



**JUPITER INLET LIGHTHOUSE
OUTSTANDING NATURAL AREA
COMPREHENSIVE MANAGEMENT PLAN**
and
ENVIRONMENTAL ASSESSMENT

U. S. Department of the Interior
Bureau of Land Management ó Eastern States
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Table of Contents

Executive Summary	1
Part I. Introduction	3
A. Location and Setting	3
B. Relationship to Other Plans and Relevant Statutes	5
1. BLM Resource Management Plans	5
2. BLM Activity Level Plans	5
3. Relevant Laws and Statutes	5
4. Other Plans, Programs and Initiatives	8
C. Jupiter Inlet Lighthouse ONA Partners and Current Uses	9
1. Administrative Responsibilities	9
2. Key Dates Related to the Public Domain at Jupiter Inlet	12
D. Resources in the Outstanding Natural Area	13
1. Physical Resources	13
2. Natural Resources	21
3. Cultural Resources	39
4. Recreation	46
5. Visual Resources	47
E. Current Management Strategies	48
1. Weed Management	48
2. Prescribed Burn Program	48
3. Research	48
F. Existing Facilities and Easements	49
1. Facilities	49
2. Easements	50
G. Adjacent Land Uses	51
H. Socio-Economic Conditions	51
I. Nearby Destinations	52
Part II. Management Guidelines	55
A. Mission Statement	55
B. Purpose and Need	55
C. Management Issues	56
1. Public Access to Natural Areas	56
2. Public Use of the Indian River Lagoon Bluff Area	56
3. Re-creating Historic Structures	57
4. Protecting Cultural Resources	57
5. Prescribed Burn Program	57
6. Invasive Plant Control	57
7. Interpretive Program	58
Part III – Standard Management Practices	59
A. Cultural and Historic Resources	59
B. Prescribed Burns	59
C. Herbicide Use	60
D. Recreation and Visual Resource	60
E. Vegetation and Wildlife	60

Part IV. Management Actions	63
Part V. Environmental Assessment	69
A. Purpose and Need for the Action	71
B. Description of the Affected Environment	71
C. Description of the Proposed Action	71
D. Environmental Impacts	80
1. Water Quality	80
2. Air Quality	82
3. Soils	83
4. Cultural Resources	85
5. Native American Culture or Religious Concerns	86
6. Vegetation	87
7. Wildlife	89
8. Special Status Species	90
9. Invasive, Non-native Species	100
10. Wetland/Riparian Zones	101
11. Recreation and Public Use	102
12. Visual Resources	103
E. Cumulative Impacts	104
1. Cumulative Impacts from the Preferred Alternative	104
Part VI. Appendices	107
A. Public Law 110-229, Section 202	109
B. Master Species Lists	117
C. Palm Beach County Ordinances	135
D. Literature Cited	151
E. Natural Resource Monitoring Protocols	155
F. Summary of Public and Regulatory Agency Comments	171
1. Summary of Public Comments	173
2. Regulatory Agency Comments	185

Executive Summary

On May 8, 2008, Public Law 110-229 brought the Jupiter Inlet Lighthouse Outstanding Natural Area (ONA) into being, designating it a unit within the U.S. Department of Interior, Bureau of Land Management's National Landscape Conservation System (NLCS). Of the 886 units currently within the NLCS, the Jupiter Inlet Lighthouse ONA is the first unit east of the Mississippi River. Designation of this "island of green" in heavily urbanized south Florida to the NLCS is very significant – indeed making the system truly national.

The Jupiter Inlet Lighthouse ONA is home to a remarkable array of natural and cultural resources. It is one of the rare geographical points on the planet where these two sets of values intersect in such striking fashion. Perhaps this is most clearly demonstrated by the fact that today this 120-acre site provides habitat for 25 special status species (including four Federally-listed) and yet also has cultural resource values so rich that human occupation of can be documented over the last 5,000 years.

There are few locations where history and the natural environment have so perfectly converged. This can be seen in the abundant fresh water and rich fisheries that lured Juan Ponce De Leon in 1513 to take respite at Jupiter Inlet for several days, or the bluff at the confluence of the Loxahatchee and Indian Rivers – a bluff that attracted indigenous people for thousands of years. This bluff also provided the optimal location to construct a lighthouse to safely guide ships past the treacherous reefs and sand bars off of Jupiter Inlet. The Jupiter Narrows (Indian River) with its meandering mangrove islands played a key role in concealing blockade runners in the civil war. Today, the same Indian River, which graces the eastern border of the ONA is one of the richest and most biologically diverse estuaries in North America.

The Management Plan that follows was prepared pursuant to section 202(c)(1) of the designating Act. It describes the resources that currently exist within the ONA, past and present uses and how we arrived at the point we are today. Most importantly, it will guide the management of the ONA for the foreseeable future with over 40 actions that address a wide range of issues and needs. These actions were carefully and collaboratively developed by the Jupiter Inlet Working Group – a unique partnership of Federal, county, municipal and non-profit entities dedicated to this special site. The Plan strives to strike a balance between use and conservation, between public access and preservation of imperiled habitat, between recreational opportunities and protection of the sacred trust of the people that came before us. To meet the requirements of the National Environmental Policy Act of 1969, this document also contains an Environmental Assessment.

Ideally all resource issues that pertain to the Jupiter Inlet Lighthouse ONA would be addressed comprehensively in this plan. However, there are certain issues that require more in-depth analysis. The issue with the highest profile and with the highest degree of public interest is the erosion occurring along the shoreline where the Indian River Lagoon meets the Loxahatchee River. Through the American Recovery and Reinvestment Act of 2009, BLM is funding an engineering study to address the critical need for slope stabilization along this stretch of shoreline. Following analysis of public input and review by working group partners and permitting agencies, a shoreline stabilization design will be amended to this plan. An interpretive plan and prescribed burn plan are also in preparation.

We encourage you to read this plan and get involved as we strive to manage this very special location for current and future generations.

Jupiter Inlet Lighthouse Outstanding Natural Area Planned Management Actions



Part I. Introduction

A. Location and Setting

The Jupiter Inlet Lighthouse Outstanding Natural Area is located on south Florida's Atlantic coast in northern Palm Beach County. It sits at the confluence of the Loxahatchee River and the Indian River Lagoon (Intracoastal Waterway) approximately ½ mile east of the inlet and includes almost a mile of riverfront shoreline within this coastal estuary. The Outstanding Natural Area (ONA) is 14 miles north of West Palm Beach and about two hours north of Miami via U.S. Highway 1.

The Jupiter Inlet Lighthouse ONA encompasses 120 acres of open space in the urbanized Treasure Coast area. The northern portion of the ONA is in the Village of Tequesta and the southern portion is in the Town of Jupiter. The eastern shoreline south of County Road 707 (County Road 707) is within the municipal limits of the Jupiter Inlet Colony. County Road bisects the ONA and provides access across the Indian River Lagoon to the Jupiter Inlet Colony and the southern reaches of Jupiter Island over a manned drawbridge (Cato Bridge). U.S. Highway 1 runs along the western boundary, and the Indian River Lagoon and Loxahatchee River form the southern and eastern boundaries of the ONA.

The legal description of the Jupiter Inlet Lighthouse ONA is:

Tallahassee Meridian
Township 40 South, Range 43 East, Section 31
Including those portions of Lots 15, 16, 17, 18, 19 and 20
within the Outstanding Natural Area boundary, as shown in Figure 2.

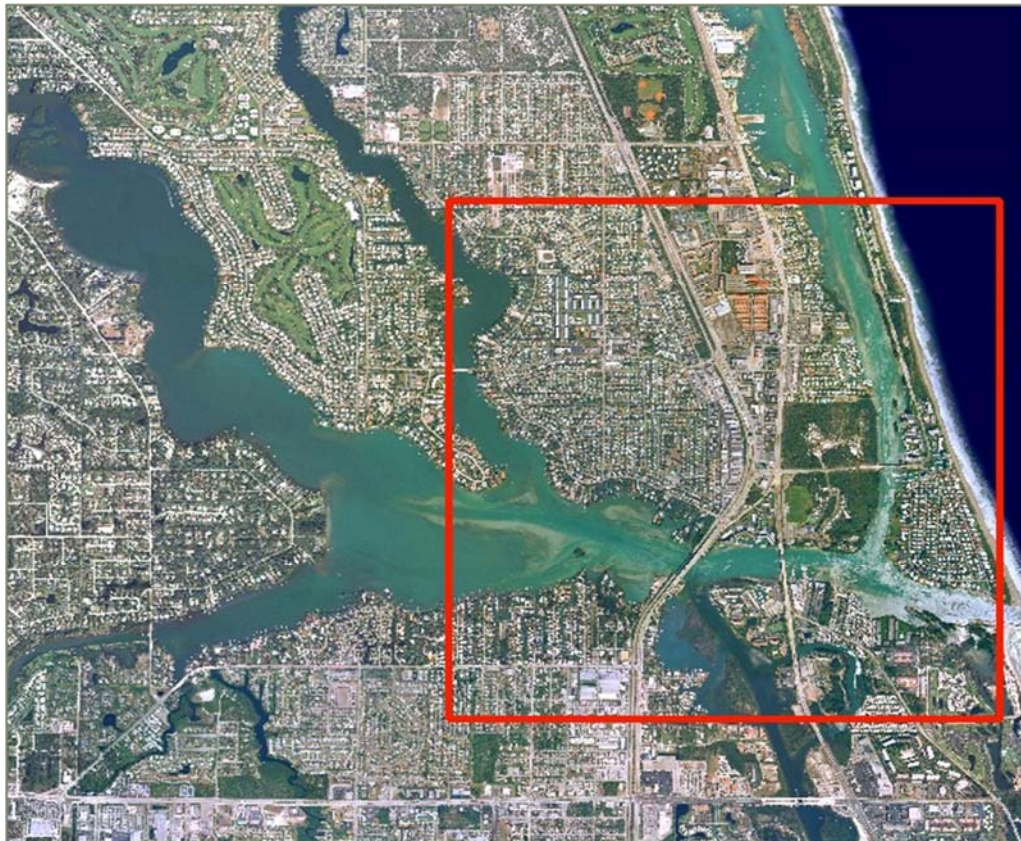


Figure 1. Aerial view of Jupiter Inlet Lighthouse Outstanding Natural Area

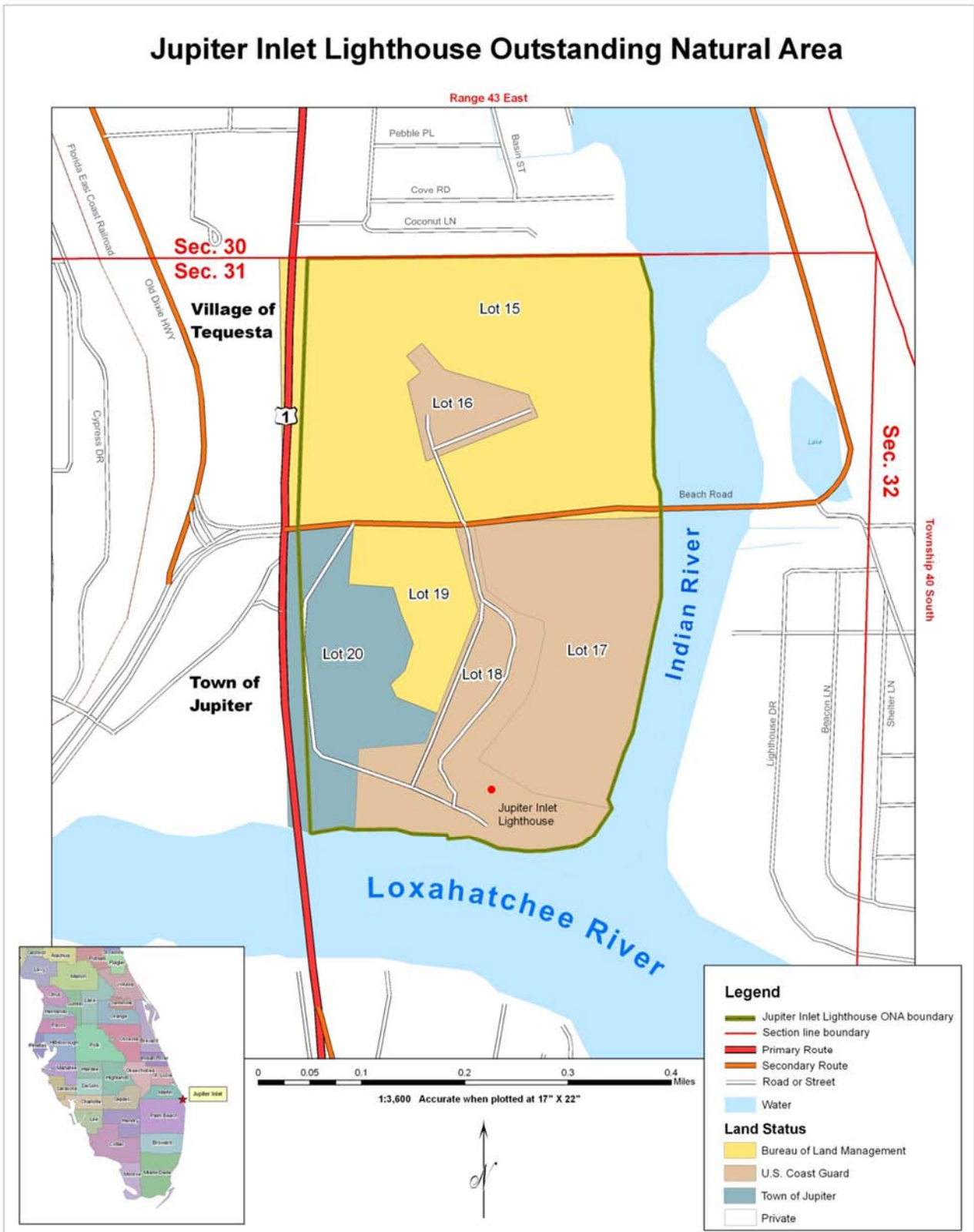


Figure 2. Jupiter Inlet Lighthouse Outstanding Natural Area Map

B. Relationship to Other Plans and Relevant Statutes

1. BLM Resource Management Plans

The Bureau of Land Management (BLM) develops regional land use level plans, or Resource Management Plans (RMPs), to make general land use decisions on the management of BLM-administered lands and resources. The Florida RMP, developed by BLM in 1995, included the public land at Jupiter Inlet and has guided BLM's management of public domain lands at the site. On May 8, 2008, Public Law 110-229, Section 202 designated the site as the Jupiter Inlet Lighthouse Outstanding Natural Area. The language of that act included resource objectives and management guidelines which, while they are generally compatible with the original RMP goals, now supersede them. A new RMP is underway which will update the 1995 Florida RMP. The land use level decisions contained in Public Law 110-229, Section 202, will be incorporated into this new RMP, as will the resource objectives and management tools developed in this plan.

2. BLM Activity Level Plans

Once the broader land use decisions are made in RMPs, the BLM typically prepares site specific activity level plans to implement these decisions. The Jupiter Inlet Coordinated Resource Management Plan was written in 1997 to provide that activity level planning for the public domain land at Jupiter Inlet. The goals of that plan were to develop local partnerships for the collaborative management of the public resources at Jupiter Inlet, manage for endemic species, remove non-native plant species, preserve cultural resources, reduce hazards to the public, provide recreational opportunities that promote a land and conservation ethic and focus on the natural and cultural resources, and establish partnerships to promote environmental education. The 1997 activity plan has been largely implemented, but continued to serve as the current management plan until this plan, the Jupiter Inlet Lighthouse Outstanding Natural Area Comprehensive Management Plan, was completed.

3. Relevant Laws and Statutes

The following are some of the most relevant laws and regulations that guide the BLM in the management of the ONA and which apply to projects on federal lands or receiving federal funds within the ONA.

a. Public Law 110-229, Section 202

On May 8, 2008, the President signed the Consolidated Natural Resources Act (PL-110-229) (Act) creating the Jupiter Inlet Lighthouse ONA. The law also established the resource objectives and management parameters by which the new ONA would be managed, including the site as a unit of the National Landscape Conservation System. The Act also required that a comprehensive management plan be developed within three years of the designation and that the plan be developed with public participation, and in consultation with the Local Partners and the U.S. Coast Guard Commandant.

The following is a summary of those items in the law which specifically guides future management of the new ONA. For the complete text of Public Law 110-229, Section 202 see Appendix A.

The Secretary, in consultation with the Local Partners and the Commandant, shall manage the Outstanding Natural Area as part of the National Landscape Conservation System in a manner that conserves, protects, and enhances the unique and nationally important historical, natural, cultural, scientific, educational, scenic, and recreational values of the Outstanding Natural Area, including an emphasis on the restoration of native ecological systems.

The purposes of the Outstanding Natural Area are to protect, conserve, and enhance the unique and nationally important historic, natural, cultural, scientific, educational, scenic, and recreational values of the Federal land surrounding the Lighthouse for the benefit of present generations and future generations of people in the United States while allowing certain recreational and research activities to continue in the Outstanding Natural Area; and ensuring that Coast Guard operations and activities are unimpeded within the boundaries of the Outstanding Natural Area.

The enabling legislation specifically authorizes cooperative agreements to facilitate the implementation of the approved management plan and to continue to build on the successful partnerships with local communities and other partners. It directs the Secretary of the Interior through BLM, in accordance with section 307(b) of the Federal Land Management Policy and Management Act of 1976 ([43 U.S.C. 1737\(b\)](#)), to enter into cooperative agreements with the appropriate Federal, State, county, other local government agencies, and other partners (including the Loxahatchee River Historical Society) for the long-term management of the Outstanding Natural Area;

The Federal land and any interests in the Federal land included in the Outstanding Natural Area are withdrawn from all forms of entry, appropriation, or disposal under the public land laws; location, entry, and patent under the mining laws; and operation of the mineral leasing and geothermal leasing laws and the mineral materials laws;

The management plan shall include objectives and provisions to ensure the protection and conservation of the resource values of the Outstanding Natural Area;

Restoration of native plant communities and estuaries in the Outstanding Natural Area, with an emphasis on the conservation and enhancement of healthy, functioning ecological systems in perpetuity;

Objectives and provisions to maintain or recreate historic structures;

An implementation plan for a program of interpretation and public education about the natural and cultural resources of the Lighthouse, the public land surrounding the Lighthouse, and associated structures;

A proposal for administrative and public facilities to be developed or improved that are compatible with achieving the resource objectives for the Outstanding Natural Area and would accommodate visitors to the Outstanding Natural Area;

Natural and cultural resource management strategies for the Outstanding Natural Area, to be developed in consultation with appropriate departments of the State, the Local Partners, and the Commandant, with an emphasis on resource conservation in the Outstanding Natural Area and the interpretive, educational, and long-term scientific uses of the resources;

Recreational use strategies for the Outstanding Natural Area, to be prepared in consultation with the Local Partners, appropriate departments of the State, and the Coast Guard, with an emphasis on passive recreation.

b. Endangered Species Act of 1973, as amended

Section 7 of the Endangered Species Act (ESA) requires Federal agencies use their legal authorities to promote the conservation purposes of the ESA and consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), as appropriate, to ensure that effects of actions they authorize, fund, or carry out will not jeopardize the continued existence of listed species or adversely affect designated critical habitat.

c. National Historic Preservation Act

Section 106 of this act requires Federal agencies to review all actions which may affect a property listed on the National Register of Historic Places, or which may affect a property eligible for listing.

d. Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)

For activities on Federal lands, NAGPRA requires consultation with "appropriate" Indian tribes to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony.

e. Archeological Resources Protection Act of 1979 (ARPA)

For activities on Federal or Indian lands, ARPA prohibits unauthorized excavation, establishes standards for permissible excavation, requires agencies to identify archeological sites, and encourages cooperation between Federal agencies and private individuals.

f. Archaeological and Historic Preservation Act of 1974

Archaeological and Historic preservation statutes where any Federal or federally assisted or licensed project, activity, or program is involved and to protect and preserved in the public interest.

g. National Environmental Policy Act of 1969 (NEPA)

The National Environmental Policy Act (NEPA) requires Federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

h. Federal Land Policy and Management Act of 1976

This law established public land policy, guidelines for its administration, and provides for the management, protection, development, and enhancement of the public lands; and for other purposes.

i. The Watershed Restoration and Enhancement Agreements

Commonly referred to as the Wyden Amendment, this legislation gives BLM the authority to use appropriated funds to enter into cooperative agreements with other Federal agencies, tribal, State and local governments, private and nonprofit entities, and landowners on projects that protect, restore, and enhance habitat or other resources, or that reduce risk from natural disaster where public safety is an concern, including those lands outside of the public domain.

j. Coastal Zone Management Act of 1972 – Section 307

This Act deals mainly with the coastal management plans developed by States and subsequently approved by the Secretary of Commerce. Public domain lands are specifically excluded from the operation of the Act because the Act's definition of "coastal zone" excludes land with Federal jurisdiction. However, Section 307 (c)(1)(A) of the Act states:

“Each Federal agency activity within or outside of the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of the approved State management programs...”

4. Other Plans, Programs and Initiatives

The following non-BLM plans and initiatives have the potential to affect management of the Outstanding Natural Area and/or could be supported by future management actions taken within the Outstanding Natural Area.

a. Loxahatchee River Preservation Initiative

This project is the outgrowth of the watershed management effort that was spearheaded by the Florida Department of Environmental Protection in 1996. Annually the initiative identifies several key projects that are critical in preserving the long-term health of the Loxahatchee River. Projects include urban storm water improvements and the restoration of other tributaries and the estuarine portions of the river. The BLM and Palm Beach County Environmental Resources Management serve on the Council.

b. Loxahatchee River Management Coordinating Council

The Loxahatchee River Management Coordinating Council is comprised of federal, state, and regional agencies and local representatives. It advises the Florida Department of Environmental Protection and the South Florida Water Management District on matters that affect administration of the Loxahatchee River National Wild and Scenic River, to identify and resolve inter-governmental coordination problems and to enhance communications. Furthermore, the Council is responsible for the development of the Loxahatchee River National Wild and Scenic River Management Plan.

c. Indian River Lagoon Initiative

The Indian River Lagoon borders the eastern boundary of the ONA and stretches 156 miles north across three inter-connected estuaries along Florida’s central east coast from Jupiter Inlet to Ponce Inlet. It has national significance as one of the more biologically diverse estuaries in North America with over 3,000 plant and animal species recorded. The Indian River Lagoon National Estuary Program is one of 28 National Estuary Programs, and was established in 1990 through the Environmental Protection Agency’s designation of the Indian River Lagoon as an “estuary of national significance” in response to the nomination forwarded to the agency by Florida’s Governor. The initial comprehensive management plan was written in 1996. The draft Indian River Lagoon Comprehensive Conservation and Management Plan Update released in 2008 outlines the following goals:

Goal 1: To attain and maintain water and sediment of sufficient quality to support a healthy estuarine lagoon ecosystem;

Goal 2: To attain and maintain a functioning, healthy ecosystem which supports endangered and threatened species, fisheries, commerce, and recreation;

Goal 3: To achieve heightened public awareness and coordinated interagency management of the Indian River Lagoon ecosystem.

Goal 4: To identify and develop long-term funding sources for prioritized projects and programs to preserve, protect, restore and enhance the Indian River Lagoon system.

d. Indian River Aquatic Preserve (Jensen Beach to Jupiter Inlet Aquatic Preserve)

The Indian River - Vero Beach to Ft. Pierce Aquatic Preserve and Jensen Beach to Jupiter Inlet Aquatic Preserve are part of southeast Florida's Indian River Lagoon (IRL). The Indian River Lagoon is an extensive ecosystem spanning two biogeographic zones characterized by diverse land and water body formations. The lagoon is bordered mostly by intertidal mangrove fringes and salt marshes that are periodically sectioned by man-made mosquito impoundments and residential development. Much of its open waters are dotted by oyster bars, clam beds and spoil islands. The submerged lands are a mosaic of seagrass and algae beds, bare sandy areas, and deep water sites. All of these features combine to create the most diverse (species-rich) and productive estuary in North America.

d. Loxahatchee River – Lake Worth Creek Aquatic Preserve

This state designated Aquatic Preserve is located immediately west of the ONA and encompasses 9,000 acres of submerged State owned lands. The Preserve includes three forks of the Loxahatchee River: North, Northwest, and Southwest (C-18). These three freshwater tributaries drain into the Loxahatchee River Estuary, which opens easterly to the Indian River Lagoon and the Atlantic Ocean. Lake Worth Creek lies south of the estuary. The Preserve is divided into two sections: the Wilderness and Urban Preserves. The Wilderness Preserve (National Wild and Scenic River portion) is upstream of river mile 5.5 along the Northwest Fork and is managed by maintaining the existing wilderness (animals and plants) condition. The remainder of the preserve, a designated Urban Preserve, is managed by restoring and enhancing the natural condition of the resources.

5. Local Land Use Designation and Zoning

The current Land Use for the ONA within the Town of Jupiter is Public/Institutional. While the Town's current zoning for the site is "Rural Residential", the Town intends to change it to "Public/Institutional" to be consistent with the Land Use. For the northern portion of the ONA within the Village of Tequesta, the area is zoned as "Recreation/Open Space". The eastern shoreline within the Jupiter Inlet Colony is zoned Conservation. The surrounding areas are zoned residential and commercial.

