinal	*Cardinalis cardinalis*	12,81
Painted bunting	*Passerina ciris*	12
Indigo bunting	*Passerina cyanea*	12
Rose-breated grosbeak	*Pheucticus ludovicianus*	12
MAMMALS		
Domestic cat *	*Felis domesticus*	12,81
Black rat*	*Rattus rattus*	12,81
Raccoon	*Procyon lotor*	12,75,76
Marsh rabbit	*Sylvilagus palustris*	75

* Non-native Species

Addendum 6—Imperiled Species Ranking Definitions

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

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

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

FNAI GLOBAL RANK DEFINITIONS

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

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

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

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

G5..... demonstrably secure globally

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

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

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

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

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

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

G#Q ..... rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q..... same as above, but validity as subspecies or variety is questioned.
GU..... due to lack of information, no rank or range can be assigned (e.g., GUT2).
G?..... Not yet ranked (temporary)
S1..... Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2..... Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3..... Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
S4..... apparently secure in Florida (may be rare in parts of range)
S5..... demonstrably secure in Florida
SH ..... of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
SX..... believed to be extinct throughout range
SA..... accidental in Florida, i.e., not part of the established biota
SE ..... an exotic species established in Florida may be native elsewhere in North America
SN ..... regularly occurring but widely and unreliably distributed; sites for conservation hard to determine
SU..... due to lack of information, no rank or range can be assigned (e.g., SUT2).
S?..... Not yet ranked (temporary)
N ..... Not currently listed, nor currently being considered for listing, by state or federal agencies.

LEGAL STATUS

FEDERAL

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

LE..... Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.
PE..... Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.LTListed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.

PT..... Proposed for listing as Threatened Species.
C ..... Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.
E(S/A) ..... Endangered due to similarity of appearance.
T(S/A) ..... Threatened due to similarity of appearance.

STATE

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

LE..... Listed as Endangered Species by the FFWCC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.
LT..... Listed as Threatened Species by the FFWCC. Defined as a species, subspecies, or isolated population, which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat, is decreasing in area at a rapid rate and therefore is destined or very likely to become an endangered species within the near future.
LS ..... Listed as Species of Special Concern by the FFWCC. Defined as a population which warrants special protection, recognition or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance or substantial human exploitation that, in the near future, may result in its becoming a threatened species?

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

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

number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

Addendum 7—Cultural Information

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

A. General Discussion

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

B. Agency Responsibilities

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

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

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

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

C. Statutory Authority

Statutory Authority and more in depth information can be found in the following:

Chapter 253, F.S. – State Lands

Chapter 267, F.S. – Historical Resources

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

Other helpful citations and references:

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

Other helpful citations and references:

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

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

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

D. Management Implementation

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

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

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

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

E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, the following information, at a minimum, must be submitted for comments and recommendations.

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

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

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

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

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

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

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

Susan M. Harp
Historic Preservation Planner
Division of Historical Resources
Bureau of Historic Preservation
Compliance and Review Section
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Phone: (850) 245-6333
Fax: (850) 245-6438

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

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

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

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

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

e) a reconstructed building, when it is accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and no other building or structure with the same association has survived; or a property primarily commemorative in intent, if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

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

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

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

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

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