C. Jupiter Inlet Lighthouse ONA Partners and Current Uses

1. Administrative Responsibilities

The Jupiter Inlet Lighthouse Outstanding Natural Area is unique in the collaborative nature of its administration. In addition to BLM, the Consolidated Resources Act (PL-110-229) identifies five entities as partners within the ONA. These include: the U.S. Coast Guard, Palm Beach County, the Town of Jupiter, the Village of Tequesta and the Loxahatchee River Historical Society (LRHS). The BLM and these partners are known collectively as the Jupiter Inlet Working Group. An additional entity, the Jupiter High School Environmental Research and Field Studies Academy, participates in the Working Group because of the key role they play in connecting the site to the local community. The Jupiter Inlet Colony has also been invited to participate as a member of the Working Group.

a. U.S. Coast Guard

The U.S. Coast Guard retains 45.60 acres of public domain land through withdrawal within the ONA. This includes 40.71 acres south of County Road 707 currently used for Coast Guard family housing, ancillary support and a post exchange. There are eleven houses in this area, plus a work shop and small garage. North of County Road 707, the Coast Guard retains 4.89 acres which is currently used for a high frequency radio tower, a remote location servicing Coast Guard installations in Miami and the Keys. ONA activities on lands retained by the U.S.

Coast Guard are generally handled under a special license administered out of the Civil Engineering Unit, Miami, Florida. Ongoing work is coordinated with the U.S. Coast Guard Station Lake Worth commanding officer and his staff.

b. Palm Beach County

The County's Department of Environmental Resources Management (ERM) has worked collaboratively at Jupiter Inlet with BLM on management of BLM-administered lands within the ONA since 1996 with ERM acting as the onsite manager through a series of cooperative agreements. The site is included in the County's system of 35 Natural Areas which are managed to preserve the rare and diverse native ecosystems, and the endangered, threatened, and rare species of plants and animals they support. ERM's involvement has included invasive species control, implementation of the prescribed burn program, and habitat restoration and enhancement projects. In addition, they provide technical support in other areas of the ONA related to natural resource management.

c. Town of Jupiter

The Town of Jupiter received a Recreation and Public Purposes Act lease from BLM on November 23, 1998 covering the 26.35 acres of Lighthouse Park and 8.55 acres of adjacent land. This was followed by a Recreation and Public Use Patent for 17.8 acres presented to the Town of Jupiter by the Secretary of the Interior on October 20, 2004. The 8.55 acres included in the original R&PP lease was returned to BLM management for incorporation into the Jupiter Inlet Natural Area because of its high resource values. The current ball fields are used primarily for the city sponsored youth soccer program. There are also tennis courts, pavilion, and parking available to the public within the park. The former naval married officer's housing (Station J Building) now houses the Loxahatchee River Historical Society's Jupiter Inlet Lighthouse Museum.

d. Village of Tequesta

The area of the ONA north of County Road 707 is within the incorporated limits of the Village of Tequesta. The Village's management responsibilities have included personnel and equipment support during prescribed burns, support of volunteer events such as National Public Lands Day, and maintenance of the landscaping within the County Road 707 and U.S. 1 rights-of-way.

e. Jupiter Inlet Colony

The eastern shoreline south of County Road 707 is within the incorporated municipal limits of the Jupiter Inlet Colony.

f. Loxahatchee River Historical Society

The Historical Society leases the Station J Building from the Town of Jupiter for the Jupiter Inlet Lighthouse Museum. The Historical Society also has a thirty-year lease from the U.S. Coast Guard issued in April 1994 which authorizes Historical Society to conduct guided tours of the lighthouse, as well as restore, rehabilitate, maintain and preserve historically significant structures, as approved by the Florida Historical Preservation Officer. The lease was modified on September 19, 2006 to include the relocation of the 1892 George Washington Tindall Pioneer House and the lease was expanded to include the "Lighthouse Keeper's Workshop" located near the base of the lighthouse, and the maintenance of the grounds associated with these historic structures.

g. Jupiter High School Environmental Research and Field Studies Academy

The ONA has served as an outdoor classroom for the Jupiter High School Environmental Research and Field Studies Academy since 1996. The ONA is a designated "Hands on the Land" site, a Department of the Interior

program which links similar outdoor classrooms across the nation to share information about their local ecosystems; as well as creative teaching strategies. The program provides students with a site to practice field skills and test project designs in a realistic setting. Class instruction and more in-depth senior projects have included monitoring efforts in post-burn areas and in the constructed tidal wetlands. The students have been involved in building and testing custom nets for sampling the lagoon fisheries, and in designing a protocol for quantifying sand pine regeneration in two burn plots. They have established photo plots for both burn plots, as well as vegetation transect data.

In addition, Jupiter High School Environmental Research and Field Studies Academy (JERFSA) students participate in “Enviroservice” an environmental community service program for sophomores. Students contribute over 200 hours of environmental community service doing exotic plant removal, habitat restoration, water quality monitoring, fish population surveys, native nursery upkeep, plant surveys and the always-needed litter removal and general maintenance of local natural areas as part of their academic learning.



Figure 3. ERFSA students monitoring fish populations in the Jupiter Inlet tidal lagoon.

2. Key Dates Related to the Public Domain at Jupiter Inlet

The following are some of the key dates in the history of these public domain lands, which were originally ceded to the United States from Spain on February 22, 1819 under the Onís-Adams Treaty of 1819, ratified by the United States in 1821 (also referred to as the Transcontinental Treaty).

October 22, 1854 – Sixty-one acres of the Jupiter Inlet tract were withdrawn from the Fort Jupiter reservation for lighthouse purposes by Executive Order dated October 22, 1854. Although delays in construction occurred due to the Seminole wars, construction of the lighthouse was completed in 1859. The light was first lighted on July 10, 1860. However, the light mechanism was taken by Southern sympathizers during the Civil War. The light was relighted on June 28, 1866 (DuBois 1960). In 1973, the Jupiter Inlet Lighthouse was placed on the National Register of Historic Places (Weed et al. 1982:52).

1905 - The U. S. Navy acquired approximately 5.4 acres in 1905 for a wireless station (Weed et al. 1982:44). These holdings were later increased (Kennedy et al. 1995:44).

1928 - The U. S. Navy formally requested transfer of properties within the Lighthouse Station to its jurisdiction. This included an additional 60.45 acres withdrawn by Executive Order Number 4254 dated June 12, 1925, bringing the total to 121.95 acres

1939 - Jurisdiction over the entire lighthouse reservation was transferred to the U.S. Coast Guard. During World War II, both the U.S. Navy and U.S. Coast Guard constructed additional buildings at various locations on the tract. The U.S. Navy had terminated its lease by the mid-1960s (Kennedy et al. 1995:45).

1951-1987 - The U. S. Air Force leased approximately 30 acres in the northern part of the Jupiter Inlet tract. All buildings or remains of buildings in this area post-date 1956. This part of the tract has been extensively disturbed. In addition, most of the original structures, dating from the 1950s, have been removed (Weed et al. 1982:58).

September 11, 1989 - U.S. Coast Guard notified the BLM that portions of the Jupiter Inlet Lighthouse Station were no longer needed and that a board of survey was being initiated to excess 80.68 acres of the property.

July 12, 1996 - Public Land Order No. 7202 partially revoked the reservation and 80.68 acres were relinquished to BLM. The U.S. Coast Guard retained 45.60 acres, which included installation housing, a post exchange, the lighthouse and associated buildings on the south side of County Road 707, and a 4.89 acre communication site on the north side.

November 23, 1998 – The BLM issued a Recreation and Public Purposes Act Lease to the Town of Jupiter for Jupiter Lighthouse Park (26.35 acres). This was subsequently followed up with a Recreation and Public Use patent presented to the Town of Jupiter by the Secretary of the Interior on October 20, 2004 for 17.8 acres, with 8.55 acres originally included in the lease returning to BLM management.

May 8, 2008 - Jupiter Inlet Lighthouse Outstanding Natural Area was designated as a unit of BLM's National Landscape Conservation Area in Section 202 of the Consolidated Natural Resources Act (PL-110-229). The pertinent portion of the Act is provided in Appendix A. PL-110-229 states that any public domain no longer needed within the ONA by the U.S. Coast Guard will be returned to the Secretary of the Interior subject only to any environmental remediation that may be required by law.

D. Resources in the Outstanding Natural Area

1. Physical Resources

a. Topography

The ONA is located on the Atlantic Coastal Ridge, the remains of an ancient coastal dune system formed during the Pleistocene era. These low ridges stretch north along the eastern coast of Florida into Georgia. Within the ONA elevations range from sea level along the Loxahatchee and Indian River Lagoon to 31.4 feet at the crest before falling back to 9 feet near the corner of County Road 707 and U.S. Highway 1 on the western boundary. The top of the Jupiter Inlet Lighthouse mound stands at almost 60 feet, making it one of the highest points in this area of south Florida. In the southeast corner of the ONA, a 20-foot tall bluff stands along the bank of the Indian River in an area that has been progressively widened to accommodate boat traffic and, ultimately, the Intracoastal Waterway. Historically the inlet at Jupiter was only intermittently open to the sea. Between 1913 and 1922 the inlet was relocated approximately 1,250 feet north to its present location, but it closed again from 1942 to 1947. Since 1947, biennial maintenance dredging has kept the inlet open for small-craft navigation. The ONA includes nearly a mile of shoreline along the banks of the Loxahatchee and Indian Rivers, which comprise the eastern and southern boundaries of the ONA.

b. Air Quality

Air quality in Palm Beach County is generally good. According to the Florida Department of Environmental Quality an average of 87.8 days per year were within the Good category for ozone, particulates, sulfur dioxide, carbon monoxide, and nitrogen dioxide during 2005 – 2007. During this time air quality was considered Moderate for an average of 11.7, and only 0.8 days of Unhealthy for Sensitive Groups were recorded in 2006 and 2007.

c. Climate

South Florida has a marked wet season from May through October and a dry season from November through April. The mean annual rainfall pattern averages 45-55 inches. The seasonality of the rainfall and high evaporation rates plays an important role in the ecosystems of the region. Because the abundant rainfall continuously leaches and translocates soluble minerals, most of the mineral soils contain only small amounts of organic matter and soluble plant nutrients. High percolation rates in these deep sands result in an arid conditions despite the high precipitation.

The Atlantic hurricane season stretches from June 1 through November 30 according to the National Oceanic and Atmospheric Administration and Jupiter's coastal location is vulnerable to high winds and storm surges from the adjacent inlet. The site has been hit by several major hurricanes in the last hundred years. Jupiter was narrowly missed by the Great Miami Hurricane of September 1926, but two years later was hit hard when the eye of the Great Okeechobee/San Felipe Hurricane passed between Jupiter and Boca Raton on September 16, 1928 creating 10 foot storm surges with waves likely as high as 20 feet. Even more devastating, however, forty miles west of Jupiter, heavy rains filled Lake Okeechobee to the brim and the dikes crumbled, flooding the surrounding area in 6 to 9 feet of water. Almost 2,000 people, most African American agricultural workers, perished as a result of this storm.

During the 2004 hurricane season, Jupiter experienced almost direct hits from Hurricane Frances, which made landfall at Stuart just twenty miles to the north as a Category 2 hurricane on September 5, 2004.

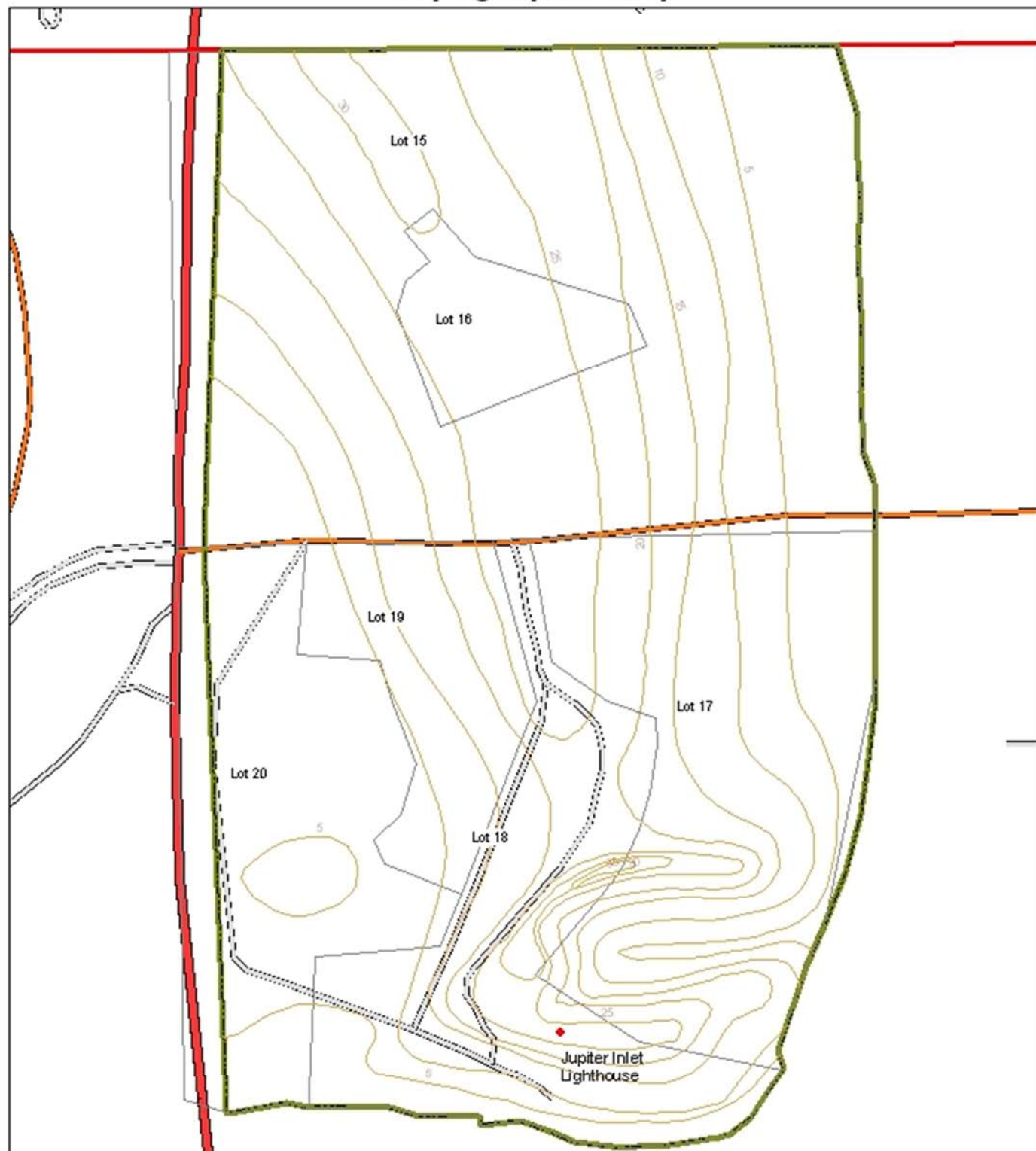
Three weeks later, on September 26, 2004, Hurricane Jeanne made landfall at almost the same location as a Category 3 hurricane. Just over a year later, on October 24, 2005, Jupiter received a direct hit from Hurricane Wilma a large Category 2 hurricane which crossed over the Florida peninsula from the west.

In addition to the tremendous impacts on the residents of South Florida, these hurricanes are a major force in shaping the natural landscape. The recent series of hurricanes decimated the remaining mature sand pines within the ONA, and the heavy seas undercut the banks along the Loxahatchee River and exacerbated erosion along the Indian River Lagoon. The shorelines continue to be vulnerable to storm damage.



Figure 4. Sand pine snapped during 2004 hurricanes.

Jupiter Inlet Lighthouse Outstanding Natural Area Topographic Map



0 200 400 800 1,200 Feet



U.S. Department of the Interior
Bureau of Land Management
Eastern States, Jackson Field Office
May 2009



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Legend

- Elevation in feet above sea level
- Jupiter Inlet Lighthouse Outstanding Natural Area boundary

d. Soils

Soils have been mapped according to the Palm Beach County soil map provided on-line by the U.S. Department of Agriculture, Natural Resource Conservation Service. This soil map is used for a general soil overview of the ONA. Brown et. al (1990) urged caution when using soil maps in general because even at the county level soil properties are highly variable across the landscape. In addition, past disturbances can alter the native soils, for example the deposition of dredged spoil materials from the adjacent Intracoastal Waterway.

Almost 89 acres or 74% of the ONA are mapped as St. Lucie-Urban land-Paola Association, which is described as nearly level to sloping, excessively drained soils that are sandy throughout.

The St. Lucie series is excessively drained, deep sandy soils on long, narrow, dune-like ridges and isolated knolls near the Atlantic coast. They formed in thick beds of marine or eolian sand. The water table is below a depth of 6 feet. These white sands extend to a depth of 80 inches or more. Permeability is very rapid. The available water capacity, the organic content, and natural fertility are very low in all layers. Although mapped as an Urban Land association, the native vegetation within the series are typical scrub species including sand pine (*Pinus clausa*), scrub oak (*Quercus spp.*), saw palmetto (*Serenoa repens*), cacti, and lichens.

According to the 1978 Soil Survey of Palm Beach Area, Florida (SCC) Paola sands occur on the lower slopes in Lot 15. These soils are also excessively drained, deep, sandy soils with origins similar to St. Lucie discussed above. These soils have a layer of yellow sands 4 inches thick beginning at a depth of 21 inches, which is transitional to the sandy subsoils to a depth of 80 inches or more. Again, permeability is very rapid, and the available holding water capacity, organic content, and natural fertility are very low.

Almost 26 acres or 21% of the ONA is mapped as a Quartzipsamments soil. This is not a naturally occurring soil type, but rather represents deposited dredged material primarily from the adjacent Intracoastal Waterway.

Just over 5 acres or .04% of the ONA is mapped as Kesson Mucky Sand. These soils are located in the very northeastern corner of the tract along the Indian River Lagoon. The Kesson series consists of deep, very poorly drained, rapid to moderately rapid permeable soils that formed in thick marine deposits of sand and shell fragments in tidal swamps and marshes along the Gulf Coast of Peninsular Florida. Slopes range from 0 to 1 percent. This includes soils flooded by salt or brackish water during high tides. Shell fragments constitute up to 10 per cent of the subsurface layer in some places. Natural fertility is low. This series was formerly mapped as tidal swamp and typically these areas support mangrove swamps, including red mangrove (*Rhizophora mangle*) and black mangrove (*Avicennia germinans*).

The majority of soil deposition related to the adjacent Intracoastal Waterway was placed on Jupiter Island (Raymond Swanson, personal communication). If there was spoil material placed in the southern portion of the ONA, it seems to have been minor. Based on a 2006 survey and four soil borings, the Natural Resources Conservation Service reported that the soils south of County Road 707 were “predominately natural..., and do not need to be truncated or reshaped.” “Soil surfaces have seen some heavy equipment and there are some minor disturbances possible due to tractor tires and leveling, but nothing that will alter the interpretations, or management of these soils.” According to NRCS, “some ridges were cut down and some material was spread over lower areas. This is of a minor extent and should not be confused with fill from construction or other unnatural sources, being brought in.”

Jupiter Inlet Lighthouse Outstanding Natural Area Soils



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May 2009

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Legend	
Soils	
	Pecora mucky sand, 0 to 5 percent kpces
	Quartz hammock, sloped, 0 to 5 percent kpces
	St. Leck-Paob-Ulba had complex, 0 to 8 percent kpces

e. Hydrology

The site is within the Loxahatchee River drainage basin, which presently covers an area of approximately 240 square miles. The basin consists of 12 drainage basins, ranging in size from 5 square miles to 100 square miles. The drainage basins form three watersheds, each forming a branch, or fork, of the river. The forks merge in a large estuary that drains through Jupiter Inlet to the Atlantic (SFWMD, 2006). All of the portions of the Loxahatchee River and the Indian River Lagoon adjacent to the ONA are tidally influenced. There are no permanent freshwater sources within the ONA, although a historic well has been located southeast of the lighthouse under the lighthouse keeper's workshop.

A tidal lagoon was constructed in Lot 15 along the Indian River Lagoon in 1999-2000. Its main outlet is a rock lined entrance in the middle of the project. There is also an outlet via an old mosquito ditch incorporated at the northern edge of the project, and tidal exchange through the existing mangrove fringe in the northern portion of the tidal lagoon and the Indian River Lagoon

f. Fire History

There are no available records of the fire history at Jupiter Inlet prior to 1941 but, based on aerial photographs taken intermittently since that year, there is no evidence of major fires within the ONA since that date. The lack of fire during this time is supported by the relatively even ages of mature sand pine which, based on sample coring done in 1996, were between 40 to 60 years of age at that time. By the mid-1990's the mature sand pine were beginning to show signs of senescence with increasing numbers succumbing to wind and drought stress.

The initial Jupiter Inlet management plan included a prescribed fire program to reintroduce fire as a tool to manage scrub habitats at Jupiter Inlet. Sand pine scrub is adapted to infrequent, catastrophic crown fires that typically result in complete stand replacement every 20-80 years. At Jupiter Inlet the prescribed fire program was designed to incrementally burn small 5-6 acre blocks to reduce the existing hazardous fuel load and to improve habitat conditions for the host of endemic species that require more open scrub conditions.

Since 1998, there have been three prescribed burns conducted in scrub habitat north of County Road 707. The first burn (5.3 acres in Prescribed Burn Management Block 1) was predominately scrub oak with a scattered mature sand pine. This block was pre-treated by chopping the standing scrub oak to reduce the spotting potential and flame heights, and was successfully burned on May 14, 1998.

The second burn (5.8 acres in Prescribed Burn Management Block 2) had a mature sand pine canopy with a heavily shaded understory of scrub oaks and very few forbs. The sand pines in this area were mechanically cleared in September 2001 using a feller buncher. All fuels over 4 inches were removed from the site to reduce the fuel load and spotting potential. The burn was postponed until February 11, 2002, when wind direction conditions finally came into prescription.



Figure 5. Feller buncher cuts and removes sand pine prior to 2002 prescribed burn.

In September 2004 the remaining unburned sand pine scrub was heavily impacted by Hurricanes Frances and Jeanne. Over 90% of the remaining mature sand pine were killed by wind damage or died in the following months due to storm related stresses. Several hundred wind damaged trees were felled in November 2004 to hasten decomposition, and 17 tons of heavy fuels were removed from a 150-foot strip along the northern boundary of the ONA to provide a fire break for nearby homes and businesses.

In 2005, a third burn site was prepared along County Road 707 (6.0 acres in Prescribed Burn Block 5). Larger down or standing logs were removed from the site to reduce the hazardous fuel load, but conditions for burning the remaining slash did not come into prescription until January 30, 2008 when this third burn was completed.

These three burns have totaled 17.3 acres or 34 percent of the 51 acres of the intact scrub acreage within the ONA.

In July 2010, most of the remaining sand pine snags from the 2004-2005 hurricanes were removed from Lot 19 to reduce the fuel load. The snags were removed by hand to avoid impacts to perforate lichen. The chipped material was mulched and provided for use in planting beds around the lighthouse.

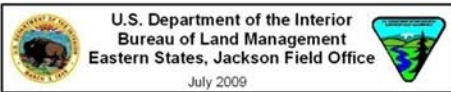


Figure 6. Smoke column during 2008 prescribed burn in Block 5 north of County Road 707.

Jupiter Inlet Lighthouse Outstanding Natural Area Prescribed Burn Management Blocks



0 200 400 800 1,200
Feet



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Legend

 Prescribed Burn Management Blocks

2. Natural Resources

a. Vegetation

The natural habitats found within the ONA are predominately Florida scrub, including oak scrub and sand pine scrub, a fringe of mangrove swamp along the Indian River Lagoon and tropical hardwood hammock along the transition zone between these habitats. In addition, there are areas dominated by non-native invasive species and maintained landscapes.

Scrub – There are 51 acres of intact Florida xeric oak scrub and sand pine scrub within the ONA. Scrub communities are associated with ancient coastal dunes formed along Pleistocene era seas. Remnants of these dunes form the Atlantic Coastal Ridge and the even older interior Lake Wales ridge. Because these ancient dunes occupied some of the highest and driest areas along the coast, they were among the first to be developed. As some of the oldest habitats in the state, scrub habitats support a high proportion of endemics. This coupled with the high rate of loss of scrub habitats has resulted in these areas supporting a relatively high number of special status species. According to the Florida Wildlife Conservation Strategy (2007), the state-wide threat category is Very High with the primary stresses being fragmentation and insufficient size of remaining scrub tracts. Within the State of Florida 76% of scrub acreage (257,015 acres) is in existing protected or managed areas. Another 3% (11,311 acres) are in Florida Forever projects, while 4% (14,031 acres) are in Strategic Habitat Conservation Areas (SHCA). The remaining 16% (55,101 acres) are other private lands.

Scrub habitats are fire-dependent and adapted to infrequent but intense fires. In the prolonged absence of fire, the structure and species composition of a scrub community can gradually change, often resulting in the succession to xeric hammock (FNAI and FDNR 1990). Alternately, where sand pines are abundant in the canopy, a dense sand pine forest may develop and shade out most of the other species that are typical of scrub (Fernald 1989). Regular fires occurring at intervals of every 20-80 years may return stands of mature scrub to a younger, more open state (FNAI and FDNR 1990). Periodic fire is one of the physical disturbances that may maintain the areas of open sand that characterizes typical scrub. Fire is probably necessary for the growth and proliferation of many of the rare and/or endemic species associated with scrub communities in Florida. In coastal scrubs hurricanes may also be responsible for maintaining scrub characteristics such as the periodic removal of the mature sand pine canopy.



Figure 7. Saw palmetto

The density of sand pine within a scrub canopy is often a reflection of fire frequency. Individual sand pines are killed by fire, and the stand is replaced by new sand pines growing from seeds. Sand pines generally begin to produce cones at about 10 years of age (Austin 1976) and frequent fires reduce the capacity of sand pines to become reestablished. Conversely, long term fire exclusion may also lead to the elimination of sand pines. Myers (1990) estimated that sand pine stands may begin to break up after 50-70 years, and that individual trees rarely reach 100 years of age. Without fire to create the bare soil seed beds and temporarily remove the competing canopy, sand pine regeneration is limited. Florida rosemary, like sand pine, succumbs to fire and is regenerated after burns by seeds stored in the soil. Most scrub shrubs resprout quickly from root stock, and many flower and fruit more prolifically following a fire. Many of the most rare scrub plants are dependent on the openings in the sand pine and scrub oak canopy created by fire.

Tropical Hardwood Hammock – There are 5.3 acres of intact tropical hardwood hammock within the ONA, located generally west and upland of the mangrove swamp. These hardwood forests occur only in south Florida and are characterized by tree and shrub species on the northern edge of a range that extends southward into the Caribbean. These communities are sparsely distributed along coastal uplands south of a line from about Vero Beach on the Atlantic coast to Sarasota on the Gulf coast. They occur on many tree islands in the Everglades and on uplands throughout the Florida Keys. This is a cold-intolerant tropical community which has very high plant species diversity, sometimes containing over 35 species of trees and about 65 species of shrubs. Characteristic tropical plants include strangler fig, gumbo-limbo, mastic, bastic, lancewood, ironwoods, poisonwood, pigeon plum, Jamaica dogwood, and Bahama lysiloma. Live oak and cabbage palm are also sometimes found within this community.

According to the Florida Wildlife Conservation Strategy (2007) tropical hardwood hammocks' conditions in the state are poor and declining. According to the best available GIS information at the time, 15,232 acres (6,164 ha) of Tropical Hardwood Hammock habitat exist, of which 71% (10,867 ac; 4,398 ha) are in existing conservation or managed areas. Another 10% (1,470 ac; 595 ha) are Florida Forever projects and 5% (783 ac; 317 ha) are SHCA-identified lands. The remaining 14% (2,112 ac; 855 ha) are other private lands. The state-wide threat category is High with the primary stresses including incompatible residential activities that include movement of fertilizer, herbicide, and invasive species from landscape maintenance, activities of people, their pets, and nuisance species, and disposal of yard and household waste. Feral or pet cats and roof rats were specifically identified as threatening species of conservation concern in this habitat.



Mangrove Swamp – There are 5.9 acres of intact mangrove habitat within the ONA. Mangroves form dense stands along the Indian River Lagoon north of County Road 707 and surround the tidal wetland constructed in 2000. These brackish-water swamps occur along low-energy shorelines and in protected, tidally influenced bays of southern Florida. This community type is composed of freeze sensitive tree species. With some limited exceptions, mangroves are distributed south of Cedar Key on the Gulf coast and south of St. Augustine on the Atlantic coast. These swamp communities are usually composed of red mangrove, black mangrove, and white mangrove. Depending on slopes and amounts of disturbance, mangrove swamps may progress in zones of single species from seaward (red mangrove) to landward (white mangrove) areas. Buttonwoods usually occur in areas above high tide. Often vines, such as rubber vines and morning-glory, clamber over mangroves, especially at swamp edges. According to the best available GIS information at the time 588,434 acres (238,131 ha) of Mangrove Swamp habitat exist, of which 88% (515,783 ac; 208,730ha) are in existing conservation or managed areas. Another 2% (10,376 ac; 4,199 ha) are in Florida Forever projects and 3% (16,997 ac; 6,878 ha) are in SHCA-designated lands. The remaining 7% (45,278 ac; 18,323 ha) are in other private lands. The state-wide threat category is Very High with the primary habitat specific stresses being reduction in freshwater flows from dam operations, lack of tidal fluctuation caused by mosquito impoundments, loss of mangroves from inappropriate pruning by coastal property owners, and coastal development.



Figure 8. Planted mangroves surround tidal wetland two years after tidal lagoon was completed in 2000.


Disturbed Habitats - Approximately 23 acres located primarily in Lot 17 are mapped as Disturbed Habitat because of the dominance of invasive plant species, primarily Brazilian pepper (*Schinus terebinthifolius*) and Australian pine (*Casuarina equisetifolia*). The understory, and particularly the area along the western border along the Coast Guard housing, supports most of the exotic, invasive species known to occur at the site (see Appendix C, Master Species List). Dense stand of bowstring hemp (*Sansevieria hyacinthoides*) pose a particular management challenge in areas of know cultural sensitivity. The most effective removal technique is to pull or dig out the robust rhizomes which can damage or displace artifacts near the surface. Outside of the developed Lighthouse Park, Lot 17 and the Jupiter Lighthouse mound support the most extensive areas of invasive plants remaining in the ONA. There are vestiges of the native vegetation. Wild coffee (*Psychotria nervosa*) is relatively common in the understory and gumbo limbo (*Bursera simaruba*) and strangler fig (*Ficus aurea*) are scattered through the eastern portion of the lot. There are two areas of scrub, covering approximately 3 acres, remaining in the upland areas, including a relatively intact area with open sand and scrub endemics, including state-listed nodding pinweed (*Lechea cernua*).



Figure 9. Mulching Brazilian pepper as part of exotic removal program.

Jupiter Inlet Lighthouse Outstanding Natural Area Vegetation




U.S. Department of the Interior
Bureau of Land Management
Eastern States, Jackson Field Office
 May 2009

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Legend

Vegetation

- Scrub
- Tropical Hardwood Hammock
- Mangrove
- Tidal Lagoon
- Disturbed Habitats
- Developed
- JILONA Boundary

b. Wildlife

Despite its urban setting, the 120 acres of the ONA provide habitat for a relatively wide array of wildlife species. See Appendix B. for a complete species list.

Mammals - Mammals recorded on site include gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), and river otter (*Lutra canadensis*). Armadillo (*Dasypus novemcinctus*) and opossum (*Didelphis virginiana*) are common, and raccoon (*Procyon lotor*) numbers are likely artificially high because of the availability of urban food sources. White-tailed deer (*Odocoileus virginianus*) were seen onsite occasionally during the mid-1990s and tracks were recently observed again in April 2009, but use is expected to be sporadic at best.

Reptiles/Amphibians - Common native reptile species include southern black racer snake (*Coluber constrictor*), coachwhip snake (*Masticophis flagellum*), six-lined racerunner lizard (*Cnemidophorus sexlineatus*), green anole (*Anolis carolinensis*), and gopher tortoise (*Gopherus polyphemus*). Non-native species found on site include the brown anole (*Anolis sagrei*), northern curly-tailed lizard (*Leiocephalus carinatus armouri*), and fox gecko (*Hemidactylus garnoti*). These are discussed below under Non-native Wildlife Species.

Birds – Eighty-eight bird species have been recorded at the ONA, and that list continues to be augmented by the diligent efforts of Dr. Jack Hailman and his wife Liz Hailman, ERM staff and others. Almost a quarter of the recorded species are associated with the mangrove tidal wetlands or shorelines of the Loxahatchee River or Indian River Lagoon, including Osprey, Great Blue Heron, Great Egret, Reddish Egret, Snowy Egret, Little Blue Heron and Belted Kingfisher. Mottled Duck have nested within the ONA in native plantings along the bank of the Loxahatchee River.

The resident birds associated with the upland habitats include Blue Jay, Fish Crow, Chuck-will's-widow, Carolina Wren, Brown Thrasher and Northern Cardinal. Spring and fall migrants as well as winter visitors boost bird numbers and diversity, and include Yellow-rumped Warbler, Pine Warbler, Palm Warbler, Black and White Warbler, Northern Parula, and Painted Bunting.

Birds recorded within the ONA that are included on the U.S. Fish and Wildlife's list of Birds of Conservation Concern in this region include: Common Ground Dove, Chuck-wills-widow, Northern Loggerhead Shrike, Pine Warbler, and Painted Bunting. Bird species listed as Species of Greatest Conservation Need by the State of Florida include Florida Mottled Duck, Brown Pelican, Great White Heron, Snowy Egret, Little Blue Heron, Tricolored Heron, Black-crowned Night Heron, Yellow-crowned Night Heron, White Ibis, Gray Kingbird, and Florida Prairie Warbler.

Fish – Twenty-one species of fish have been recorded in the tidal lagoon since its construction in 2000 by the Environmental Research and Field Studies Academy. The adjacent Indian River Lagoon, a 156-mile estuary along Florida's east coast, is perhaps the most biologically diverse estuarine system in the continental United States. According to the Final Indian River Lagoon-South Project Implementation Report and EIS Indian River Lagoon, Gilmore (1977, 1981) described over 800 species of fish collected in the southern IRL from the freshwater tributaries out to the deep reefs. Many of the fish spend part or all of their life in the estuary and include important recreational and commercial species such as the spotted seatrout, red drum, snook, tarpon, and gray snapper, and sheepshead. Mullet spend a majority of their life in the Indian River Lagoon and are an important forage fish for higher-level predators.

Insects/Arachnids

Although the ONA has not been systematically surveyed there have been a number of interesting insects and arachnids recorded at the site during field visits. One of these includes *Aethecerinus hornii*, identified by M.C. Thomas, Ph.D. of the Florida State Collection of Arthropods, Florida Department of Agriculture & Consumer Services. This species is typically found on decaying stumps and logs and was found a block burned one year previously. According to Dr. Thomas, this beetle is one of the rarest in Florida and likely a new record for Palm Beach County. A systematic survey of the site is warranted.

c. Special Status Wildlife Species

Three animal species recorded at the Jupiter Inlet Lighthouse ONA have been listed as Endangered (E) or Threatened (T) by either the U.S. Fish and Wildlife Service (USFWS) or the Florida Fish and Wildlife Conservation Commission (FWC). In addition, 15 other species are listed by either Florida Natural Areas Inventory (FNAI) as critically imperiled (S1), imperiled (S2), or rare (S3) in the state, or by FWC as a Species of Special Concern.

Mammals

Florida mouse (*Podomys floridanus*) – This scrub endemic occurs in central Florida and along the east coast, with an isolated population in the Florida panhandle (Whitaker and Hamilton 1998). It is most common in sand pine scrub and high pinelands dominated by longleaf pine (*Pinus palustris*), as well as scrubby flatwoods, sand hill and coastal scrub. This species is generally associated with gopher tortoise burrows (Cox et al. 1987). There was evidence that one individual was captured within the ONA in the oak scrub near the Intracoastal Waterway by Ecological Consultants in 1995. Retrapping of suitable open sand areas throughout the ONA was conducted over four days beginning on March 30, 2009. There were no Florida mouse captures after 523 trap nights¹. The Florida mouse is listed as G3/S3 by FNAI; it is not listed by USFWS; it is listed as a Species of Special Concern by FWC.

West Indian manatee (*Trichechus manatus*) - The Indian River Lagoon and Loxahatchee River bordering the ONA are designated critical habitat for West Indian manatee. Manatees are frequently observed in the area and have been documented within the constructed tidal lagoon north of County Road 707. The nearby Jupiter Sound has been identified as a seasonally important feeding area. The largest concentrations occur in October, December and January. The species ranges from North Carolina southward into the West Indies, and along the coasts of the Gulf of Mexico. Manatees are vegetarians and feed primarily on sea grasses. Repeated dredging and high boat traffic have prevented the establishment of any significant amount of sea grasses in the Intracoastal Waterway immediately adjacent to the ONA. Consequently, manatees primarily use the adjacent waters as a transit route between the Indian River and Lake Worth Lagoons. Manatee are protected by the Florida Manatee Sanctuary Act (§370.12(2), Florida Statutes) and are federally protected by both the Marine Mammal Protection Act and Endangered Species Act and are listed as endangered by the USFWS. They are also protected by the Florida Manatee Sanctuary Act of 1978, which establishes the entire state as a refuge and sanctuary for manatees. The West Indian manatee is listed as G2/S2 by FNAI and is listed as Endangered by FWC.

¹ trap nights equal the number of traps multiplied by the number of nights.

Birds

Brown Pelican (*Pelecanus occidentalis*) – Brown Pelican frequently loaf and feed in the adjacent Loxahatchee River and Indian River Lagoon. This species ranges from South America north to the south Atlantic and Gulf coasts of North America. It is a Florida resident, and feeds on fish. In Florida, the brown pelican builds nests in colonies most often on mangrove islands surrounded by open water (Kale and Maehr, 1990). The ONA does not possess typical nesting habitat, i.e. appropriate mangrove islands. Historically the Brown Pelican suffered a decline due to insecticide uses. The brown pelican is listed as G4/S3 by FNAI and is listed as a Species of Special Concern by FWC. The Brown Pelican is considered recovered by the USFWS and was removed from the Federal List of Endangered and Threatened Wildlife on November 17, 2009 (*Federal Register* 74:220, p. 59443).

Reddish Egret (*Egretta rufescens*) - This wading bird is likely an occasional visitor to the tidal wetlands and adjacent shorelines where it forages for small fishes, crustaceans and insects, waiting motionless for an opportunity to strike. This species was nearly extirpated from the United States by the plume trade, is now recolonizing areas of former occurrence where nesting/foraging habitat still remains. Habitat loss and human disturbance are now the primary threats. Christmas Bird Count (CBC) data indicate declines in Texas, but increases in Florida. Reddish Egret is listed as G4/S2 by FNAI; it is not listed by USFWS; it is listed as a Species of Special Concern by FWC.



Figure 10. Reddish Egret

Snowy Egret (*Egretta thula*) – This wading bird has been observed feeding in the tidal wetland. Snowy Egrets are local residents feeding in many types of permanently and seasonally flooded wetlands, streams, lakes, and swamps, and in manmade impoundments and ditches. They usually prefer calm waters. They have not been documented breeding within the ONA. According to FNAI, numbers have been declining since the 1950s, possibly faster than declines of other herons and egrets. In 1989, this species was found in only 22 percent of the colonies where it formerly occurred. Persistent patterns of wetland destruction and alteration are probably eliminating large areas of essential habitat. Most impacts appear to affect quality of foraging habitat rather than areas immediately surrounding nesting colonies.

The Florida Fish and Wildlife Conservation Commission and the Department of Environmental Protection have developed setback distances around wading bird colonies of 330 ft. (100 m) to prevent human disturbance. Snowy Egret is listed as G5/S3; it is not listed by USFWS; it is listed as a Species of Special Concern by FWC.

Black-crowned Night Heron (*Nycticorax nycticorax*) - This resident heron has been observed foraging along the shorelines of the ONA. This species is an opportunistic forager, feeding on primarily on fish, amphibians and invertebrates. Adults tend to be crepuscular, feeding during the evening or at night and roosting during the day, often in mangroves. Black-crowned Night Heron are listed as G5/S3 by FNAI; it is not listed by USFWS or FWC.

Little Blue Heron (*Egretta caerulea*) - This wading bird has been observed feeding in the tidal wetland. Little blue herons breed throughout much of North America, Mexico, and Central America and winter from North Carolina southward. It is a Florida resident, and feeds on small fish, amphibians, and invertebrates in both fresh and saltwater systems. Nesting occurs between late February and August in colonies composed only of little blue herons or mixed colonies with other wading birds, mainly at saltwater sites (Kale and Maehr, 1990). Kale and Maehr (1990) considered the general population trend of this species to be downward due to wetlands loss and, possibly, competition with the cattle egret (*Bubulcus ibis*) for nesting sites. The little blue heron is listed as G5/S4 by FNAI; it is not listed by USFWS; it is listed as a Species of Special Concern by FWC.

Tri-colored Heron (*Egretta tricolor*) - This wading bird has been observed feeding in the tidal wetland. The tricolored heron breeds from North Carolina to the West Indies and Central America; it winters from California and South Carolina southward. It is a Florida resident, and feeds primarily on fish in saltwater marshes and swamps, and estuaries; it also feeds in freshwater wetlands. Platform nests are created in mangroves or other dense aquatic shrubs, and eggs are laid from late February through July (Kale and Maehr, 1990). Kale and Maehr (1990) considered this species to still be abundant throughout much of peninsular Florida, but suffering population declines due to wetland losses. The tricolored heron is listed as G5/S4 by FNAI; it is not listed by USFWS; it is listed as a Species of Special Concern by FWC.

White Ibis (*Eudocimus albus*) – This resident wading bird is not known to breed on the site but forages along the shorelines, wetlands and park areas for primarily crustaceans, but also fishes, frogs, small snakes, slugs, snails, and insects. White Ibis is listed as G5/S4 by FNAI; it is not listed by USFWS; it is listed as a Species of Special Concern by FWC.

Osprey (*Pandion haliaetus*) – This resident diurnal raptor feeds exclusively on fish and is common within the ONA, feeding in the tidal wetlands and adjacent waterways. Osprey are often found roosting in the taller mangroves and snags surrounding the tidal wetland. Ospreys typically build large stick nests both on living and dead trees, but also will use numerous man-made structures including telephone poles, wharf pilings, windmills, microwave towers, chimneys, and channel markers. Nesting typically occurs in winter and early spring in Florida and Mexico. The number of young successfully fledged increases with increased abundance of food resources, and large numbers may nest in a relatively small area when food resources are adequate and nesting sites are plentiful. Osprey nests are often used in successive years. Osprey is listed as G5/S3/S4 by FNAI; it is not listed by USFWS or FWC in Palm Beach County.

Merlin (*Falco columbarius*) - This falcon is a winter visitor to south Florida, nesting in northern U.S. and Canada. Populations tend to be increasing after declines related to pesticide pollution, which is still an issue in South and Central America. In south Florida this species utilizes a wide range of habitats and could be expected to roost and forage across most of the ONA where it hunts predominately song birds. Merlin is listed as G5/S2 by FNAI; it is not listed by USFWS or FWC.

Royal Tern (*Sterna maxima*) – Although the ONA does not provide the open sandy beaches that provide typical nesting habitat for this species, Royal Tern could utilize the adjacent waterways to forage for small fish. Royal tern is listed as G5/S3 by FNAI; it is not listed by USFWS or FWC.

Painted Bunting (*Passerina ciris*) – Although not expected to nest within the ONA, the eastern population of painted buntings winters in southern Florida. Wintering Painted Buntings utilize a wide variety of habitats including shrub/scrub habitats and riparian thickets foraging for grass seeds and insects. Painted Bunting is listed as G5/S3 by FNAI; it is not listed by USFWS or FWC.

Florida Scrub Jay (*Aphelocoma coerulescens*) - The southern Florida population of Florida Scrub Jay has been in rapid decline and the Jupiter Inlet Lighthouse ONA scrub jay population has unfortunately followed that trend. In 1995 there were three Florida scrub jay families being monitored on the site (Iverson, unpublished data). The last pair, including a male banded as an adult on the site in 1992, was last seen in the spring of 2002 utilizing Lot 18 and 19. The presence of a scrub jay nest in Lot 19 in 2003 provides evidence that this pair was still on the site that year, but jays have not occupied the site since. The reason for the decline is not known. The site continues to provide apparently suitable habitat and two of the burn areas have reached the optimal age and structure for scrub jays. Annual surveys during the breeding season continue on the site as part of the range wide volunteer “Jay Watch” program sponsored by The Nature Conservancy.

In 2008, an epidemic resulted in documented losses of scrub jays at Archbold Biological Station and other areas of the state. Palm Beach County appears to have suffered dramatic declines. According to Jay Watch volunteers 2008 numbers in northern and mid-Palm Beach County were down to 11 individuals, five families over five sites. In contrast, there were 122 birds recorded in this area in 1999 and 144 in 1993.



Figure 11. Banded Florida Scrub Jay.

The Florida Fish and Wildlife Commission and the Florida Natural Areas Inventory recently developed Scrub Management Guidelines (FFWCC and FNAI, June 2009) as a basis for the restoration and management of scrub habitats in peninsular Florida (June 30, 2009). With the Florida scrub jay serving as the “umbrella species”, these management guidelines recommend actions that create a low, open structure that is favorable to scrub jays but also likely to benefit most other scrub-associate species, such as the Florida scrub lizard, Florida mouse, gopher tortoise, and a host of endemic plants and arthropods. The guidelines identify four primary indicators of optimal Florida Scrub-jay habitat: 1) at least 10% of each potential scrub-jay territory (25 acre unit) should have shrubs that average 4-5.5 feet high to provide cover and produce acorns. The rest of the vegetation should be shorter, with no more than 1 acre taller than 5.5 feet per unit, 2) If present at all, less than 1 tree per acre, 3) Maintain a 1,000 foot non-forested (<1 tree per acre) buffer between a scrub-jay territory and forest, and 4) 10-50% bare sand or sparse herbaceous vegetation. Currently, at least 20 acres within the ONA would be considered optimal habitat according to those guidelines, except that these scrub areas are all within 1,000 feet of areas with > 1 tree per acre on the western one third of the tract along U.S. Highway 1. Habitat conditions are generally more suitable for Florida Scrub-jay (i.e. shorter oak scrub, less sand pine coverage and fewer woody invasives) than in 1997, when the tract was supporting three scrub-jay families. The Florida Scrub Jay is listed as G2/S2 by FNAI and is listed as Threatened by both USFWS and FWC.

Reptiles

Eastern Indigo Snake (*Drymarchon corais couperi*) – Although there are no confirmed sightings of eastern indigo snake in the ONA, it is nevertheless possible that they could occur onsite, given that they are a commensal burrow species, a wide-ranging habitat generalist, are cryptic and not easily surveyed.

Gopher tortoise (*Gopherus polyphemus*) - The gopher tortoise population at Jupiter Inlet appears to be stable or increasing. Initial inventories of all suitable upland habitats in 1995 surveys identified 13 active burrows, 30 abandoned burrows and 1 inactive burrow in Lot 15 and 19. Based on a standard Fish and Wildlife Commission formula², this indicates a population of 0.19 tortoises per acre. Subsequent tract-wide monitoring in 2005 located 35 active burrows, 98 abandoned burrows, and 58 inactive burrows, or an estimated 1.26 tortoise per acre. In 2007, based a representative survey of 9.83 acres or 22% of the suitable upland habitat, the population was estimated to be 1.5 tortoises per acre. In 2009, a representative survey of 11.3 acres or 23% of the suitable habitat, the population was estimated at 1.7 tortoises per acre. The FWC recommends no more than 2 tortoises per acre, so the Jupiter Inlet population is nearing carrying capacity. Habitat improvement in disturbed areas could support additional population growth in the scrub areas of Lot 17.

The gopher tortoise is known as a keystone species in Florida natural areas because of the important role that this species plays in relation to other plants and animals in upland natural communities. At least 300 species of animals are known to use gopher tortoise burrows (Moler 1992). Speake (1981) developed a list of 81 gopher tortoise burrow commensals. During monitoring efforts, no observations of Indigo snakes or gopher frogs have been made, but we will continue to make opportunistic observations for these and other commensal species. The gopher tortoise is listed as G3/S3 by FNAI; it is under Status Review by the USFWS; it is listed as Threatened by the FWC.

Florida scrub lizard (*Sceloporus woodi*) – This lizard is found in Florida scrub habitat in four disjunct populations in Florida. Scrub lizards have limited ability to move between scrub remnants because of their very specific habitat needs. Predation of females in these small populations may be an issue. Scrub

² Tortoises per acre = (active + inactive) X 0.614 acres surveyed

lizards are largely restricted to evergreen oak scrub and young sand pine scrub with ample open space for nesting, basking, and foraging in close proximity to mature trees (*Pinus* or *Quercus*) that can provide shade and perch sites. Development of a closed canopy (e.g., in the absence of fire) results in increasingly unsuitable habitat. It never occurs in non-xeric sites. The species is mostly terrestrial but commonly perches low on tree trunks. The Florida scrub lizard prefers early successional scrub, where it feeds primarily on ants, adult beetles, and orthopterans (Jackson 1973b). It is listed as a common or characteristic species of coastal scrubs in the Treasure Coast Region by Fernald (1989). The Florida scrub lizard is listed as G3/S3 by FNAI, but it is not listed by USFWS or FWC.

Fish

Opossum Pipefish (*Microphis brachyurus lineatus*) – Although not technically occurring within the ONA, there is potential for this species to occur in the adjacent Indian River Lagoon and Loxahatchee River.

d. Special Status Plant Species

Nine plant species and one lichen have been recorded at the ONA and are listed by at least one of the following governmental agencies: U. S. Fish and Wildlife Service (USFWS); Florida Department of Agriculture and Consumer Affairs (FDACS); and Florida Natural Areas Inventory (FNAI).

Curtiss' milkweed (*Asclepias curtissii*) - This endemic perennial forb is a long-lived perennial found almost exclusively in open white sandy patches in the sand pine scrub community and in the disturbed scrub edge community. Because of the small size and inconspicuous appearance of this plant when not in bloom (Ward 1978); individuals in open sandy trails are often the only ones spotted, even though additional plants may be present in more vegetated areas. Management recommendations include maintaining open sandy habitats and by routing foot trails away from known plant locations. Curtiss' milkweed is listed as endangered by FDACS.

Four-petal pawpaw (*Asimina tetramera*) – This long-lived shrub is associated with scrub habitats and has a very limited distribution. According to the 5-year review for this species there are approximately 1,800 pawpaw plants located on 21 sites in Martin and northern Palm Beach Counties (FWS 2009b), although there is some discussion about the delineation of the populations. In all this species occurs across a 30-mile stretch of coastal scrub habitats in Martin and Palm Beach Counties, and with few populations containing 100 or more plants. One-third of the extant sites support 15 or fewer pawpaws (FWS 2009b). These small populations tend to lack genetic diversity and may not be self-sustaining over time (Ellstrand and Elam 1993). It is likely that these small populations are very. Most of these populations are thought to be reproductively isolated from each other, which could be limiting genetic diversity and recruitment, as out crossing is the primary breeding system for this species. Seedling recruitment is low or non-existent at most sites. The Jupiter Inlet population is typical in this regard with only 4 naturally occurring plants and



Figure 12. Curtiss' milkweed

no known recruitment in the last 15 years. The U.S. Fish and Wildlife Service Recovery Plan outlines the need to introduce/augment populations of this species

The Jupiter population was augmented in December 2008 when 134 one-year old four-petal pawpaw were planted north of County Road 707 in a management block burned in January 2008. These plants were provided with drip irrigation through the initial summer and fall, and are being monitored to assess their survivorship. Initial results were encouraging with 97% survival after four months, and five plants flowering and at least three fruiting the first summer. Future management recommendations include periodic burning to promote the robust growth and flowering needed to produce viable fruit, and additional planting. Four-petal pawpaw is listed as G1/S1 by FNAI and as endangered by both the USFWS and FDACS.



Figure 13. Four-petal pawpaw



Figure 15. Young four-petal pawpaw planted in 2008.

Johnson's Seagrass (*Halophila johnsonii*) - Johnson's seagrass is a marine plant species found growing in lagoonal waters along approximately 200 km of coastline in southeastern Florida between Sebastian Inlet and north Biscayne Bay. The species often grows in a patchy, noncontiguous distribution at water depths extending from the intertidal down to 3 meters. Within its range, ten areas have been designated as critical habitat, including a portion of the Indian River Lagoon on the south side of Jupiter Inlet. Outside of critical habitat, a very small population occurs adjacent to the ONA in the Indian River Lagoon south of Cato Bridge. Johnson's seagrass is listed as G2/S2 by FNAI and as endangered by the U.S. Fish and Wildlife Service. National Marine Fisheries Service is the lead agency for this species.

Perforate lichen (*Cladonia perforata*) - Florida Natural Inventory occurrence records, as of 2006, document 16 populations of this species in four separate populations in Florida, including Lake Wales Ridge, North Gulf Coast at Eglin Air Force Base, Manatee County on the west coast, and six sites in Martin and Palm Beach County (Fish and Wildlife Service 2009a). The ONA is one of two populations

in Palm Beach County with the other population being at Jupiter Ridge Natural Area. This species grows slowly, branching once a year and reproduction appears to be primarily, if not exclusively vegetative with the thalli fragmenting due to trampling or natural breakage (Yahr 2003). In addition, Yahr suggested that the relatively large size of thalli, as well as barriers of dense leaf litter could be limiting factors (1997 and 2000).

Fire shapes the scrub habitats of *C. perforata*, but lichens are destroyed by fire and recolonize slowly from unburned local sources. Following fires, lichen cover increases slowly. A study by Menges and Kihfeldt (1995) found *Cladonia* sp. began to recolonize burned sites within three to five years, but at lower densities than prior to the burn. Hawkes and Menges (1996) found that it did not reach more than 10% until after more than 20 years. Menges and Kohfeldt (1995) found *C. perforata* increased between 4 and 20 years after fires, but no thereafter. According to Johnson and Abrahamson (1990), "*Cladonia* and *Cladina* sp. are destroyed by fire and take 10 to 12 years to recover to preburn levels".

Virtually all of the *C. perforata* within the ONA is located south of County Road 707 (CR 707) in Lot 19, with the exception of a small population, estimated at less than 20 thalli, in the southwest corner of Lot 15. The current number of individual thalli in the population is unknown, but probably exceeds 1,000. The population extends over approximately 8 acres, although the majority is clustered in patches in the southern one third of Lot 19. There it tends to occur in areas occupied by several other lichen species, making detection difficult. In Lot 19, *C. perforata* is generally found in more sheltered openings and is atypically not found in the largest expanses of open sand. This may be a result of coastal winds or sheet flow during heavy storms. As a result *C. perforata* is often found in microsites that are in deep shade under sand pines and amongst dense leaf litter. In the northern two thirds of Lot 19 heavy fuel accumulations resulting from the killing of the sand pine canopy during the 2004 hurricanes degrades potential habitat and possibly dispersal of *C. perforata*.



Figure 16. Perforate lichen

There is potential for transplanting *C. perforata* into unoccupied suitable habitat within the ONA, both as refugia during prescribed burns and to provide a buffer against loss of the population due to wild fire or other natural disaster. Thirty thalli have been transplanted into open sand areas in Lot 15 on March 9-10, 2009, and continue to be monitored to assess survivability (Consultation Code 41420-2009-F-0102). There is successful precedent for transplanting (Yahr 2000, Yahr and DePriest 2005). Perforate lichen is listed as G1/S1 by FNAI and as endangered by both the USFWS and FDACS.

Large-flowered rosemary (*Conradina grandiflora*) - This endemic shrubby mint was recorded at Jupiter Inlet by Ecological Consultants in 1995. This small shrubby mint is restricted mainly to white sand scrub. Although this species requires periodic fire for survival, it is capable of persisting for long periods under a sand pine canopy. Wunderlin (1998) listed it as occasional in the central peninsula of Florida along the east coast. It was listed as a scrub indicator species in the Treasure Coast Region by Fernald (1989). Large-flowered rosemary is listed as G3/S3 by FNAI and threatened by FDACS.

Nodding pinweed (*Lechea cernua*) - This endemic forb is relatively common in open sandy sparsely vegetated areas in the oak scrub and disturbed scrub natural communities and tends to be located in areas with past disturbance. It responds very quickly to burning. In 2002 nodding pinweed was estimated at ten times pre-burn numbers (Richardson, 2002). It will be protected by maintaining some open sand within the scrub community and also by routing foot trails away from known plant locations. Because this plant is often interspersed with opportunistic weeds such as natal grass, it is particularly vulnerable to unintentional damage during herbicide applications. Nodding pinweed is listed as G3/S3 by FNAI and threatened by FDACS.

Wild pines (*Tillandsia* spp.) - Four species of wild pines have been recorded at the Jupiter Inlet Lighthouse ONA. The four species of epiphytic bromeliads include the banded wild pine (*Tillandsia flexuosa*), giant wild pine (*Tillandsia utriculata*), in addition other species although recorded in the early 1990's have not been documented in subsequent inventories, including reflexed wild pine (*Tillandsia balbisiana*), and common wild pine (*Tillandsia fasciculata*). Giant wild pine and reflexed wild pine are susceptible to the feeding activities of an imported bromeliad weevil that burrows through the central growing point of the plant. The burrowing can cause the growing point to die, which usually leads to the eventual death of the entire plant (Frank 1999). There is no known practical treatment for this bromeliad weevil, but it is not known to kill all the bromeliads in a given population. FNAI lists banded wild pine as G5/S3. FDACS lists giant wild pine and common wild pine as endangered, and banded wild pine and reflexed wild pine as threatened.

e. Invasive and Non-native Plant Species

Like many fragmented natural areas in southeastern Florida, the Jupiter Inlet ONA has been invaded by a number of non-native plant species. Past disturbances, an abundance of nearby seed sources and suitable growing conditions for a long list of non-native plants make control of these species a challenge across south Florida. A total of 46 non-native plant species have been recorded at the ONA, or about 23% of the total number plant species. Of these, 15 species have been listed by Florida Exotic Pest Plant Council (FLEPPC, 2009) as Category I, or those plants that have shown the capacity to invade and disrupt native plant communities. Category I species recorded within the ONA include Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia*), rosary pea (*Abrus precatorius*), Surinam cherry (*Eugenia uniflora*), sword fern (*Nephrolepis cordifolia*), asparagus fern (*Asparagus densifolius*), Chinese tallow (*Sapium sebiferum*), guava (*Psidium guajava*), woman's tongue tree (*Albizia lebeck*), laurel fig (*Ficus microcarpa*), schefflera (*Schefflera actinophylla*), torpedo grass (*Panicum repens*), natal grass (*Rynchelytrum repens*), earleaf acacia (*Acacia aunculiformis*), shrub verbena (*Lantana camara*), and seaside mahoe (*Thespesia populnea*).

Eight non-native species identified by FLEPPC as potentially invasive, or Category II have been recorded in the ONA. These include bowstring hemp (*Sansievaria hyacinthoides*), creeping oxeye (*Wedelia trilobata*), life plant (*Kalanchoe pinnata*), lead tree (*Luecaena leucocephala*), mahoe (*Hibiscus tiliaceus*), Senegal date tree (*Phoenix reclinata*), oyster plant (*Tradescantia spathacea*), and burrnut (*Tribulus cistoides*). Of these, bowstring hemp and lead tree are particular challenges in Lot 17 and 18 and will be given priority for treatment. Bowstring hemp occurs in monocultures on the lighthouse mound and across Lot 17. A thick waxy cuticle and robust rhizomes make this species difficult to control with herbicides. The most effective control requires excavation of the rhizomes; but this is complicated in the vicinity of the lighthouse by the presence of surface and near surface cultural resources. Lead tree, fast growing tree has the capacity to produce seed year round. It has reestablished itself along the banks of the Loxahatchee after two years without maintenance.

In addition, aggressive native but invasive ruderal vines can degrade habitat values. Within the ONA these include, but are not limited to, love vine (*Cassytha filiformis*), muscadine (*Vitis mumsoniana*), coinvine (*Dalbergia ecastophyllum*), and grey knicker (*Caesalpinia bonduc*). Vines can pose a significant threat to the natural communities particularly following disturbances or in the absence of fire when they can shade out native trees, shrubs and forbs. Native love vine, while not wholly parasitic, does have the potential to severely damage or kill host plants and during heavy infestations can blanket large areas of oak scrub in the ONA.

f. Integrated Weed Management Program

The vast majority of non-native plants occur in untreated areas of Lot 18 and across most of Lot 17. In Lot 15 and 16, the initial removal of woody invasives, such as Brazilian pepper and Australian pine was completed by 2000 and in Lot 19 in 2006. These areas are in maintenance mode with no more than 1% invasive cover in the canopy or understory layers.

Lot #15

The 54-acres in Lot 15 have been the focus of an invasive exotic removal program since 1997. Activities have included mechanical removal of larger Australian pine and Brazilian pepper, removal of deposited spoils which supported dense stands of Australian pine, basal bark herbicidal treatment of Brazilian pepper where it was intermingled with native oaks and sand pine, hand removal and stump



Figure 17. Hemiparasitic love vine blanketing a scrub oak.

treatment of Brazilian pepper where it was accessible, hand pulling of invasive vines and forbs, and spot treatment of invasive grasses using herbicides, where needed. This integrated pest management approach has been effective in removing the woody component of invasives and in suppression non-native vines and forbs. Suppression activities towards native but invasive vines have been more

intermittent, relying on occasional contracted sweeps and volunteer labor to hand pull this vine which is widespread across Lot 15.

Other habitat improvement projects have included the use of prescribed fire and fuel reduction activities. Although a vital component in the management of scrub communities, these fuel reduction activities prompt the germination and spread of opportunistic invasives, such as natal grass which is ubiquitous in natural areas throughout South Florida.

Lot #19

In 2005, 8.55 acres of undeveloped land east of Jupiter Lighthouse Park returned to BLM management. A well-established oak scrub and sand pine community dominated this tract, but the mature sand pines were heavily damaged by the 2004 hurricanes. This area had a substantial infestation of Brazilian pepper, particularly along the perimeter of the Lot with several large Australian pine in the interior. Rosary pea is prevalent across the tract. The initial invasive species removal effort in this area was completed in 2006. Sand pines felled or damaged during the 2004 hurricanes have provided a structure for non-native and native invasive vines. Annual sweeps have not been able to provide adequate suppression and additional sweeps have been conducted in this area over the last two years. In addition, watering of adjacent turf areas results in overspray that supports invasive grasses, forbs and vines along the perimeter of this scrub habitat, requiring more frequent sweeps and increasing the need for herbicide application.

Lots #16, #17, and #18 (U.S. Coast Guard Administered Properties)

In Lot #16, a 4.89-acre area used as an active communication site, the vegetation is currently being managed by BLM/ERM under a license issued by the U.S. Coast Guard. Natal grass is a particular problem in this area after the site was cleared of derelict buildings in 2003.

Lot #17 is administered by the U.S. Coast Guard. This 23-acre open space borders the Intracoastal Waterway/Indian River Lagoon. This site contains a few remnant scrub components (2.7 acres) on higher points on the western edge and hardwood hammock species across the lower elevations, but the majority of the area is dominated by a canopy of Brazilian pepper (17.3 acres) and large Australian pine (3 acres)

Lot #18 is currently used for housing, a Post Exchange, and includes the Jupiter Inlet Lighthouse. Outside of ornamental planting associated with the houses, this area contains several areas of native vegetation. Many of these areas contain substantial invasive components, particularly bowstring hemp and Brazilian pepper. A major effort to remove woody and perennial weeds within this area was undertaken in 2004-2005 along the bank of the Loxahatchee River and the scrub area between housing and Lot 19. These areas require regular maintenance. Lack of regular maintenance since 2008 has allowed lead tree to become reestablished along the Loxahatchee River bank.

Herbicide Use

Within the ONA, herbicide applications on BLM administered land are covered by a Pesticide Use Proposal, reviewed and renewed every three years by the BLM National Weed Coordinator, BLM State Weed Coordinator and management. The proposal identifies the target species, the intended herbicides and adjuvants, the rates of use, maximum rate of application, application techniques and constraints to protect sensitive resources. The current proposal approves the use of glyphosate for foliar application and triclopyr and imazapyr for cut stump treatments of woody stems.

g. Non-native Wildlife Species

The following non-native wildlife species have been recorded within the ONA.

Brown anole (*Anole sagrei*) – This species is a native to Cuba, the Bahamas, and nearby islands. The range of the brown anole in the eastern United States includes all of peninsular Florida (SREL).

Curly-tailed lizards (*Leiocephalus carinatus*) – This species is a native of the islands of the Bahama Bank were imported in the 1940s, when twenty pair of curly-tailed lizards were brought to the island of Palm Beach. Within 20 years, they had spread 20 blocks. By 1968, researchers discovered that the lizards had spread to the mainland. A survey in September 2002 documented relatively contiguous occurrences along the Atlantic coastline from Lighthouse Point, Broward County to Hobe Sound, Martin County (Smith et al. 2004). There is documentation of this carnivorous lizard taking another exotic, the brown anole (*Anole sagrei*), and of shifts in populations of this species toward more arboreal habitats because of the curly-tailed lizard (Callahan (1982:51). This species is typically found in association with buildings or disturbed sites, however, there is concern that this species could displace or predate native species, including the scrub lizard (*Sceloporus woodi*).

Fox gecko (*Hemidactylus garnoti*) - This species is native to southeastern Asia, the East Indies, and many South Sea Islands (Conant and Collins 1991). . It is widely distributed in many urban and suburban areas of Florida, and it can even be found in natural habitats, such as mangrove, sand pine scrub and pine rocklands . It is often found on buildings, trees, fences, wooden and cement power poles, and bridge abutments. Of the 7 introduced gecko species in Florida, this one has the widest distribution in Florida (Conant and Collins 1991). This species is expanding its range rapidly and has apparently replaced the long-established Mediterranean gecko (*Hemidactylus turcicus*) in much of southern Florida (Meshaka 1995, Butterfield et al. 1997). However, the tropical house gecko (*H. mabouia*), a more recent arrival, is apparently out competing the Indo-Pacific gecko on buildings in some areas (Meshaka 2000).

Domestic cat – Feral and domestic cats, which are observed regularly within the ONA, have the potential to be serious predators of nesting birds, including the Florida Scrub Jay, as well as reptiles, including Florida scrub lizard. Removal and ongoing control of feral cats would be prerequisite for Florida mouse reintroductions. Coordination with local residents is needed to exclude domestic cats from the ONA.

Feral Hog (*Sus scrofa*) - Feral hogs have been documented within the ONA on two occasions over the last two years. Hogs cause considerable damage to natural systems through their rooting activities and efforts are made to remove hogs immediately once detected.

3. Cultural Resources

Jupiter Inlet lies within the Atlantic Coastal Ridge which extends from entire north-south span of Palm Beach County along the eastern coast. Of the various ecosystems found within this important physiographic feature the Coastal Dune and Strand ecosystem, with ocean-facing dune slopes, tropical hammock, Florida scrub oaks and sand pines made an ideal spot for human settlers, both prehistoric and historic. The following is a generalized summary of prehistoric and historic cultural periods. For more comprehensive information on the cultural history of the Jupiter Inlet area see literature cited section for related documents by Ryan Wheeler, Jerald Kennedy and James P. Pepe and James Snyder, Jeannette Thurber Conner and Richard K. Murdoch. For older report references of Jupiter and Palm Beach County look at the reference sections in some of the literature.

a. Prehistoric Periods (10000 B.C. – 1750 A.D.)

Recent discoveries of fiber tempered pottery shards dating to c 4,000 BC at the site and across the inlet indicate occupation by people of the Late Archaic Period. Fiber tempered pottery, the oldest ceramic technology in the New World, was made by mixing clay with fibers from saw palmetto or Spanish moss before firing. This invention enabled early people to store food, cook stews and likely contributed to more permanent settlements, rather than the semi-nomadic lifestyle of earlier natives who may have used the site seasonally, but lived further up the Loxahatchee River.

The following information details a tentative and general chronology of the East Okeechobee Area for Florida Native American cultural periods:

Paleo Period (10000 B.C. – 8000 B.C.)

Paleoindians lived in southern Florida in association with mammoths, bison and other types of megafauna. Deposits of fossilized Pleistocene bone have been uncovered by dredging operations from several locations in Southern Florida and from solution holes in south Dade County. These deposits indicate a presence of more extensive grasslands than present day. With the extinction of the megafauna by about 11,000 B.P., Paleoindians apparently adapted to the emerging wetlands of southern Florida, and began to establish the patterns of subsistence that were to provide the basis of resource procurement for the subsequent 10,000 years. Evidence of the Paleo period in southern Florida is now well established with the discovery of a late Paleo/Early Archaic sites which have yielded evidence of exploitation of deer and rabbit, some marine fauna, and some indication of hunting extinct horse and peccary. However, the majority of data from sites basically reflect Indian adaptation to the extinction of New World megafauna.

Archaic Period (7500 B.C. – 750 B.C.)

Florida archaeologists recognize three temporal divisions for the Florida Archaic: early, middle, and late. Although these divisions have traditionally been based on changes in projectile points and pottery types, new environmental and climatic data and increased knowledge of artifact assemblages and site types are now also used for dividing the Archaic (Milanich, 1994).

Early Archaic (7500 B.C. to 5000 B.C.)

To date, only a few sites are known in southern Florida that contain Early Archaic components. Other southern Florida sites from this time period may as yet be unidentified. If such sites are found they would be expected to be ancient cenotes or sinkholes which served as ponds or waterholes in the past (Milanich, 1994).

Middle Archaic (5000 B.C. to 3000 B.C.)

During the Middle Archaic more and larger areas of surface water were present in southern Florida. However, most known habitation sites are again located around ancient hydric sinkholes or around similar features, which would have been good sources of water in the past. One extremely interesting culture trait that seems to be peculiar to the Early and Middle Archaic of southern Florida is the mortuary pond. Preservation of organic materials from these pond burials is excellent because of the anaerobic condition of the ponds and the mucky soils that underlie them. Middle Archaic village middens are or were once located on the edges of these mortuary ponds.

Late Archaic (3000 B.C. to 750 B.C.)

By 3000 B.C., the climate and environments of Florida had reached essentially modern conditions. This allowed for a regionalization of cultures as individual societies throughout Florida developed adaptations specific to their local environments (Milanich, 1994). During the Late Archaic, the first pottery was produced by the aborigines of Florida. The development of ceramics is important as it suggests that the peoples of this time had adopted a more sedentary lifestyle.

In southern Florida, two separate Late Archaic cultures can be identified archaeologically: the Orange culture and, for lack of a better term, the Glades Archaic culture. The Orange culture is known primarily from northeast Florida, including both the Atlantic coast and the St. Johns River drainage. The Orange peoples made a distinctive fiber tempered pottery. Site types are generally oyster and coquina shell middens along the coast and freshwater pond snail middens along the inland river sand stream. Some coastal shell rings have also been observed (Newman and Weisman, 1992). The Joseph Reed Mound (8MT13) on Jupiter Island may represent the remains of one of these Orange settlements. Although the Reed Mound has been damaged by storm surges, it was once probably a shell ring made up mostly of oyster shell. In this respect it seems quite similar to other Orange period shell rings located farther north (Newman and Weisman 1992).

The other Late Archaic culture, referred to as the “Glades Archaic,” also was present in southern Florida and probably had only limited ties to the Orange culture. The presence of this culture is suggested by numerous non-ceramic bone middens now recognized as being present on almost all interior tree island or former tree islands and marshes or former marshes in southern Florida. Faunal remains from these sites are all dominated by freshwater species, such as turtle, fish and pond apple snail, which could have been easily obtained from the marshes that once surrounded most of these sites.

The fact that these sites are non-ceramic suggests that they represent short-term hunting camps occupied temporarily by coastal inhabitants, or that they date to earlier mid-Archaic times. The extreme densities of some of these sites argue against tree islands as communities date back no farther than 5000 B.P., or 3000 B.C. (Kremer and Spackman, 1981).

The Glades Archaic is postulated as being a culture that was well adapted to life within that newly formed interior wetland of the Late Archaic. This adaptation was so complete that Glades Archaic peoples were able to remain relatively unchanged for over 2000 years.

b. East Okeechobee Period (Ca. 750 B.C. to 1750)

The recent research conducted by Florida Atlantic University makes it clear that previous chronology is not useful for the East Okeechobee Area. Therefore, a new chronology, specific to this area, is proposed. It must be noted, though, that the only radiocarbon dates recorded in the area have come from Jupiter Inlet I (8PB34) and the following chronology is based mainly on sites in the Jupiter area. Thus, the chronology will be most successfully applied to sites found along the Loxahatchee River.

The *East Okeechobee I period* (750 B.C. – ca. A.D. 800) is characterized by the use of undecorated sand-tempered pottery from the numerous sites recently identified along the upper Loxahatchee River (Kennedy et al., 1991; Kennedy, Jester, Pepe, Sinks and Wernecke 1994; Kennedy, Jester, Pepe, Sinks, Wernecke and Flaherty 1994; Carr, et al., 1995), and in basal levels of Jupiter Inlet I (8PB 34) (Kennedy et al., 1993). Other types of pottery are absent or make up only trace amounts of total assemblages from this period. It is important to note that the transition results from the Glades Archaic rather than from the Orange culture.

As with the Glades Archaic, sites seem to be concentrated in the interior wetlands rather than on the coast. However, the upper Loxahatchee River sites seem to demonstrate that, unlike the earlier Glades Archaic, East Okeechobee I sites may be found along the upper reaches of river and streams in the area. These sites probably represent camps that were occupied seasonally and not located in exactly the same place every year. This would explain the extended length and unevenly distributed middens of most of the upper Loxahatchee sites. Coastal sites such as Jupiter Inlet I were probably occupied seasonally as well during this time.

The *East Okeechobee II period* (800 A.D. – 1000 A.D.) This relatively short period is marked by the appearance of St. Johns Plain ceramics as documented at Jupiter Inlet I (8PB43) and Suni Sands (8PB7718). The noticeable lack of St. Johns ceramics (a soft “chalky” plain or sometimes incised ware) in the interior sites testifies to a change in settlement patterns for the East Okeechobee II. It appears that permanent settlements in this period were concentrated along the coast for the first time (excepting earlier Orange settlements).

Perhaps from about A.D. 950 to A.D. 1200, Jupiter Inlet I (8PB34) provides the radiocarbon date for the beginning of the next period, *East Okeechobee III*. The marker type for this period, St. Johns Check Stamped, makes its first appearance at about A.D. 1000. No date on the first appearance of this type has been obtained from the Spanish River Complex, but it may very well appear somewhat later, perhaps at around A.D. 1200, as it does in the rest of southern Florida. In all parts of the East Okeechobee Area though, this period is marked by a substantial increase in the St. Johns ceramic series, until St. Johns Plain and St. Johns Check-Stamped eventually become the dominant types. This can be seen at the Riviera Site (8PB30) (Wheeler, 1992). Before the St. Johns series becomes dominant in the Boca Raton area though, the increase in Sand-tempered Plain and decrease in Belle Glade Plain continues, so that, for a while at least, both the amounts of Sand-tempered Plain and the St. Johns wares are increasing simultaneously. This period ends with the appearance of European goods. A tentative date in line with other areas in southern Florida for sustained European contact is A.D. 1500.

Therefore, the next period, *East Okeechobee IV*, is marked by essentially the same ceramics as the previous period except that this period has the addition of European goods. The St. Johns series is dominant and the Riviera Site (8PB30) suggests that St. Johns Check-Stamped may actually be the most dominant ware. The tribe encountered in the East Okeechobee Area by Europeans at this time was called the Jeaga. It is possible that the Jeaga were under the political dominance of the Calusa, and tribe centered on the southwestern coast of Florida (Fontaneda in True, 1945). However, the large amounts of St. Johns pottery and other artifacts from the Indian River and St. Johns Areas in the East Okeechobee Area during this time suggest dominance by these northern areas instead.

It has been estimated that there were about 20,000 Indians in south Florida when the Spanish arrived (Milanich and Fairbanks, 1980). By 1763, when the English gained control of Florida, that population had been reduced to several hundred. These last survivors were reported to have migrated to Cuba with the Spanish (Romans, 1962), however, it is likely that the so-called “Spanish Indians” (Sturtevant, 1953), who raided Indian Key in 1840, were the mixed-blood descendants of the Calusa and/or refugees from north Florida missions raided by the English in the early eighteenth century. The Spanish-Indians joined

the Seminoles, who had fled en masse into south Florida in 1838 after the Battle of Okeechobee, although some Creek groups apparently had migrated to south Florida earlier in the century.

c. Historic Period (1750 A.D. – 1900 A.D.)

It is believed Ponce de Leon sailed into the Jupiter Inlet in 1513, planted a cross at a fork in the river and declared it the Rio de la Cruz. Thus began the European Contact Period in Jupiter. Spanish contact with the local Jobe tribe occurred primarily due to shipwrecks and strandings. The *San Miguel Archangel* wrecked off the inlet in 1659, and upon discovery in 1987, 11 cannon from the ship were temporarily stored in the water under the Coast Guard dock. Later accounts of Jonathan Dickinson's capture in 1696 by the Jobe Indians on Jupiter Island provide remarkable, though culturally biased, information. The DeBraham's map of 1763 (the year the last 200 original Native Americans were transported to Cuba by the Spanish) indicates an English settlement or plantation (known as Grenville) may have been located at the site. The archaeology done at the lighthouse during restoration in 2000 unearthed English artifacts dating to that period. The recent recovery of British Period artifacts from the inlet by treasure salvors may also corroborate this brief era.

Numerous Seminole sites have been documented along the Loxahatchee River, including locations of two Second Seminole War battlefields and Fort Jupiter. Delays in the construction of the Lighthouse in the late 1850s are attributed to the proximity of Seminoles. Present day Seminoles from the Brighton Reservation relate stories of their ancestors removing bricks from the lighthouse construction site during times when the workers left to avoid them, as well as the sickness-bearing mosquitoes. Early Lighthouse keepers told of regular friendly interactions with local Seminoles and photos taken of Seminoles at the site in the late 1880s attest to their visits.



Figure 18. Jupiter Lighthouse Station showing 1860 original keeper's house (far left), the 1883 house built for Head Keeper and Weather Bureau building circa 1910.

The U.S. Light House Service operated the Jupiter Light Station from 1860 until 1939, when the USLHS became the responsibility of the U.S.C.G. By 1883, the Light Station consisted of the Lighthouse, Oil House, two Keeper's Houses and associated buildings, and a dock. In 1887, the U.S. Signal Corps added a wireless telegraph station and one of the first U.S. Weather Bureau stations in Florida, which later moved to Miami to become part of the National Weather Service (NOAA.) In 1905, the U.S. Navy created a cutting-edge wireless radio station, another technological first. In 1907 a windmill and dock were added. By 1938 the Navy had acquired additional acreage and began building a top-secret base, known as Station J, which was operated by 95 Navy personnel and guarded by Marines throughout WWII. During the Cold War in the 1950s, the U.S. Air Force utilized the property for missile tracking. The U.S. Coast Guard has maintained a presence at the site since 1939.

What follows is the successful 1973 Jupiter Inlet Lighthouse nomination to the National Register of Historic Places, recounting the early history of the Lighthouse.

The earliest documentary evidence of Seminole settlement in South Florida is an account by John Lee Williams (1837) describing Snake Warrior's Island at the headwaters of Snake Creek. This site was recently identified as probably being site 8BD1867 in Miramar in southern Broward County.

Seminole Archaeology is a relatively new focus in South Florida archaeology, but recent work has contributed new data. Numerous Seminole sites have been documented along the Loxahatchee River as well as several U.S. military sites associated with the Seminole Wars including Fort Jupiter and the Loxahatchee Battlefield (Carr *et al.*, 2003).

Jupiter Inlet was an important locus of human settlement throughout the Historic Period. The DeBrahams map of 1763 indicates that an English settlement or plantation may have been located at or near the Inlet.

In the Annual Report of the Lighthouse Board dated January 30, 1852, a recommendation was made for the construction of "a first-order lens light, with an elevation of 150 feet, near Jupiter Inlet, Florida." A first class light for "the vicinity of Jupiter Inlet, Florida," was authorized by Congress on March 3, 1853, "to serve as a seacoast light and also to guard mariners in approaching the dangerous shoal lying off that point." The sum of \$35,000 was appropriated for "preliminary steps ordered to be taken in regard to obtaining title to the proper site, plans to be prepared, etc." Difficulties in constructing the lighthouse were anticipated from the outset, for the authorization stated that "this point being inaccessible for all useful purposes by land and difficult to be reached by sea for want of harbors in its vicinity, some delay may ensue in making the proper site and obtaining title to it. The act of Congress ceding swamplands to this and other states, "without making reservations for light-house purposes, renders this duty complicated and causes delays."

The tract selected in 1853 after an examination of the coast in the Jupiter Inlet area was part of the Fort Jupiter reservation established during the Seminole War period; the Lighthouse Board officially recommended the use of this site. Plans and estimates for the lighthouse were submitted for approval in 1854 or early 1855. The chief of administrative affairs for the Seventh Lighthouse District, which until 1890 included the Jupiter Inlet Light (transferred to the Sixth District in that year), was George G. Meade, then a lieutenant in the Bureau of Topographical Engineers and later a noted Civil War general. According to National Archives documents, the design for the lighthouse was submitted to the Lighthouse Board by Meade but was drawn and designed under Meade's instruction by John W. Nystrem. Construction arrangements until May 31, 1856, the date when Meade's appointment as chief administrator for that district ended, were supervised by Meade. This does not mean that he was constantly in attendance on the site, however; his duties included administering two lighthouse districts

(the Seventh and the Fourth) and his office was in Philadelphia. Whether or not Meade actually visited the site while the Jupiter Inlet Lighthouse was under construction is not documented.

61.5 acres of the reservation were reserved by the Executive Order of President Franklin Pierce signed October 22, 1854. (In 1925, a topographical survey indicated that the lighthouse reservation had not been properly located; the new area of the reservation was fixed by Executive Order on June 12, 1925, at 121.95 acres.) All was in readiness for construction to begin, but it would be almost six years before the Jupiter Inlet Lighthouse was ready for operation.

The major reason for this delay was the fact that Jupiter Inlet sanded shut in 1854, forcing the use of an alternative route for transporting building materials to the site. The pattern of opening and closing of the entrance to the intercoastal waterway areas by drifting sand had often been repeated over the years. The Inlet was open briefly in 1853, but soon reclosed. In 1855, the commander of Fort Jupiter, a Major Haskins, made an unsuccessful effort to open it; however, in the next year Captain Capron of the same installation did open the inlet. For roughly a decade it remained open, but in the period between 1853 and 1856, the problem of access to the lighthouse site was a difficult one.

In spite of the inconveniences presented by the situation, construction of the lighthouse progressed. Supplies had to be sent down the Indian River and Jupiter Narrows, a procedure which involved some overland carriage and lightering of around five hundred tons of construction materials. The expenses mounted and in 1856, Congress appropriated another sum (\$19,522.90) for purposes of “continuing and completing the Jupiter light.”

Congressional records indicate that little of this new sum was expended in 1857 and 1856; the major expenditures did not come until 1859. The cause of this gap in progress was the hostilities accompanying the Third Seminole War. The Annual Reports of the Lighthouse Board of those years refer to Indian troubles in 1856 and 1857 which continued into the winter working season of 1858. The 1857 Report anticipated that work would begin at the end of 1858 and be completed by 1859; this was not the case. In 1859 work had to be halted because of problems of heat, moisture, and insect molestation. However, the work was completed during the 1859 – 60 working season as was predicted in the 1859 Annual Report. Before the work was finished, more money for the project had to be found; funds totaling \$6,336.08 were transferred from balances remaining from appropriations made for other lighthouses. The combined expenditure for the Jupiter Inlet Lighthouse from 1854-1859 amounted to \$60,858.98.

The Jupiter Inlet Lighthouse was first placed in operation on July 10, 1860. The events of the Civil War in the area precipitated an action on the part of civilians in the area in 1861. The coast of Florida was patrolled by ships of the U.S. Navy whose duty was to blockade the coast and prevent supply ships from reaching Confederate shores. The Jupiter Inlet, which was open at the time, was a useful point of entry for blockade runners. In order to make it more difficult for the U.S. Naval force to apprehend the Confederate supply ships, a group of men from the Jupiter Inlet area, in August 1861, rendered the Jupiter Lighthouse inoperable by removing and carrying away the lighting apparatus so that the light could not be used to aid U.S. Naval pilots on the coast of Florida. The Lighthouse Board Report of that year reported that “lawless persons visited the Jupiter Inlet Lighthouse on the coast of Florida and removed there-from the illuminating apparatus.”

The Jupiter Inlet Lighthouse has continued to function since 1866 with its routine activities enlivened by occasionally at sea. A Life Saving Station was established there in 1886, after which rescue activities occurred in the area as would be typical for any coastal lookout and rescue unit. Shipwrecks occurred in the area before and after the Life Saving Station was put into service. During World War II, enemy

activities off the Atlantic coast of the U.S. resulted in a submarine alert in which the Jupiter Inlet Lighthouse was involved; American vessels were torpedoed off nearby Hobe Sound in 1942.

The decision to establish a lighthouse at Jupiter Inlet Sound in the 1850's was made as part of a general plan for lighting the Florida reef on the east coast as an aid to commerce and transportation. The determined effort to complete the lighthouse at great cost of effort and money indicates that it was thought to be essential to the protection of naval commerce and transportation in that area. The difficulties which beset the construction of the lighthouse, with the exception of the Indian hostilities which ceased to be a major problem after the Third Seminole War, are illustrative of the kinds of problems continually faced in the development of the south Florida area.

Since so much of the activity in Florida during the Civil War centered on the question of naval control of access by water to Florida, the local civilian action at Jupiter Inlet Lighthouse indicated the degree to which this was a concern to the residents of Florida. The later activities at the lighthouse typify the value of a coastal station to transportation and commerce. All of the points illustrate the significance of the Jupiter Inlet Lighthouse.



Figure 19. Looking up stairs to Jupiter Inlet Lighthouse and oil house.

4. Recreation

Outside of the organized sports associated with Jupiter Lighthouse Park, public recreation facilities are primarily associated with the Loxahatchee River Historical Society's interpretive facilities and docent guided tours. Public visitation to the lighthouse is permitted only as part of a LRHS guided tour. From October 2008 through September 2009, the LRHS provided tours, programs, etc, for 64,150 visitors, which included national and international visitors. During the same fiscal year, docents and other volunteers donated 7,880 volunteer hours in support of this organization's public outreach, education, facility maintenance, and protection mission. LRHS has installed new interior interpretive exhibits which are expected to increase the quality of the visitor's experience and appreciation of the rich history of the ONA. There is a need to extend the visitor's experience along the corridor leading to the lighthouse, incorporate other historic features and include natural history as part of the interpretive message to the public.

There have been increases in public use behind the Station J historic building which houses the LRHS museum. The Town of Jupiter has adopted Palm Beach County's Parks and Recreation Ordinance for its parks. These ordinances apply to the area behind Station J, a midden listed on the Florida Master Site File, although there is need for posting and enforcement to protect historical and archaeological resources from damage resulting from trampling, digging, boat mooring and unauthorized fires. Unguarded swimming poses public safety issues due to the swift current in the inlet and boat traffic.

The other primary recreational use within the ONA is the unauthorized public use along the Indian River Lagoon, discussed under Management issues. This use has occurred for decades, but has contributed to erosion along the bank as people climb the bank and excavate sand caves. Rope swings placed on Australian pine eventually dislodge trees at the top of the sand bank. This bank has lost over 100 feet in places within the last 50 years. The adjacent Indian River Lagoon is well known for its high water quality during incoming tides and provides excellent snorkeling and swimming opportunities, but very swift currents and high boat traffic are issues for public safety. The adjacent waterway is a No Wake zone south of Cato Bridge.

There is some use by walkers, bird watchers and for geocaching (there were two geocache locations listed on the national web site as of February 20, 2009) within the scrub and hardwood hammock areas of the ONA. These uses tend to be casual and most visitors utilize the existing management road network north of County Road 707 to access the site. Use of the natural areas are expected to increase due to increased media attention and as more people become aware of the ONA status. There is some kayaking in the tidal lagoon.



Figure 20. Visitors returning from guided lighthouse tour.

5. Visual Resources

The ONA is rated as a Visual Resource Management (VRM) Class III zone. The objectives for this zone are to partially retain the characteristics of the natural landscape. Actions can be noticeable but should not dominate the view of a casual observer. The VRM class applies to BLM actions on the public domain lands within the ONA, which includes lots 15, 17, and 19. The class is based on the characteristics of the form, texture, and color present in the landscape, the scarcity of those characteristics in the region, and the amount and nature of manmade change to the natural landscape, as seen from the most commonly visited locations on the site or in the surrounding area. For the ONA, these observation points are traveling north or south on US 1, where the property is visible for about 0.25 miles, and east and west on County Road 707 for approximately 0.4 miles, on the several public access points across the Indian River, and from recreational boats on the Indian and Loxahatchee Rivers for about .7 miles total, and from the top of the lighthouse itself. From the observation points, the scrub habitat is the most prominent, appearing as fairly long stretches of green 3-6 feet tall along the roadsides, with small areas of pines 10-30 feet tall. Along the waterways, the dense mangrove stands present a wall of green to recreation boaters. Depending on tides their interesting buttress roots are occasionally visible. Iconic views of the lighthouse are from the public access points along the Loxahatchee and Indian Rivers looking north. A common theme from all the observation points is that the site represents an oasis of green vegetation and white sands which provides a variety and relief from a boat or vehicle trip through dense but tidy commercial and residential neighborhoods along the coast of Palm Beach County. Over the years the non-native Australian pines near the lighthouse in Lot 17 have reached a height where they are beginning to compete vertically with the dominance of the lighthouse over the site.



Figure 21. Looking northeast across the Loxahatchee River.

E. Current Management Strategies

1. Weed Management

The Jupiter Inlet Lighthouse ONA is managed as a Cooperative Weed Management Area to facilitate collaborative efforts between agencies across administrative boundaries to control non-native, invasive plants; this includes Jupiter Lighthouse Park and the U.S. Coast Guard properties. The weed program within the ONA uses an integrated pest management program to restore native plant communities, including mechanical and hand removal, prescribed burning, the targeted application of approved herbicides, and native plantings. On BLM administered land, weed control is conducted under a Pesticide Use Proposal, which addresses the specific herbicides and adjuvants to be used and the application methods and timing related to the use of those materials. These Pesticide Use Proposals are prepared every three years and require agency review and approval. Weed work conducted by BLM or with BLM funding incorporates appropriate best management practices and guidelines from the BLM Vegetation Treatments Using Herbicides Programmatic Environmental Impact Statement (November 2005,) and subsequent updates.

2. Prescribed Burn Program

The prescribed burns at Jupiter Inlet have been conducted under a prescribed burn plan developed as part of the initial management plan in 1996. That burn plan was developed to restore a more natural fire regime to the fire dependent scrub communities at Jupiter Inlet where fire had been excluded for at least 60 years. The prescribed burn objectives were to improve wildlife habitat, and reduce hazardous fuel loads. To accomplish those objectives, the scrub areas north of County Road 707 were divided into seven blocks (5.8 to 1.5 acres) to be burned incrementally over eighteen years. An additional two blocks were identified south of County Road 707 where only mechanical manipulation would be used. To date three burns have been completed totaling 17.3 acres or 34 percent of the 51 acres of the intact scrub acreage within the ONA. The 2004 hurricanes drastically altered the sand pine stand at Jupiter Inlet killing most of the mature sand pine and substantially modifying the fuel loads within the ONA. An updated burn plan is needed to address the current resource objectives.

3. Research

There is a biological research permit system in place for the ONA. Appropriate state and federal permits are required to work on listed species, and projects are coordinated with U.S. Fish and Wildlife Service and the State, if there is a potential to affect listed species or their habitat.

The Bureau of Land Management issues Cultural Resource Use Permits in order to authorize cultural resources studies or research, for compliance with the National Historic Preservation Act, as amended, and for compliance with the Archeological Resources Protection Act (ARPA), and to authorize paleontological research. When specific projects are proposed, applicants who already possess a Cultural Resource Use Permit must also obtain a Field Use Authorization. When a proposed project involves ground disturbing work at an archeological site the project must be reviewed by the State Historic Preservation Office before work begins.

F. Existing Facilities and Easements

1. Facilities

a. Fencing

Fencing has been installed along the perimeter of the area north of County Road 707, security fencing around the Coast Guard managed areas and along the eastern border of the soccer fields.

North of County Road 707 the perimeter of ONA is delineated with a two rail, three-foot high split-rail fence (totaling 3,898'). Behind the residences on the northern boundary 1,096' of the split-rail fence has been backed with 4-inch square hog wire. A total of 284' of 6' green chain link fence has been placed behind commercial property in the northwestern corner of the property. There is a 15' long steel swing gate on the northern access road off County Road 707. These facilities were installed in 1997 and continue, with occasional maintenance, to be serviceable.

There is a 4x4 fence along the eastern boundary of Lighthouse Park ball fields. This fence has worked well to visually separate the ball fields from the natural area to the east, but it does not exclude stray balls or trash. The fence also does not exclude public access to adjacent areas supporting perforate lichen (*Cladonia perforata*), federally listed as endangered, a ground lichen which is difficult for a lay person to identify and highly susceptible to trampling.

The Coast Guard managed properties are surrounded by a chain link fence with gates off County Road 707, the post exchange and adjacent to the Loxahatchee River Historical Society/Museum. The communication site north of County Road 707 is also fenced in chain link, portions of which are in need of maintenance.

b. Trails

Outside of the paved path to the Jupiter Inlet Lighthouse, there are no developed or designated trails within the ONA. North of County Road 707 the management roads, which also serve as fire breaks for the prescribed burn program, provide access through the area. These fire breaks/management roads provide no interpretation or directional signage for the visiting public.

c. Parking

Public parking within the ONA is currently available only at Lighthouse Park and in front of the Loxahatchee River Historical Society/Museum (Station J Building). There are approximately 50 parking spaces available at the entrance to Lighthouse Park, another 100 in front of the Loxahatchee River Historical Society/Museum (Station J Building) and 113 combined along the soccer fields. This parking capacity is generally exceeded on Saturdays during soccer season.

There is no parking available for the portion of the ONA north of County Road 707 and visitors must either leave their car at Lighthouse Park and cross County Road 707 (no designated crosswalk) or park outside the gate off County Road 707. There is considerable traffic traveling from both directions of County Road 707 to Jupiter Island and visibility is obscured by a slope rising to the east creating a potential hazard for the public entering and leaving this undesignated parking area.

d. Roads

The only public road in the ONA is Captain Armour Way; a paved county maintained road providing access to Jupiter Lighthouse Park and the Loxahatchee River Historical Society/Museum. The other roads include a loop road into the U.S. Coast Guard housing and Post Exchange, and an asphalt road to the U.S. Coast Guard communication site on the north side which branches inside of the compound. The sand management roads on the north side are open for agency use only.

c. Station J

This historic WWII vintage building originally served as married officer's housing. The building was included in lands patented to the Town of Jupiter in 2004. Restored in 2006 after heavy damage by the 2004 hurricanes, the building now houses the Loxahatchee River Historical Society Museum, gift shop, and Jupiter Lighthouse tour office on the first floor, and administrative offices upstairs. The LRHS leases the space from the Town of Jupiter.

d. Jupiter Inlet Lighthouse

Still an active aid to navigation, this iconic lighthouse is on withdrawn public domain land managed by the U.S. Coast Guard. The Loxahatchee River Historical Society has a lease agreement with the U.S. Coast Guard to maintain the lighthouse tower, oil house and associated property. The lighthouse underwent an extensive restoration from 1999-2000. The Jupiter Inlet Lighthouse houses a First Order Fresnel lens, one of only 13 still in operation in the country. The Jupiter Inlet Lighthouse and associated oil house were placed on the National Register of Historic Places in 1973

e. Coast Guard housing

There are eleven U.S. Coast Guard houses, plus outbuildings, in Lot 18 east of Jupiter Lighthouse Park ball fields. This housing is used by families of active service members serving at Station Lake Worth Inlet.

f. Lighthouse Park

This 17.8 acre park provides ball fields, tennis courts, a shelter, parking, and restrooms.

g. Communication Site

This 4.89 acre tract (Lot 16) is in the center of the property north of County Road 707. The tract is public domain withdrawn for use by the U.S. Coast Guard as a remote unmanned high frequency radio communication site which services U.S. Coast Guard installations in Miami and Key West.

h. ONA Signs

The Jupiter Inlet Natural Area sign off County Road 707 is obsolete and should be replaced as part of the coordinated signing program for the new ONA.

2. Easements

The following right-of-ways have been recorded within the ONA

Easement deed dated October 11, 1955, filed December 8, 1955, and recorded in Deed Book 1117 at page 156, an easement to the State of Florida for the use and benefit of the State Road Department for

the purposes of relocating, widening, constructing and maintaining a portion of State Road 5 (U.S. Highway 1).

Easement deed dated January 31, 1958, filed on March 18, 1958, and recorded in Official Record Book 169, page 585, an easement to the State of Florida for the purpose of relocating, widening, constructing and maintaining a portion of State Road 5 (U.S. Highway 1).

Easement deed dated October 19, 1967, filed on November 9, 1967, and recorded in Official Record Book 1614, page 131, to DiVosta Construction Company, an easement for a six inch sanitary sewage force main from the island portion of the Village of Tequesta, Florida to the sewage main along U.S. Highway 1. (Assigned to the Loxahatchee River Environmental Control District on July 16, 1980)

Easement deed dated December 19, 1967, filed January 16, 1968, and recorded in the Official Record Book 1634, page 529, an easement to the State of Florida for the purpose of relocating, widening, constructing, and maintaining a portion of State Road 707.

Easement deed dated March 16, 1979, and recorded December 4, 1979 and recorded in the Official Record Book 3187, page 215, to the State of Florida for the purpose of widening, construction and maintenance of State Road ALT A-1-A.

G. Adjacent Land Uses

The ONA is located in an urban setting and straddles the border between the Town of Jupiter and the Village of Tequesta. The eastern shoreline south of County Road 707 is within the municipal limits of the Jupiter Inlet Colony. U.S. Highway 1 is on the western border and the area west of U.S. Highway 1 is zoned commercial with retail, restaurants and office buildings. The northwest corner is also bordered by commercial property. The residential community of Coconut Cove borders the ONA on the northern boundary. County Road 707, which bisects the ONA, provides the major access to the Jupiter Inlet Colony and the southern reaches of Jupiter Island across Cato Bridge, a manned drawbridge. The ONA is bordered on the south and east by the Indian River Lagoon and the Loxahatchee River. Dubois County Park is located across the inlet to the southeast and commercial properties, primarily restaurants, are located immediately to the south across the Loxahatchee River.

H. Socio-Economic Conditions

The Town of Jupiter has grown from a small village at the turn of the century where employment was focused on agricultural/fishing and tourism, to an incorporated township in the 1925, to a bedroom community in the post World War II era. Recent growth has been tremendous with the population expanding from 9,868 in the 1980 census to 44,087 in 2003 and is projected to be just over 50,000 in 2010. The incorporated area totals 23.53 sq. miles. Racial demographics in the Town of Jupiter in 2000 were Caucasian (94.9%), Hispanic (7.3%), Other (2.5%), African American (1.2%), Asian (1.1%), and American Indian (.02%). The median age is 42.4, with almost 19% being over the age of 65. Over 34% of the population has a bachelor's degree or higher.

The Village of Tequesta was incorporated in 1957 and occupies 2.28 square miles. The population as of April 1, 2008 was 5,898, according to the University of Florida's Bureau of Economic and Business Research. The Village is over 95% developed and does not anticipate significant population growth. Tequesta is a bedroom community with 38% residential housing and 38% residential canals, water bodies, recreation and open space. Route U.S. Highway 1 is a commercial corridor that runs through it, connecting the Town of Jupiter to the south and Martin County to the north. The corridor supports

almost all of Tequesta's 5% commercial uses, along with Cypress Drive South and the Village Center. Racial demographics in the Village of Tequesta in 2000 were 97.97% Caucasian (95.8% were Non-Hispanic White,) 0.47% African American, 0.09% Native American, 0.70% Asian, 0.02% Pacific Islander, 0.13% from other races, and 0.61% from two or more races. Hispanic or Latino of any race were 2.43% of the population. The median age is 47.5, with almost 27% being over the age of 65. Over 36% of the population has a bachelor's degree or higher.

The Jupiter Inlet Colony was incorporated in 1959 and occupies 140 acres, or 0.2 acres. The Colony is solely residential and is essentially built out. The population is less than 400. According to the 2000 census 99.7% of the population was Caucasian. The median age was 60.5 years. Over 56% of the population has a bachelor's degree or higher.

I. Nearby Destinations

Northern Palm Beach County has a wide variety of managed natural areas and parks. Many of these are included in the Northeast Everglades Natural Area system. Palm Beach County hosts NENA as a forum for land managers to coordinate issues of cross-boundary access, complementary facilities, visitor registration, signage and protection of historic landscapes.

The following are examples of sites within five miles of the ONA.

- Jupiter Ridge Natural Area is managed by Palm Beach County Department of Environmental Resources Management as part of its Natural Areas Preserve System. The 271-acre site is primarily scrub and depression marsh, and has a parking area, bike racks, interpretive kiosk, 2.5 miles of trails and boardwalks, and an overlook.
- Juno Dunes Natural Area is managed by Palm Beach County Department of Environmental Resources Management as part of its Natural Areas Preserve System. The 576-acre site is split between a western scrub dominated site and a 42-acre oceanfront section that includes a maritime hardwood hammock. The preserve offers an accessible nature trail, bike rack, interpretive kiosk, overlook and hiking trails. This site will soon provide boater access day dockage with an observation tower and picnic tables.
- Delaware Scrub Natural Area, totaling 15.8 acres, was a collaborative purchase by the Town of Jupiter and Palm Beach County completed in 2005. The site is managed by Palm Beach County Department of Environmental Quality as part of its Natural Areas Preserve System. The site contains upland scrub and scrubby flatwoods habitats, and one of the county's few cypress swamps. There are no public use facilities yet at this site.
- Limestone Creek Natural Area is owned and managed by Palm Beach County Department of Environmental Resources Management. It is currently comprised of 22.8 acres of county owned lands north of the C-18 canal, and a long-term management lease over an additional 30 acres of the C-18 Canal right-of-way by way of a linear park permit from South Florida Water Management District is in place. The site contains four native ecosystems: mesic flatwoods, scrubby flatwoods, hydric hammock, and tidal swamp.
- The Nature Conservancy manages the 73-acre Blowing Rocks Preserve on nearby Jupiter Island. The site spans this barrier island and includes the Atlantic Ocean's largest formation of Anastasia limestone formation with exposed rock consists of coquina shells, other seashells and sand for which it

was named. It also includes mangrove shoreline along the Indian River Lagoon. Facilities include an interpretive center, trail, and wetland boardwalks.

- Dubois Park is located south of Jupiter Inlet and is managed by Palm Beach County Parks. The 18.69- acre park includes guarded swimming areas, saltwater fishing, and picnicking. A sheltered snorkeling area has been proposed and day slips for boaters are being added.
- Riverbend Park is a regional park located west of Interstate Highway 95. It encompasses 680 acres with five miles of waterways, 15 miles of trails and access roads, bicycle rental, canoe and kayak rental and ride-to-only equestrian access.
- The Loxahatchee River District's River Center has a combination of static displays, interactive exhibits, live tanks which trace the Loxahatchee River system from a freshwater cypress swamp to seagrass-dominated estuary to marine ecosystems. The center provides an opportunity for school children, adults, visitors, and long-time residents an opportunity to learn about Florida's first federally designated Wild and Scenic River.
- Jonathan Dickinson State Park covers 11,500 acres in southeastern Martin County. The park supports 13 natural communities, including sand pine scrub, pine flatwoods, mangroves, and river swamps. The Loxahatchee River, Florida's first federally designated Wild and Scenic River, runs through the park. Ranger-guided tours of the 1930s pioneer homestead of Trapper Nelson are available year-round. The park provides off-road biking, equestrian, and hiking trails, and boating, canoeing, and kayaking along the river. Anglers can fish along the riverbank or from a boat. The Elsa Kimbell Environmental Education and Research Center provides interpretive exhibits. The park also offers two full-facility campgrounds and a youth/group primitive campground.

Part II. Management Guidelines

A. Mission Statement

The following language, excerpted from the Act, establishes the overall mission for the Jupiter Inlet Lighthouse Outstanding Natural Area.

“The Secretary, in consultation with the Local Partners and the Commandant, shall manage the Outstanding Natural Area as part of the National Landscape Conservation System in a manner that conserves, protects, and enhances the unique and nationally important historical, natural, cultural, scientific, educational, scenic, and recreational values of the Outstanding Natural Area, including an emphasis on the restoration of native ecological systems.”

B. Purpose and Need

The Act requires that the Secretary of the Interior develop a management plan for the Jupiter Inlet Lighthouse ONA within three years and that the plan be developed in consultation with appropriate Federal, State, county, and local government agencies, the U.S. Coast Guard Commandant, the Local Partners, and other partners; and in a manner that ensures full public participation.

The following is a summary of those items in the Act which provide specific guidance on management of the ONA and requirements related to this planning effort. For the complete text of the Act see Appendix A.

The Federal land and any interests in the Federal land included in the ONA are withdrawn from all forms of entry, appropriation, or disposal under the public land laws; location, entry, and patent under the mining laws; and operation of the mineral leasing and geothermal leasing laws and the mineral materials laws.

The management plan shall include objectives and provisions to ensure the protection and conservation of the resource values of the Outstanding Natural Area, including;

Restoration of native plant communities and estuaries in the ONA, with an emphasis on the conservation and enhancement of healthy, functioning ecological systems in perpetuity;

Objectives and provisions to maintain or re-create historic structures;

An implementation plan for a program of interpretation and public education about the natural and cultural resources of the Lighthouse, the public land surrounding the Lighthouse, and associated structures;

A proposal for administrative and public facilities to be developed or improved that are compatible with achieving the resource objectives for the ONA and would accommodate visitors to the ONA;

Natural and cultural resource management strategies for the ONA, to be developed in consultation with appropriate departments of the State, the Local Partners, and the Commandant, with an emphasis on resource conservation in the Outstanding Natural Area and the interpretive, educational, and long-term scientific uses of the resources;

Recreational use strategies for the Outstanding Natural Area, to be prepared in consultation with the Local Partners, appropriate departments of the State, and the Coast Guard, with an emphasis on passive recreation.

C. Management Issues

There a number of issues that were considered in the development of this plan, including those raised during the public scoping process, by the ONA Partners, or that were indicated by past management experience at the site. The following provides background on these issues.

1. Public Access to Natural Areas

Providing for public access to the Outstanding Natural Area was a key issue raised during the public scoping meetings. During the time the site was administered by the U.S. Coast Guard, public access to most of the site was restricted. The community perception lingers that the natural areas of the ONA are not available for public use and it is reinforced by the lack of public access points, trails and sufficient signage. Over the last two years the media and community attention on the NLCS designation has generated a sense of public ownership and raised expectations within the communities that access points will be developed. The legislation language provides for passive recreational experiences. The issue is enhancing the public's access and experience on the site with facilities that are compatible with the maintenance and enhancement of the natural and cultural resources for which the area was designated, while meeting security needs of the U.S. Coast Guard residents and facilities.

2. Public Use of the Indian River Lagoon Bluff Area

There is a long history of public use, albeit unauthorized, along the Indian River Lagoon south of the County Road 707 Bridge. The sand bluffs and clear water provide a destination for boaters from across the county and beyond. The site has been popular for decades, in fact it was repeatedly described as a "right of passage" for local kids who installed and used rope swings from trees leaning over the bluff. It is also a popular anchoring spot for people using the shallow beach. Exacerbated by public use, dredging, storms and boat traffic these 20 foot bluffs have been substantially eroded losing over 100 feet of land in some areas along this shoreline over the last fifty years. The steep unstable slope currently poses a public safety hazard for persons climbing the bluff and for boaters anchored below. The U.S. Coast Guard, despite limited manpower and personnel, has repeatedly signed and patrolled the area; but without the availability of full-time enforcement or citation authority the problem has overwhelmed their capacity. The issue is how to support the Act's direction to provide for passive recreation while concurrently protecting the resources along the bluff, and reducing the public hazard.

Please note that this plan will only present conceptual alternatives to address this issue. The feasibility of these alternatives will be dependent on an in-depth engineering design being funded by the American Recovery and Reinvestment Act initiated in 2009. This study will develop the alternatives based on objectives outlined in this plan. These alternatives will be presented to the Jupiter Inlet Working Group and to the public for additional comment and coordination. The final design once approved by BLM in coordination with the ONA partners and successful completion of the permitting process will be amended to this plan.

3. Re-creating Historic Structures

The Act requires that this plan include objectives and provisions to maintain or re-create historic structures. The objectives will be established to guide future opportunities, including collaborative efforts between the partners to recreate historic buildings for use either by the U.S. Coast Guard, for interpretive purposes, or both.

4. Protecting Cultural Resources

The ONA is estimated to receive over 60,000 visitors per year. Providing for this level of visitation, and the expected increases, requires that an infrastructure be installed to protect the historic and prehistoric resources. One vulnerable area is immediately south of the Station J building where a prehistoric midden is exposed to regular foot traffic. The site was capped with additional sand, geofabric and sod in 1998, but the fabric has been exposed and lost in many areas with continuing public use. Another area is at the base of the lighthouse where visitors gravitate to the shade of the iconic council fig, which covers the site of the original lighthouse keeper's house. There is a need in this location to provide an area for groups waiting to climb the lighthouse, accommodating those who are unable to climb, while protecting the historic location and providing opportunities for interpretation.

Due to the sensitive security issues of past military installations at the Jupiter Inlet Lighthouse ONA, archaeological research has been minimal to date. This limited research has only scratched the surface of the cultural significance of the ONA and its eligibility for the National Register of Historic Places. There is the need for a full archaeological survey and evaluation to understand the extent of the substantial prehistoric occupation and use. This information would guide enhancement and educational projects, as well as contribute significantly to the limited understanding of southeast Florida's original Native Americans.

5. Prescribed Burn Program

Although fire is the preferred tool in maintaining the scrub habitat characteristics that are needed by most of the special status species occurring in the ONA, the site's urban location requires that prescribed burns be conducted only during a very narrow window of wind direction, wind speed, ambient humidity and fuel moisture levels. Mechanical manipulation of the vegetation, such as chopping or using other heavy equipment, while it does not produce all of the habitat benefits, can mimic some of the affects of prescribed fire without these restraints. The issue is how to balance the use of these methods and where they would be used to meet resource objectives.

6. Invasive Plant Control

All of the ONA partners have policies or laws that support control of invasive weeds in their areas of responsibility. The ONA has been managed in the past as a Cooperative Weed Management Area and collaboration across administrative boundaries has resulted in increased efficiencies. This plan will continue with this coordinated approach. The primary issue raised by the public regarding invasive species issues was the removal of woody invasives in Lot 17. The concern was that the removal of the woody structure would result in loss of wildlife habitat and visual resource impairment. The issue is what options are available to meet the resource objective of removing exotic woody vegetation within the ONA while mitigating these impacts.

7. Interpretive Program

The Loxahatchee River Historical Society is currently the primary nexus for the visiting public within the ONA. The Lighthouse Museum is housed in the Station J Building. Palm Beach County Department of Environmental Resources Management has interpretive programs being used in nearby natural areas with similar habitats, primarily through interpretive kiosks and brochures. There is a need to incorporate these existing programs into a cohesive interpretive program addressing the unique combination of cultural, historic and natural resource values of the Jupiter Inlet Lighthouse ONA.



Figure 22. Giant wild pine at Jupiter Inlet

Part III – Standard Management Practices

The following management practices are standard for all activities within the ONA.

A. Cultural and Historic Resources

1. Cultural resource surveys, analysis, and evaluation of historic properties will be completed prior to all surface disturbing activities and cultural resource monitoring will be employed during these activities. All work will be conducted to the professional archeological guidelines and standards for the Secretary of the Interior and the Florida Division of Historical Resources.
2. Consultation with the appropriate federally recognized Native American tribes will continue to be conducted, addressing any concerns regarding cultural and religious issues.

B. Prescribed Burns

1. All prescribed burning conducted on the Jupiter Inlet tract will comply with BLM Manual 9214 Prescribed Fire Management, Chapter 590, Florida Statutes for Forest Protection, Chapter 5I-2, Florida Administrative Code (FAC) for Rural Open Burning, and Chapter 17-256, FAC for Open Burning and Frost Protection Fires. Copies of the BLM regulations may be obtained by contacting the BLM. Copies of the referenced Florida Statutes administrative codes may be obtained by contacting the Florida Division of Forestry.
2. No prescribed burning will be conducted without an approved prescribed burn plan. A Go/NoGo checklist would be completed prior to ignition of the prescribed fire to ensure that all conditions and smoke management considerations specified in the prescribed burn plan have been met.
3. The Clean Air Act (as amended) requires compliance with Florida's Air Quality regulations. Compliance with Florida's state or local smoke management laws and regulations will require that close communication be maintained with air quality authorities prior to and during prescribed fire applications.
4. Prescribed burning will only be conducted when atmospheric conditions are favorable for rapid smoke dispersion (sufficient transport wind speed, direction and mixing height).
5. Prescribed burning will not be conducted if there is a temperature inversion that will prevent smoke dispersion. No burning will be conducted if there is a potential, identified by the Florida Division of Forestry, for smoke to be transported into populated areas.
6. The fire management plan will include coordination with adjacent municipalities on all aspects of the operational burn plans, as well as notification and coordination with adjacent landowners and businesses.
7. Burn sites may be hand or mechanically prepared, as needed, to reduce the standing live fuel loads and remove larger diameter fuels. Longer burning fuels will be suppressed following completion of the burn to reduce residual smoke problems. Special status species including four-petal pawpaw, gopher tortoise, and others vulnerable to disturbance will be flagged prior to mechanical treatments.
8. A thorough inventory of potential indigo snake refugia (i.e. stumps, debris piles, etc.) will be conducted prior to prescribed burns, briefing of the burn crew on identifying and protocol if seen, as well

as avoiding use of ring fires that could trap wildlife will help to reduce the potential to adversely affect this species.

C. Herbicide Use

1. The use of herbicides will be done in accordance with the standard operating procedures provided in the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement, Sept. 2007*.
2. Only chemicals approved by the Environmental Protection Agency (EPA) will be used. Of these, only chemicals approved for use on BLM-administered lands or approved by BLM for limited research purposes will be used.
3. Control of exotic (non-native) plants will be in conformance with the BLM's mandates in the Federal Land Policy and Management Act of 1976 (3 U.S.C. 1700 et seq.); and Management of Undesirable Plants on Federal Lands, 1990; and the Carlson-Foley Act of 1968 (P.L. 90-583), as well as the current BLM strategy plan "Partners Against Weeds, An Action Plan for the Bureau of Land Management."
4. Herbicide application will be by hand and backpack sprayers only.
5. Effective nonchemical methods of vegetation control will be applied where feasible, including hand pulling, girdling, prescribed fire and mulching.
6. Chemicals may be used where benefits will meet or exceed those of other control methods. The application of chemicals shall meet BLM and EPA label requirements.
7. A pre-treatment survey will be conducted to identify target plant species, as well as associated plant species, and proximity to sensitive resources.
8. Herbicides with a non-aquatic label will not be used within 10-foot of the upper tidal zone or other body of water. If treatments are needed within the buffer zone, only those herbicides and adjutants formulated for aquatic situations may be used. No treatment of aquatic species is anticipated at this time, so there will be no direct application of herbicides to water or intertidal areas.
8. A pesticide application record will be completed. This record documents site conditions at the time of application and initiates monitoring to determine effectiveness of treatment.

D. Recreation and Visual Resource

1. Placement of signs and fencing on the Jupiter Inlet tract will comply with related ordinances and regulations of the Town of Jupiter, the Village of Tequesta, and the BLM.
2. Motorized vehicle use will be permitted only on maintained surfaced roads. The Jupiter Inlet ONA will be closed to off-highway vehicle use. Travel on non-surfaced management roads and all off-road travel will be allowed for emergency or authorized vehicles only.

E. Vegetation and Wildlife

1. No mechanized equipment will be allowed to operate within 25 feet of gopher tortoise burrows, or in accordance with the current federal and state best management practices for this species.

2. Construction of nest boxes, roost sites, and platforms will be incorporated where needed to meet wildlife needs. Suitable snags, that do not pose a public hazard, may also be retained as roost and nest sites.

3. All activities with potential to affect Federally listed species will require the appropriate coordination under the Endangered Species Act with the U.S. Fish and Wildlife Service.



Figure 14. Giant leather fern

Part IV. Management Actions

The following section provides the goals and objectives for the future management of the ONA and describes a range of implementation actions to meet those goals and objectives.

A. Goal: Promote public understanding of the Jupiter Inlet Lighthouse Outstanding Natural Area as a unit of the National Landscape Conservation System.

1. Objective: Identify the Jupiter Inlet Lighthouse Outstanding Natural Area as a component of the National Landscape Conservation System and inform the public of the National Landscape Conservation System designation, the mission and purpose of the designation, and the role the ONA plays in this national system .

Actions:

- Install 4' X 8' standard format National Landscape Conservation System portal signs on both the north and south corners of County Road 707 and on the west side of Cato Bridge. This alternative would “brand” the new ONA and most accurately identify its full extent.
- Pursue installation of tourist destination signs for the ONA at Indiantown Road north and south I-95 exits to promote the unit and assist visitors. This action would require updating the existing tourist destination signs to include the ONA.
- Use the National Landscape Conservation System designation as a unifying theme for public interpretive facilities and materials, including kiosks, interpretive signage, brochures and exhibits.
- Install split rail fencing around the perimeter and along interior roads of unfenced areas of the ONA to identify the boundary and to unify the site.

B. Goal: Enhance the public experience and access to the natural areas and historic properties of the ONA site with facilities that are compatible with the maintenance and enhancement of the natural and cultural resources for which the area was designated.

1. Objective: Develop a cohesive interpretive program to provide the visiting public and national audience a multi-layered story of the interrelated history and ecological significance of this strategic location.

Actions:

- Contract for the development of a comprehensive interpretive plan, based on specific themes and highlighting key periods in the history of the ONA, in close coordination with the ONA Partners.
 - Coordinate with ONA Partners to incorporate interpretive themes across administrative boundaries, where it supports the mission and goals of the Partners.
- 2. Objective: Provide an infrastructure of parking, trails and signage to accommodate public visitation to representative areas within the ONA in manner that protects historic, cultural and natural resources, as well as the security of U.S. Coast Guard installations.***

Actions:

- Construct additional public access to natural areas within the ONA, a small parking area on the north side of County Road 707 straddling the existing asphalt road.
- Include bike racks at public access points.
- Install interpretive kiosks at major public access points and destinations within the ONA to provide an overview of the natural, historic and cultural resource values. These kiosks would be constructed at each public parking area and overlook and would include a map and general information on the ONA, as well as components of the interpretive program.
- Construct a trail system, compliant with American with Disabilities Act (ADA), to an elevated boardwalk and an overlook at the tidal wetland.
- Construct a soft trail system north of County Road 707 incorporating existing management roads and approximately 2,000 feet of new soft trail.
- Replace the existing asphalt road on the north side of County Road 707, when needed.
- Replace the existing chain-link fence and gates, install irrigation and native tree planting along public access route.
- Install an ADA compliant ramp at the Tindall House.
- Extend electric service to historic lighthouse fig tree and Tindall House.
- Move utility lines underground in the vicinity of the Tindall House.
- Install additional interpretive signage/kiosks, Native American replica shelter/displays, and pioneer outbuildings along the lighthouse public access route.

2. Objective: Protect the integrity of cultural and historic resources in high public use areas.Actions:

- Re-cap the midden behind the Station J building. Level area with clean sand, install geofabric and re-sod the site. Install pavers in high use areas to protect midden.
- Construct a deck beneath the lighthouse fig tree, the site of the original lighthouse keeper's house. The deck would serve to protect the site from foot traffic, provide an interpreted area for groups waiting to climb the lighthouse, and would be constructed in a manner to discourage climbing the iconic council fig.
- Restore the Jupiter lighthouse mound, remove exotic plants, and install a new irrigation system and native plantings. Archeological monitoring would be required during these projects to identify particularly sensitive areas and to ensure that exotic removal and replanting efforts do not damage cultural areas.

C. Goal: Enhance the integrity of prehistoric and historic properties in the Jupiter Inlet Lighthouse Outstanding Natural Area to reflect the rich Native American and maritime history of this strategic location.

1. Objective: Maintain, restore and recreate historic structures within the ONA.

Actions:

- Restore the historic keeper's workshop for use as living exhibit and interpretive center to demonstrate the working life of the lighthouse keeper in the 1920's. Work will be conducted as per "The Secretary of Interior's Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings." This will include the sympathetic rehabilitation and stabilization of the building, including updating the electrical, plumbing and mechanical systems without interfering with the historic fabric of the structure. This also includes abatement of all asbestos and lead paint.
- Develop a Memorandum of Understanding with the Secretary of the Interior and the Florida Division of Historical Resources, BLM and the ONA Partners to establish consistent monitoring, reporting and curation protocols for ensuring the protection of historic resources, cultural and prehistoric artifacts and human burial remains.
- Actively pursue recreation of historic structures, such as the original weather station and lighthouse keeper's residence, if/when sites become available.
- Maintain, restore and stabilize the Jupiter Lighthouse First Order Fresnel lens. This restoration work will include assessment, cleaning, repair, painting and stabilization of lens apparatus by certified lens preservationists, and digital archival documentation of lens and revolving apparatus.
- Repair, prepare and repaint the interior and metal components of the Jupiter Inlet Lighthouse, as needed. This would include the removal of oil based paint from the interior of the Lighthouse and repainting with paint suitable for the long term maintenance of the structure.

D. Goal: Restore native plant communities and estuaries in the Outstanding Natural Area, with an emphasis on the conservation and enhancement of healthy, functioning ecological systems in perpetuity.

1. Objective: Remove all woody invasive plant species from the ONA, and control regrowth and herbaceous invasive plant species so that they represent no more than 1% of the vegetation cover in the natural areas of the ONA within five years.

Actions

- Coordinate all ONA invasive weed control efforts into BLM pesticide use proposal program. This process would be updated every three years and would consider integrated weed management techniques that would reduce or minimize the use of herbicides throughout the ONA. Standardizing application techniques would reduce the need for parallel environmental review on Federal land and federally funded projects, and would simplify contracting requirements across administrative boundaries.
- Remove, mulch and stump treat woody invasives with herbicides as needed in Lot 17 and 18 in stages over at least three years, treating the eastern third of the acreage along the Indian River Lagoon slope only after the shoreline has been stabilized. Australian pine snags in strategic locations may be

retained as roosts where they do not pose a public hazard. Reestablishing natives through plantings or seeding will be used to augment vegetation where needed. All ground disturbing work in culturally sensitive areas would be monitored by an archeologist.

- In conjunction with the removal of woody invasive species in Lot 17 and 18, removal of herbaceous invasive plants will require multiple techniques, including hand pulling, mechanical removal, and selective use of herbicide. Herbicides would be used to stump treat woody stems of shrubs and mature vines and for hand held foliar applications on target species. Excavation may be used on some rhizomatous plants, such as bow string hemp, if compatible with protection of cultural resources. Areas with potential for near surface cultural resources may require special techniques to avoid disturbance, such as temporary matting. All ground disturbing work in culturally sensitive areas would be monitored by an archeologist.

- Incorporating early and more frequent invasive plant sweeps in areas in a maintenance mode are planned, particularly in areas of new disturbance and following all prescribed fires. Vigilant hand pulling can be effective during this window before invasive plants have an opportunity to produce seed. This approach will also assist in reducing the amount of herbicide needed to suppress invasive plants. At least annual sweeps will be conducted across the ONA in areas in a maintenance mode. During these sweeps, hand pulling and bagging will be the primary mode of removal, selective use of herbicides would be used to stump treat woody vines or trees, and in areas where invasive species have established a monoculture stand.

- Invasive native vines will be controlled where they pose a threat to habitat values; this includes love vine (*Cassytha filiformis*) and coin vine (*Dalbergia ecastophyllum*). Love vine would be hand pulled, while other invasive vines would typically be cut at the base and stump treated with herbicide.

2. Objective: Implement a prescribed burn program that maintains fire dependent plant communities, assists with restoration of disturbed areas, adequately addresses smoke management issue and the control of hazardous fuels in this urban wildland interface.

Actions

- Develop a fire management plan for the ONA in coordination with Palm Beach County Department of Environmental Resources Management and other ONA Partners.

- Use prescribed fire as the preferred management tool for scrub habitats within the ONA. Fire interval and preparation techniques would be adapted to maintain approximately 50% of the scrub habitats as suitable for those scrub endemics that require earlier successional scrubs. In general those characteristics are described by the Florida Fish and Wildlife Conservation Commission and Florida Natural Areas Inventory on June 30, 2009. It is anticipated that sand pine would be reduced in these areas. The remaining areas would be managed with longer fire rotations to support perforate lichen, epiphytes, and other species requiring more mature scrub communities, including sand pine. It is the goal of this plan to adapt implementation, as needed, to reflect the most current research. Where the use of fire is not prudent mechanical manipulations may be used to maintain scrub characteristics. Specific burn plans will be developed prior to each burn establishing the burn prescription based on fuel conditions and resource objectives.

3. Objective: Support the recovery of Federal and State-listed species within the capabilities of the ONA, and manage and enhance habitats to support other declining and at risk species.

Actions

- Utilize planting and seeding to augment the population of endangered four-petal pawpaw (*Asimina tetramera*) to create a self-sustaining, genetically diverse population within suitable habitat of the ONA.
- Explore relocation of endangered perforate lichen (*Cladonia perforata*) to suitable habitats within the ONA to expand the current population.
- Continue to maintain habitat values for Florida Scrub Jay, and participate if opportunities for reintroduction become available.
- Utilize existing asphalt roads within the U.S. Coast Guard communication site to access northern management road via a new locked gate. Eliminate sections of sand management road south of communication site and south of “buffer” area on northern boundary.
- Maintain between 10 and 30% open sand in oak scrub areas to benefit endemic forbs utilizing a combination of root raking or hand clearing to expand existing open areas within scrub.
- Replace existing ball field fence with a 3-4’ chain link fence and native, drought tolerant hedge to reduce trash, trampling, and deflect irrigation overspray into the adjacent scrub vegetation, and to provide increased protection for federally endangered perforate lichen.
- Lock gates and install a net over the northern side of the tennis courts to reduce the need to retrieve stray balls from the adjacent scrub areas and provide increased protection for federally endangered perforate lichen.

4. Objective: Control or remove non-native wildlife species with the potential to adversely affect native species.

Actions

- Live trap all feral cats and remove from the ONA. Work to place cats with local support groups. Alert adjacent homeowners to policy and of the risks domestic cats pose to wildlife in the ONA.
- Explore options for control of curly-tailed lizard, brown anole and other exotic wildlife species as methods become available.
- Continue to monitor for feral hogs, removing them as quickly as possible once detected.

5. Objective: Ensure that the shorelines bordering the ONA are functioning properly and are capable of withstanding anticipated uses, and natural forces.

Actions

- Design a shoreline stabilization project which addresses active erosion issues along the Indian River Lagoon and Loxahatchee River, reducing or eliminating migration of material into the Intracoastal Waterway, stabilizing the shoreline and banks to curtail loss of soil and establishing a stand of native vegetation. The design would also establish a mangrove shelf along active shoreline areas to buffer the shore from storm surges, provide enhanced wildlife and fisheries habitat along these shorelines, and to

protect water quality within West Indian manatee critical habitat, and visually screen the shoreline stabilization structures.

- A separate project would reestablish the 1995 shoreline along the area of active erosion along the Loxahatchee River.

E. Goal: Provide consistent public use guidelines for public safety and for the protection of natural, historic and cultural resources.

Objective: Establish supplementary rules for the ONA.

Actions

- Adopt as supplementary rules Palm Beach County's Natural Area Ordinance No. 94-13 for Lots 15, 16, 17 and 19 and adopt as supplementary rules Palm Beach County's Parks and Recreation Ordinance for Lots 18 and 20. These ordinances are provided in Appendix C.
- Develop a law enforcement memorandum of understanding that would authorize enforcement of the supplementary rules by the Palm Beach County Sheriff Department, Town of Jupiter Police, Village of Tequesta Police, Jupiter Inlet Colony, and Florida State law enforcement officials and other entities, as appropriate.

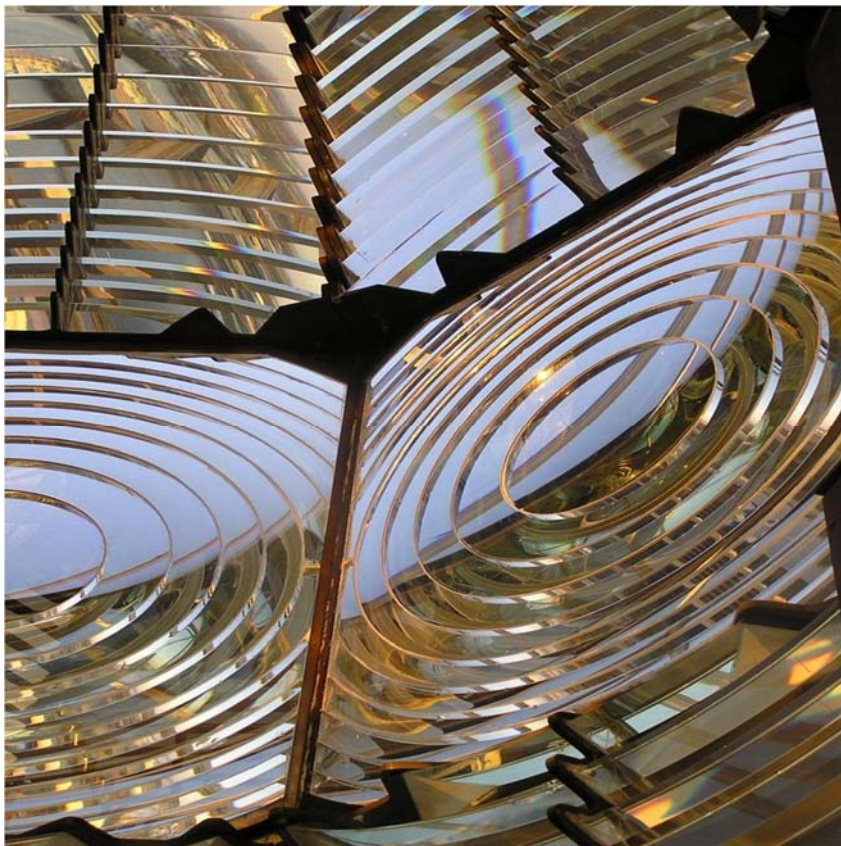
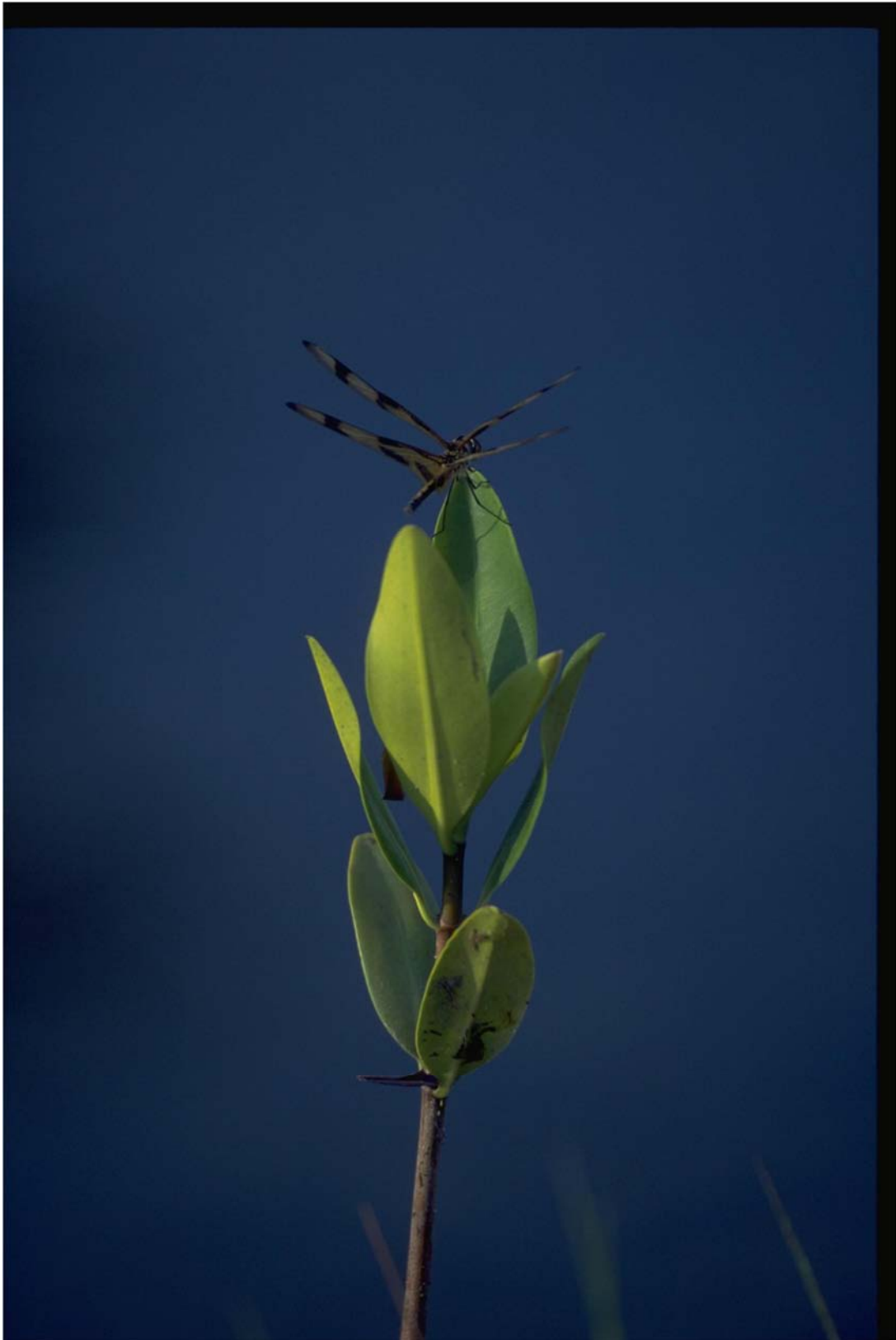


Figure 24. Jupiter Inlet Lighthouse's First Order Fresnel lens

Part V. Environmental Assessment



A. Purpose and Need for the Action

The Consolidated Natural Resources Act (PL-110-229) which designated the Jupiter Inlet Lighthouse Outstanding Natural Area requires that the Secretary of the Interior develop a management plan within three years and that the plan be developed in consultation with appropriate Federal, State, county, and local government agencies, the U.S. Coast Guard Commandant, the Local Partners, and other partners; and in a manner that ensures full public participation. When approved, this plan will guide BLM and its partners in the future management of the ONA.

B. Description of the Affected Environment

Refer to the Jupiter Inlet Lighthouse Outstanding Natural Area Management Plan for a description of the physical, natural and cultural resources found within the ONA.

C. Description of the Proposed Action

This environmental assessment addresses actions within the ONA that would be initiated by BLM or where Federal funding support is anticipated. Other projects, not addressed in this management plan where Federal support is needed, may need additional environmental analysis to meet Federal NEPA requirements. The plan includes a list of standard management practices that would be implemented across all Federal actions within the ONA. These are listed in the management plan under Part III – Standard Management Practices.

While this document addresses the impacts associated with implementation of most actions included in the Jupiter Inlet Lighthouse Outstanding Natural Area Management Plan there are several important components that will require additional analysis and environmental review. For instance, the final design for the Indian River Lagoon shoreline stabilization project has not been selected and the environmental effects from the implementation of that project are dependent on the design selected. The project will require a separate, more in-depth NEPA analysis, as well as regulatory review and permitting before the project would be approved for construction. This would include coordination as required with U.S. Fish and Wildlife Service, National Marine Fisheries Service, Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District. Also, the installation of a new water line and fire hydrant to provide fire protection for the Station J building has been proposed. This project is anticipated to be located within Lot 20, Jupiter Lighthouse Park, and would be constructed at the discretion of the Town of Jupiter.

In addition, the prescribed burn program is handled programmatically in this document and additional environmental review is expected for the completed prescribed burn plan, and may be required for individual prescribed burns. Prescribed burn best management practices for areas supporting perforate lichen are being developed by the U.S. Fish and Wildlife Service. These best management practices would be incorporated into the prescribed burn program. This could alter the planned action and require additional NEPA analysis.

Summary of Proposed Actions

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
Public Access and Passive Recreation Facilities				
North Side Parking	Construct small parking on north side of County Road 707.	Construct 8 car parking on north side of County Road 707.	Install traffic light and pedestrian crosswalk across County Road 707.	Continue off street parking on north side of County Road 707.
North Side Hard Trail	Construct a concrete nADA compliant trail from parking area to wetland boardwalk.	Construct concrete trail (ADA compliant) from parking area to wetland boardwalk.	Construct shell rock trail from parking area to wetland boardwalk.	No trail construction.
North Side Wetland /Boardwalk Overlook	Construct elevated boardwalk along wetland lagoon to a single story wetland overlook.	Construct elevated boardwalk along wetland lagoon to two story wetland overlook.	Construct elevated boardwalk along wetland lagoon to single story wetland overlook.	No trail construction.
North Side Soft Trail	Construct soft loop trail to link management roads to parking area on north side of County Road 707.	Construct soft loop trail linking management roads to parking area on north side.	Utilize sections of existing management roads as soft trails, no new trail construction.	No trail construction.
Portal Signage	Install ONA portal signs on north and south side of County Road 707 at U.S. Highway 1 and at Cato Bridge.	Install ONA portal signs on north and south side of County Road 707 at U.S. Highway 1 and at Cato Bridge.	Portal sign off County Road 707 only.	No portal sign.
Recreational and Cultural Interest Area Signs (brown highway sign)	Apply for tourist destination sign for ONA at Indiantown Road north and south I-95 exits and Florida Turnpike.	Apply for tourist destination sign for ONA at Indiantown Road north and south I-95 exits and Florida Turnpike.	Same as Alternative I	No highway sign.
South Side ADA Trail	On hold until Lot 17 restoration completed.	Construct concrete ADA trail from Jupiter Inlet Lighthouse to the Inlet overlook and to wetland boardwalk south of Cato Bridge.	Construct shell rock loop trail from Jupiter Inlet Lighthouse and another from new trailhead south of Cato Bridge.	No trail or overlook construction.
South Side Boardwalk	On hold until Lot 17 restoration completed.	Construct boardwalk along Indian River Lagoon	No boardwalk or overlook construction	No boardwalk or overlook construction.
South Side Soft Trail	On hold until Lot 17	Construct soft loop	Construct shell rock	No trail

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
	restoration completed.	trail section off concrete ADA trail.	loop trail along Indian River.	construction.
Connect Trail System	On hold until Lot 17 restoration completed.	Construct elevated boardwalk with rails under County Road 707 Bridge for public use.	Direct public use under County Road 707 Bridge with signage only.	No boardwalk construction.
Bike Racks	Provide bike racks at new parking area.	Provide bike racks at both new parking areas.	Install bike rack at new north side parking area and south side trail head.	No bike rack installation.
Management Roads	Utilize existing asphalt road in U.S. Coast Guard communication site to access northern blocks for management roads.	Utilize existing asphalt road in U.S. Coast Guard communication site to access northern blocks for management roads.	Same as No Action Alternative	Continue to use and maintain existing management roads.
Management Roads	Eliminate “buffer management road” and management road south of U.S. Coast Guard communication site (maintained as firebreak only).	Eliminate “buffer management road” and management road south of U.S. Coast Guard communication site (maintained as firebreak only).	Eliminate “buffer management road” only, continue to use management road south of U.S. Coast Guard communication site.	Continue to use and maintain existing management roads.
Non-motorized Boat Access	No new wetland construction.	Extend the existing mangrove wetland to the south to provide additional access for non-motorized boats.	Same as No Action Alternative	No lagoon extension.
New South Side Parking	On hold until Lot 17 restoration completed.	Construct parking area and trailhead.	Construct trailhead only.	No new construction.
Access Road North of County Road 707	Replace existing road, when needed.	Repave existing asphalt road.	Replace existing road with permeable surface road.	No improvements to existing road.
Historic Structures				
Historic Keeper’s Workshop	Restore historic Keeper’s Workshop to Secretary of the Interior Standards for interpretive use.	Restore historic Keeper’s Workshop to Secretary of the Interior Standards for use as a historic workshop and workroom.	Restore as storage building to Secretary of the Interior Standards as workshop only, no public access.	No reconstruction of historic structures.

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
Lighthouse Keeper's House and Weather Station	Recreate historic structures for Coast Guard housing, if it does not adversely affect U.S. Coast Guard mission.	Recreate historic structures for public interpretation, if it does not adversely affect U.S. Coast Guard mission.	Recreate historic structures for Coast Guard housing, if it does not adversely affect U.S. Coast Guard mission.	No recreation of historic structures.
Bridge Tender's Building	On hold until Lot 17 restoration completed.	Build kiosk near original Bridge Tender's building site for public interpretation.	Recreate Bridge Tender's building near original site for public interpretation.	No construction associated with Bridge Tender's building.
Station J midden protection	Re-cap and sod midden area behind Station J building, install limited pavers in high use area.	Re-cap and sod midden area behind Station J building, install limited pavers in high use area.	Same as No Action	No construction or additional capping behind Station J building.
Water Taxi Dock	No water taxi dock construction at this time.	Construct dock for use by authorized water taxi.	No water taxi dock construction.	No water taxi dock construction.
Lighthouse Keeper's house cap	Construct a deck over Lighthouse Keeper's house location (under council fig).	Construct a deck over Lighthouse Keeper's house location (under council fig).	Same as No Action Alternative	No construction of deck.
Jupiter Inlet Lighthouse Mound	Remove exotic plants, cap mound, as needed, install new irrigation system, and native plantings.	Remove exotic plants, cap mound, as needed, install new irrigation system, and native plantings.	Install new irrigation at lighthouse mound and reduce mowing to establish more vigorous bahia grass coverage, but leave eastern mound area as is.	Continuation of existing management.
Tindall House/Native Garden Facilities Maintenance/Improvement	Install sidewalk-brick paver connections, irrigation and native tree planting, ADA ramp for Tindall House, and extension of electric service to lighthouse fig tree and Tindall House, and move utility lines underground	Same as Preferred Alt.	Same as Preferred Alt.	No improvements or maintenance actions.
Exterior Educational	Install interpretive	Same as Preferred	Same as Preferred	No improvements or

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
Displays	Native American shelter and other interpretive signage along Lighthouse public access path	Alt.	Alt.	maintenance actions.
Lighthouse Maintenance	Remove oil based paint and repaint inside of Jupiter Inlet Lighthouse and repair and repaint metal components, including rust remediation.	Same as Preferred Alt.	Same as Preferred Alt.	No improvements or maintenance actions.
Lighthouse Lens Repair and Maintenance	Conduct condition assessment, clean, stabilize and repair First Order Fresnel lens and pedestal.	Same as Preferred Alt.	Same as Preferred Alt.	No improvements or maintenance actions.
Erosion Control				
Indian River Lagoon Bluff	Stabilize slope and reduce migration of material into Intracoastal Waterway.	Stabilize slope and reduce migration of material into Intracoastal Waterway, establish native vegetation cover, provide opportunities for snorkeling, no access to uplands from the water.	Stabilize slope and reduce migration of material into Intracoastal Waterway, provide opportunities for boat mooring, and public access to uplands from water.	Continue to exclude public use, but no erosion control measures taken.
Loxahatchee River	Stabilize actively eroding northern shoreline backfilling as needed to return to 1950 shoreline.	Stabilize actively eroding western shoreline backfilling as needed to return to 1950 shoreline.	Stabilize actively eroding western shoreline at current location.	No shoreline stabilization.
Shoreline Mangrove Planter	Construct a mangrove planter along southern portion of the Indian River Lagoon	Construct a mangrove planter along eastern shoreline of Loxahatchee River and southern portion of Indian River Lagoon.	Utilize mangrove balls in shallow areas on western shoreline of Loxahatchee River and Indian River Lagoon.	No mangrove plantings.
Habitat Restoration/Enhancement Actions				
North Side	Use prescribed fire as primary tool to	Combine current blocks into four	Combine current blocks into four	Continue with 6 burn blocks.

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
Prescribed Burn Program	maintain scrub habitats, mechanical manipulations permitted when and where fire is not prudent. Goal to maintain the optimal height of shrub layer in blocks 1, 2 and 5 at a height of 4 to 5.5 feet. Blocks 3, 4 and 6 would be managed for longer burn rotations to maintain mature scrub character, generally every 15 to 30 years.	units. Eastern units on 15-year burn cycle, mechanical manipulation only on western burn blocks.	units. Eastern two units on 15 year burn cycles and western units on 30-year burn cycles.	
South Side Prescribed Burn Program	Use prescribed fire as primary tool to maintain scrub habitats, mechanical manipulations permitted when and where fire is not prudent.	Utilize prescribed burn program to reduce fuel loads and improve habitat in scrub habitat on 30-year rotation.	Mechanical manipulation only on south side scrub habitat.	No fuel reduction or burn program in scrub habitats on south side.
Invasive Control	Use integrated pest management tools to eradicate woody invasives and control herbaceous invasive plant species. Conduct at least annual sweeps across natural areas within ONA. Provide additional sweeps as needed after burns, or other disturbance to control spread of herbaceous exotic and invasive plant species. Hand pulling is preferred method with hand application of herbicide allowed	Conduct semi-annual invasive sweep of ONA and quarterly sweeps of natural areas in Coast Guard housing area.	Continue annual invasive sweep of BLM administered lands only.	Continue annual summer sweep of invasive plant species and quarterly sweeps of natural areas in Coast Guard housing area.

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
	where there is low risk to non-target species.			
Invasive Control	Phase the mechanical removal of all woody invasives in Lot 17 over 3 years, with herbicide follow-up and planting of natives, as needed.	Phase the mechanical removal of all woody invasives in Lot 17 over 3 years, with herbicide follow-up and planting of natives, as needed.	Mechanically treat all woody invasives in Lot 17, with herbicide follow-up as needed.	No invasive removal
Wetland Construction South Side	No new wetland construction.	Construct an additional wetland lagoon south of County Road 707.	Same as No Action	No new wetland construction.
Open Sand Areas	Root rake and/or hand clear woody shrubs/pine to maintain 10-30% open sand.	Root rake and/or hand clear oak scrub to maintain 10-30% open sand.	Same as No Action	Do not actively create open areas in scrub habitats.
Roosting and cavity opportunities	Install osprey platforms, bat roosts, and bird boxes where appropriate.	Install osprey platforms, bat roosts, and bird boxes where needed.	Same as No Action	No installation of nest boxes, roosts or platforms.
Feral Cats	Actively trap and remove feral cats and other non-native species.	Actively trap and remove feral cats.	Same as Alternative 1	No feral cat trapping.
Four-petal pawpaw	Continue to pursue population augmentation to sustain genetically diverse population.	Augment existing four petal pawpaw population up to 500 plants over ten years.	Augment existing pawpaw population with seeding from onsite plants only up to 300 plants over ten years.	No further augmentation.
Perforate lichen	Schedule burn intervals to sustain perforate lichen populations in the ONA, and utilize current best management practices developed in coordination with U.S. Fish and Wildlife Service.	Prior to burning occupied habitat, move perforate lichen from vulnerable locations to suitable habitats, including unoccupied habitat in ONA.	Move perforate lichen from vulnerable positions, but only within currently occupied habitat.	No moving of perforate lichen.

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
Florida Scrub Jay	Continue to manage habitat to meet Florida Scrub Jay requirements. Explore options for future reintroduction, if it supports regional recovery efforts.	Continue to manage habitat to meet Florida Scrub Jay requirements. Explore options for future reintroduction, if it supports regional recovery efforts.	Same as Alternative I	Manage scrub habitat for general wildlife values.
Florida Mouse	Pursue reintroduction of this rare Florida species	Same as No Action Alt.	Same as No Action Alt.	No reintroduction of Florida mouse.
Soccer Field Fencing	Replace existing fence with 4' black chain link and native, drought resistant hedge.	Replace existing fence with 4' black chain link and native, drought resistant hedge.	Same as Alternative I	Maintain existing 4 x 4 fences.
Tennis courts	Restrict access to adjacent scrub and install overhead screen to reduce number of stray balls.	Restrict access to adjacent scrub and install overhead screen to reduce number of stray balls.	Install overhead screen but keep doors unlocked.	Continue with unlocked gates and no tennis course screen.
Security				
Perimeter Fencing	Install split rail fencing around the perimeter and along interior improved roads to identify the boundary and to unify the site.	Same as Preferred Alt.	Same as Preferred Alt.	No improvements or maintenance actions.
Fencing	Replace chain link fence between Post Exchange and Loxahatchee River.	Same as Preferred Alt.	Same as Preferred Alt.	Same as Preferred Alt.
Fire Hydrant	Install adequate water lines and fire hydrant in vicinity of the Station J building	Same as Preferred Alt.	Same as Preferred Alt.	Same as Preferred Alt.
Law Enforcement Agreements	Establish Law Enforcement MOU between ONA partners.	Establish Law Enforcement MOU between ONA partners.	Same as Alternative I.	No coordinated law enforcement effort.

PROPOSED ACTION	PREFERRED ALTERNATIVE	ALTERNATIVE I	ALTERNATIVE II	NO ACTION ALTERNATIVE
Supplementary Special Rules	Adopt Palm Beach County Natural Area Ordinance as Supplementary Rules for Lots 15, 16, 17 and 19, and County Parks and Recreation Ordinance for Lot 18 and 20.	Same as Preferred Alternative	Establish new set of Supplementary Rules.	Establish no Supplementary Rules.

D. Environmental Impacts

The following elements are not expected to be significantly affected by the implementation of this plan, and will not be discussed further.

- Environmental justice
- Floodplains
- Hazardous or solid waste
- Prime or unique farmlands
- National wild and scenic rivers
- Wilderness

The following elements would be affected or have the potential to be affected by the implementation of this plan, and will be discussed further in this document.

- Water quality
- Air quality
- Cultural resources
- Native American culture or religious concerns
- Wildlife
- Threatened or endangered species
- Invasive, non-native species
- Wetland/riparian zones

1. Water Quality

a. Impacts from the Preferred Alternative

Most projects proposed in this plan, such as public access facilities and protection and restoration of historic resources, would take place in upland situations and would not affect surface or subsurface water quality. There is potential, however, to affect water quality in the adjacent waterways as a result of proposed shoreline stabilization projects along both the Indian River Lagoon and the Loxahatchee River. While the selection of the preferred design for slope stabilization along the Indian River Lagoon is beyond the scope of this document, in general the maintenance or improvement of water quality is a key project goal to be accomplished through the control of erosion and reduction of sedimentation into the adjacent rivers, and through the use of a mangrove shelf along portions of the shoreline to capture sediments and further buffer the shoreline. There is the potential to adversely affect water quality temporarily during construction of these shoreline stabilization projects. Alternatives which install riprap, sheet piling, and include the construction of a mangrove shelf would increase suspended sediments and could add sediments to nearby sea grass beds. Use of turbidity curtains during all phases of the shoreline construction projects would be required to contain suspended sediments. In all cases, the environmental affects would be dependent on the design of the project and would require a separate more in-depth NEPA analysis, as well as regulatory review and permitting, before the project would be approved for construction. This would include coordination as required with U.S. Fish and Wildlife Service, National Marine Fisheries Service, Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District.

Under the Preferred Alternative, there would be no new tidal wetland construction projects and therefore no impacts associated with the construction of these projects.

There is the potential to affect surface and subsurface water through the use of herbicides. The selective use of herbicides and the method of application would reduce the risk. Management practices common to all alternatives require that herbicides with a non-aquatic label not be used within a 10-foot buffer from the upper tidal zone or other body of water. If treatments are needed within the buffer zone, only those herbicides and adjutants formulated for aquatic situations may be used. No treatment of aquatic species is anticipated at this time, so there would be no direct application of herbicides to water or intertidal areas. Herbicides used to treat woody material are typically applied to cut stump, which reduces the amount of product applied, increases efficacy and avoids the potential for accidental drift, further reducing the potential to affect adjacent water bodies.

Under the Preferred Alternative, more frequent sweeps to control invasive plants are planned, particularly following surface disturbance and prescribed burns, in newly disturbed areas when hand pulling herbaceous plants is more manageable. Early intervention, before the plants go to seed, can be effective in reducing the spread of these species and is expected to ultimately reduce the need for using herbicide during follow-up sweeps.

The removal of exotics in Lot 17 over at least three years would extend the period when herbicides are being used and may increase the need for follow-up treatments because of the remaining seed sources.

Impacts to subsurface water from the targeted use of herbicides are not expected. The water table is typically over 6 feet below the surface. Glyphosate (Round-up) is the primary herbicide used in foliar applications within the ONA, and its application is very targeted using a backpack or hand sprayer. Glyphosate quickly bonds with soil particles preventing it from leaching into ground water. This affinity remains until the product degrades through microbial action.

Additional techniques and products may be included in future Pesticide Use Proposals and analyzed in associated NEPA documents to ensure that the safest and more effective techniques are used to control and eradicate exotic invasive plant species within the ONA.

b. Impacts from the Alternative 1

Same as Preferred Alternative expect that this Alternative includes the construction of a new tidal lagoon and extension of the existing tidal lagoon. During construction of additional tidal lagoon there is potential to adversely affect water quality in the adjacent Indian River Lagoon, although the use of standard best management practices, including the use of silt screens is expected to mitigate those impacts. The creation of dual outlets to tidal lagoons could compromise the flushing ability of the lagoons, allowing sediments to drop out shortening the functional life of the lagoon and reducing the viability of the wetland to support aquatic species.

c. Impacts from Alternative 2

Same as Preferred Alternative, except that a single tidal wetland would be constructed south of County Road 707 under this alternative, and there would be no extension of the existing tidal wetland. There is the potential for temporary impacts to water quality related to construction activities, however prudent use of silt screens is expected to mitigate those impacts.

Invasive sweeps would be conducted annually under this Alternative. These longer intervals allow invasive plants to go to seed requiring additional effort, expense, and increase the need to use herbicides where monoculture stands develop. Invasive vines may become too large to hand pull, necessitating the need to treat cut stumps with herbicide.

d. Impacts from the No Action Alternative

Same as the Preferred Alternative, except there would be no shoreline stabilization project along the western bank of the Indian River Lagoon. Portions of this bank have lost over 100 feet of land over the last 50 years. Without stabilization, the erosion of this bank into the Indian River Lagoon is expected to continue to contribute sediments along this reach of the estuary, adding to local turbidity and contributing to dredging needs.

As under Alternative 2, longer intervals between invasive sweeps would increase the level of effort, and expense in invasive removal, and increase the need to use herbicides.

2. Air Quality

a. Impacts from Preferred Alternative

Under this Alternative prescribed burning would be the preferred tool to manage scrub habitats within the ONA, with mechanical manipulation being used when burning cannot be conducted due to public safety or resource issues. In general, no more than one incremental prescribed burn would be conducted per year and that rotation schedule could be extended up to ten years between each 5-6 acre burn.

The prescribed burning program has the potential to negatively impact air quality during the day of the burn, and affect individuals living, working or visiting in the Jupiter Inlet area during that time. Smoke from prescribed fires can release five of the six "criteria air pollutants" identified by the Environmental Protection Agency, including aerosols of organic acids and hydrocarbons, and particulate matter of various size fractions. The type of pollutants varies with the type of fuel, its moisture content, the temperature of the fire, and the length of time materials continue to smolder after the fire. There are a number of facilities within a mile of the ONA, such as schools, assisted living facilities and hospitals, or medical clinics that are considered to be smoke sensitive. In addition, the relatively high number of older residents, with potential breathing difficulties, increases the critical need for smoke management during all prescribed burns. The proposed prescription would carry smoke over the Jupiter Inlet out to sea without affecting the inland air quality. Pre-treating burn blocks to remove larger diameter fuels would reduce the burn duration and the potential for the wind shifting. Completing mop-up of residual burns within six hours would also limit the potential for smoke exposure.

Prescribed burning of Lot 19 in particular has the potential to affect Coast Guard housing and should be closely coordinated with residents, so that smoke sensitive persons are given the opportunity to leave the site until all smoke has dissipated.

Some minor negative impacts to air quality could include generation of fugitive dust from ground disturbance and hydrocarbon emissions from vehicles during the clearing of invasive plants in Lot 17. Use of mechanized equipment, such as mulchers or chain saws could also increase suspended particulates in the air. However, these impacts would be minimized by ensuring use of appropriate and properly installed mufflers on all equipment. Any increases in dust would be particularly noticeable under dry conditions when offshore winds could transport dust towards the adjacent Coast Guard housing. These impacts are expected to be localized and of short duration.

Other actions proposed are not expected to affect air quality.

b. Impacts from Alternative 1

Same as Preferred Alternative, expect that this Alternative would utilize mechanical manipulations to manage the scrub habitat on the western portion of the ONA, reducing the number of prescribed burns. Because the burn rotation for these areas is expected to be 30 years this has the potential to result in two less prescribed burns over the life of this plan.

c. Impacts from Alternative 2

Same as the Preferred Alternative, except could be more opportunity for dust as all woody exotics would be removed from Lot 17 at the same time.

d. Impacts from the No Action Alternative

Under this alternative there would be no additional burning within the ONA and as a result no adverse affects to air quality. There would also be no mechanical removal of woody invasives in Lot 17, eliminating the minor emissions and dust created by that activity.

3. Soils

a. Impacts from the Preferred Alternative

Impacts to soils could occur 1) mixing of the soil surface by heavy equipment, 2) soil compaction, 3) soil erosion and 4) use of prescribed fire. The first impact would be caused by the maneuvering of mechanized equipment on the soil surface, particularly in the mechanical manipulation of scrubs in the western management blocks, removal of invasives in Lot 17, and annual root raking to maintain fire breaks. This could cause a mixing of soil horizons and cause a short term loss of soil productivity in the scrub sites though the loss of soil cryptobiotic soil crusts, which fix nitrogen which can be passed to vascular plants. The second impact, soil compaction, would be caused by vehicle and machinery travel on the soil surface. Compaction decreases air and water infiltration into the soil profile thus reducing soil productivity. Because sandy soils are not highly susceptible to compaction and the total area affected would be small in a given year, impacts to soil productivity from compaction are expected to be negligible. The third impact, soil erosion occurs within the ONA where the vegetation cover on slopes is inadequate, and as a result of wave, storm surge and public use. There are actions proposed in this alternative to remediate active soil erosion along the banks of the Loxahatchee River and Indian River Lagoon, as well as areas vulnerable areas of the Jupiter Lighthouse mound. Under this alternative the most eroded section of shoreline along the Loxahatchee River would be returned and stabilized at its 1995 location. As in Impacts to Water, discussed above, additional assessment will be required to analyze the impacts, both positive and negative, of the final design of these shoreline projects.

The impacts of prescribed fire on soil productivity are complex. After fire large quantities of nitrogen, phosphorus, potassium, calcium, magnesium, sodium and sulphur become readily soluble (Wright, 1982). Fire is beneficial for incorporation of woody materials (nutrients) in areas where the soils are well drained (sandy soils) and decomposition of woody material generally takes longer. This rapid increase in nutrients in the soil would help stimulate new growth in areas that have been treated using fire. If vegetation is removed by a means other than by the use of prescribed fire, a measurable change in available nutrients is not anticipated because of the slow rate of decomposition of woody material on sandy well-drained soils. However, studies have shown that it may take 10 to 15 years or longer for soil crusts to recover from fire, depending on the soil crust species composition, area of the burn and distance from intact crusts (<http://www.archbold-station.org/abs/ABS/research/plantecol/plantecolsoilcrusts.htm>). These impacts may be mitigated in more opens scrubs with scattered fuels.

Under this Alternative, new public access facilities, including a small parking area, trail and boardwalk would be constructed only north of County Road 707. Public access facilities south of County Road 707 would be addressed after habitat restoration activities in Lot 17 are completed, as part of an additional planning effort.

Under this Alternative an estimated 0.435 acres of soil disturbance would occur as the result of the construction of visitor access facilities north of County Road 707. This includes approximately 1,120 feet of ADA trail, a boardwalk and wetland overlook. An additional 0.1 acre would be disturbed temporarily during the construction of the ADA trail and associated facilities. Virtually all disturbances would occur in St. Lucie-Paola sands with 0 to 8 percent slope. Compaction is not expected to be a significant problem in these deep sandy soils. However, the construction activities would disturb soil crusts and could result in the short term loss of soil productivity due to loss of cryptobiotic soil crusts, which fix nitrogen which can be passed to vascular plants.

Additional minor soil disturbances are expected as a result of the installation of new or replacement fencing, pavers, burying utilities and new irrigation systems. All of these activities may result in very local mixing of these deep sandy soils but are not expected to result in any erosive actions. Capping the lighthouse mound and midden behind the Station J building would require additional fill material. Clean fill similar to the native sands would provide the best chance for reestablishment of native plant species.

b. Impacts from the Alternative 1

Under this Alternative 1.1 acres of soil disturbance would occur as a result of visitor access facilities on both the north and south side south side County Road 707. The additional areas (0.695 acres) of disturbance are located in predominately Quartzipsamments soils and in previously disturbed areas. These are sandy soils where compaction is not expected to be a significant problem and where cryptobiotic soil crusts are less likely to be well established.

c. Impacts from Alternative 2

Under Alternative 2 there would be a total of 0.735 acres disturbed with approximately half of the soils being St. Lucie-Paola sands and remainder Quartzipsamments, plus an additional 0.37 acres of temporary disturbance in those soil types.

There could also be some additional soil disturbance of approximately 0.11 acres of sand pine scrub associated with the construction of a temporary fire break between the western burn blocks. This fire break would be needed only once during the life of this plan.

d. Impacts from the No Action Alternative

There would be no impacts to soils related to trail construction, other visitor access facilities or prescribed fire. There would be ongoing impacts to soils related to the unresolved erosion along the Loxahatchee River and Indian River Lagoon. Both shorelines have areas of active erosion. Soil will continue to be lost incrementally due to wind and tidal factors. These areas could experience catastrophic loss during hurricanes and other storm surges. Ongoing public use along the Indian River Lagoon is exacerbating soil loss as people climb and excavate the bank.

4. Cultural Resources

Standard Management Practices would require that all ground disturbing activities be monitored by a qualified archaeologist.

a. Impacts from the Preferred Alternative

All restorative, reconstruction to historic buildings and ground disturbance actions are considered adverse effects. These actions also have the potential to adversely affect undisturbed cultural deposits. A systematic archaeological survey of the 120 acres will allow for delineating areas devoid of cultural deposits and direct those ground disturbing activities to those areas. Consultation with the 106 Review and Compliance section of the Bureau of Historic Preservation, Department of State of the State of Florida will take place before the commencement of any work of the Jupiter Inlet Lighthouse Outstanding Natural Area.

All planned work on the Jupiter Inlet Lighthouse Outstanding Natural Area must be submitted to and approved by the Florida Division of Historical Resources, before such work can begin. The 106 Review and Compliance section of the Florida Division of Historical Resources, Florida's State Historic Preservation Officer (SHPO), will have oversight responsibility for all compliance activities with Federal and State of Florida historic preservation laws, regulations, and guidelines for all actions, or undertakings, by the Jupiter Inlet Lighthouse Natural Outstanding Area administrators. These laws include, but are not limited to, the following: the National Historic Preservation Act, as amended; the Archaeological Resources Protection Act, as amended (ARPA); the Archaeological and Historic Preservation Act, as amended; Native American Graves Protection and Repatriation Act (NAGPRA), as amended; and Florida Statutes 267. In addition, implementing regulations of these laws will also be followed, including, but not limited to, 36 CFR 800 (Advisory Council regulations) and 36 CFR 60 (National Register of Historic Places regulations). Project specific guidelines, such as The Secretary of the Interior's Standards for the Treatment of Historic Properties (available from the National Park Service) and other Secretary of the Interior's standards and guidelines, such as, but not limited to, the National Park Service's Preservation Brief series including those with guidance on the abatement of lead paint and asbestos, which will have an effect (see 36 CFR 800.9).

b. Impacts from Alternative 1

Impacts to sites and structures under Alternative 1 would be similar to the preferred Alternative.

c. Impacts from Alternative 2

Impacts to sites and structures under Alternative 2 would be similar to the preferred Alternative.

d. Impacts from the No Action Alternative

Under the No-Action alternative, the projects would not proceed. The No-Action alternative would result in surface disturbances from soil erosion and heavy visitor traffic especially to site PB35-B, continued weather erosion to the Lighthouse mound and further deterioration to the historic structures. Also without a complete cultural resources survey of the entire 120 acres important prehistoric site elements could be inadvertently lost during management activities.

5. Native American Culture or Religious Concerns

While the existence of cultural resources is known at the Jupiter Inlet Lighthouse Outstanding Natural Area sites associated with Native American religious practices have not been located on these public domain lots. In addition, no known historic properties (36CFR800) have been identified as being of concern to any federally recognized Native American tribe. However, Jupiter Inlet is considered to be within an area of interest by the Seminole Tribe of Florida, while other Native American tribes have expressed interest in NAGPRA issues.

a. Impacts from the Preferred Alternative

This area is within the traditional area of interest by the Seminole Tribe of Florida. Even though the area has a limited survey for cultural resources, unknown Native American sites could be damaged by implementation of ground disturbing activities. However, a stipulation covering accidental discovery, a systematic archaeological survey of the 120 acres will allow for delineating areas devoid of cultural deposits and direct those ground disturbing activities to those areas, impacts to any discovered site should be minimized. Also, during all ground disturbing activities, even after survey, will be monitored by an archaeologist.

Also consultation with the 106 Review and Compliance section of the Florida Division of Historical Resources will take place before the commencement of any work of the Jupiter Inlet Lighthouse Outstanding Natural Area. All planned work on the Jupiter Inlet Lighthouse Outstanding Natural Area must be submitted to and approved by the Florida Division of Historical Resources, Florida's State Historic Preservation Officer (SHPO), before such work can begin. The 106 Review and Compliance section of the Florida Division of Historical Resources- SHPO will have oversight responsibility for all compliance activities with Federal and State of Florida historic preservation laws, regulations, and guidelines for all actions, or undertakings, by the Jupiter Inlet Lighthouse Natural Outstanding Area administrators. These laws include, but are not limited to, the following: the National Historic Preservation Act, as amended; ARPA, as amended; Archaeological and Historic Preservation Act, as amended; NAGPRA, as amended; and Florida Statutes 267. In addition, implementing regulations of these laws will also be followed, including, but not limited to, 36 CFR 800 (Advisory Council regulations) and 36 CFR 60 (National Register of Historic Places regulations). Project specific guidelines, such as The Secretary of the Interior's Standards for the Treatment of Historic Properties (available from the National Park Service) and other Secretary of the Interior's standards and guidelines, such as, but not limited to, the National Park Service's Preservation Brief series including those with guidance on the abatement of lead paint and asbestos, which will have an effect (see 36 CFR 800.9).

b. Impacts from the Alternative 1

Impacts to sites and structures under Alternative 1 would be similar to the preferred Alternative.

c. Impacts from Alternative 2

Impacts to sites under Alternative 2 would be similar to Alternative 1.

d. Impacts from the No Action Alternative

Under the No-Action alternative, the projects would not proceed. The No-Action alternative would result in surface disturbances from soil erosion and heavy visitor traffic especially to site PB35-B, exposing cultural material to the elements and public, continued weather erosion to the Lighthouse

mound and further deterioration to the historic structures. Also, without a complete cultural resources survey of the entire 120-acres important prehistoric site elements could be lost.

6. Vegetation

a. Impacts from Preferred Alternative

Vegetation has the potential to be affected by the development of public access facilities, including trails, boardwalks and overlooks, the creation and closure of management roads, shoreline stabilization projects, prescribed burns, invasive species control, installation of fencing, implementation of special rules, and increases in public use.

Although the alignment of trails and boardwalks is conceptual, the proposed action is estimated to include 1,220 feet of new ADA compliant trails, 1,882 feet of new soft trails, 225 square feet of new parking and 240 feet of new boardwalk. The construction of these facilities would result in the loss of 0.375 acres of scrub, and 0.06 acres of hardwood hammock. During construction of the new ADA trail, the adjacent areas are expected to be temporarily disturbed by equipment and clearing activities. This is expected to include approximately 2 feet on either side of the trails, totaling an additional 0.1 acres of disturbance across these habitats. Vegetation clipped in this buffer area is likely to regrow unless the roots are damaged during the construction process. The exact trail alignment would be meandered around woody plant species to the maximum extent possible, and diverted around special status plants. This would be particularly important during the final placement of the ADA trail where it will bisect an area recently planted with federally endangered four-petal pawpaw and transplanted perforate lichen. Public use of the ONA is expected to increase and ultimately the construction of the trail system is expected to benefit special status plant species by funneling the public through the site and providing interpretive signage to increase public awareness of the sensitivity of the vegetation to trampling. Habitat restoration of Lot 17 would eventually add almost 3 additional acres of scrub oak and sand pine scrub and up to 20 acres of hardwood hammock habitat to the ONA.

The prescribed burn program would retain Florida oak scrub in burn blocks 1, 2 and 5 with burns on scheduled as needed to maintain the scrub characteristics identified in the scrub management guidelines developed by Florida Fish and Wildlife Conservation Commission and Florida Natural Areas Inventory (2009). These guidelines include maintaining shrub height at an average of 4-5.5 feet high and maintaining 10-50% bare sand or sparse herbaceous vegetation. The number of sand pine in these areas is expected to eventually diminish as subsequent burns remove young sand pine before they have reached their maximum cone production. The remaining areas would be managed with longer burn intervals. After the initial burn in Prescribed Burn Blocks 3, 4 and 6, longer burn rotations would allow sand pine to mature and provide for those species requiring more mature scrub structure, including epiphytes, ground lichens and scrub rosemary. Prior to these longer interval burns it is expected that the heavier standing fuels (sand pines) would be removed or mulched to reduce the burn duration, flame height, residual smoke and chance of spotting. In addition, most of the shrub layer would be chopped to reduce the flame heights. Species composition is not expected to be altered as a result of these burns. Oaks and other endemic shrubs resprout quickly from root stock. Some species such as sand pine and rosemary typically require fire to prompt reseeding, and germination is best in the bare mineral soil cleared of leaf litter. Scrub oaks can reach 3 feet within two to three years and sand pines could become a dominate element of the canopy again in twenty years.

Vegetation would be manipulated mechanically when needed to meet resource objectives when fire cannot be used because of failure to reach prescription or other reasons of public safety. Mechanical manipulations provide flexibility in the amount and location of activities to maintain scrub

characteristics, but may not provide the ecological benefits of prescribed fire, particularly for endemic herbaceous plants.

Disturbances, including mechanical disturbance and fire, would promote the spread of opportunistic, early succession plant species. At Jupiter Inlet, natal grass, a non-native grass, has been quick to invade following burns. Unless controlled early by hand pulling, natal grass removal can result in inadvertent damage to scrub endemics, particularly nodding pinweed, which also tends to germinate quickly in response to disturbance and can be difficult to detect in dense stands of natal grass. It can also out compete endemic species adapted to open sandy areas.

The Preferred Alternative includes provisions to hand clear or root rake to maintain between 10 and 30% open sand in the scrub habitats to benefit endemic scrub species. This vegetation removal is primarily targeting scrub oaks, the dominant shrub. Herbaceous species would benefit from these scrub openings.

Establishing a native, drought-resistant hedge between the Jupiter Lighthouse Park ball fields and Lot 19 would reduce the amount of windblown litter entering the natural area to the east. It would also deflect some of the overspray from the Lighthouse Park's irrigation system, reducing the invasive weeds along the border and subsequently management costs associated with their removal.

Actions planned in association with the Jupiter Inlet Lighthouse and Tindall House are not expected to affect native plant communities as these areas have been largely converted to maintained landscapes, predominately bahia grass, although there are an increasing number of native plantings being installed and maintained.

b. Impacts from Alternative 1

Same as Preferred Alternative, except that this Alternative would result in additional impacts to vegetation related to public access facilities south of County Road 707 in Lot 17. The proposed action is estimated to include 2,575 feet of new hard trails, 4,200 feet of new soft trails, 550 square feet of new parking and 800 feet of new boardwalks. The construction of these facilities would result in the loss of 0.93 acres of scrub, 0.017 acres of hardwood hammock and 0.33 acres in areas of disturbed hardwood hammock dominated by invasive species, primarily Brazilian pepper.

Impacts from the prescribed burn program would be the same as the Preferred Alternative for management blocks 1, 2 and 5. In management blocks number 3 and 4 along U.S. Highway 1, vegetation would be manipulated mechanically to remove excess fuels and to renovate the scrub. This option provides flexibility in the amount and location of activities to maintain scrub characteristics, but would not provide the ecological benefits of prescribed fire, particularly for endemic plants.

c. Impacts from Alternative 2

Under this Alternative the proposed action is estimated to include 4,000 feet of new shell rock trails, 750 feet of new soft trails, square feet of new parking and 240 feet of new boardwalk. The construction of these facilities would result in the loss of 0.18 acres of scrub, 0.13 acres of hardwood hammock and 0.33 acres in areas of disturbed hardwood hammock dominated by invasive species, primarily Brazilian pepper. During construction of the new hard trails, the adjacent areas are expected to be temporarily disturbed by equipment and clearing activities. This is expected to include approximately 2 feet on either side of the trails, totaling an additional 0.11 acres of disturbance across these habitats. Impacts would be similar to those discussed earlier. This alternative may provide some limited benefit over the hard trails in Alternative 1 by being more permeable and shedding less water into the trail shoulder. This should reduce the germination of invasive species.

Under this alternative, impacts from the prescribed burn program would be the same as the Preferred Alternative.

d. Impacts from No Action Alternative

Under this alternative there would be no additional prescribed burns and public use facilities would not be constructed. While there is expected to be less public use within the natural areas of the ONA, casual use is expected to continue and could result in inadvertent trampling of lichen, nodding pinweed and other smaller special status plants. Without burning or efforts to maintain open sand scrub areas, the site would eventually return, over several decades, to a sand pine scrub which would shade out most forbs and many scrub endemics.

Without a buffer behind the ball fields and cover on the tennis courts, the adjacent scrub in Lot 19 would continue to be degraded by trampling, trash and the edges of the site would require extensive maintenance to remove invasive weeds. There is the potential for extensive trampling in this open scrub habitat, particularly lichens, fungus and small annuals.

The lack of shoreline restoration projects under this alternative would result in the continued erosion along the shoreline resulting in additional loss of vegetative cover. Unmanaged, the continued public use would result in the accelerating loss of this bluff and leave the site vulnerable to catastrophic loss during storm surges.

7. Wildlife

a. Impacts from Preferred Alternative

General wildlife is expected to benefit from the habitat actions proposed under this Alternative. The continuation of the prescribed burn program and invasive weed programs would maintain or improve habitat for scrub and wetland species. The combination of the prescribed burn program and mechanical manipulations would provide a mosaic of different aged scrub habitats capable of supporting a wide variety of species. The increased public use at the site may alter some wildlife use patterns, particularly roosting wading birds and potentially foraging tortoises. However, restricting the use to established trails is expected to limit those impacts and eventually most species are expected to habituate to the use.

At least 3 acres of scrub oak and sand pine scrub and up to 20 acres of hardwood hammock habitat would be created by the restoration of Lot 17, to the benefit most wildlife species recorded in the ONA.

In some cases, the removal of non-native plant species may result in the short-term impact to wildlife, due to localized loss of cover. Ultimately, native wildlife is expected to benefit from the removal of exotic vegetation and restoration of the native plant communities. Leaving snags in strategic locations where they do not pose a hazard to the public is a standard procedure under this plan and would mitigate some of the temporary loss of structure, particularly for roosting egrets, herons and osprey.

Actions planned in association with the Jupiter Inlet Lighthouse and Tindall House are not expected to negatively affect wildlife as these areas have been largely converted to maintained landscapes, predominately bahia grass, although there are an increasing number of native plantings being installed and maintained. These areas new native planting areas provide additional habitat for wildlife species, for example a gopher tortoise recently excavated a burrow in a constructed mound near the Tindall House. The increased use of native plantings would increase habitat values even in these relatively high public use areas.

b. Impacts from Alternative 1

Same as the Preferred Alternative, the increased emphasis on mechanical manipulations to maintain scrub characteristics would provide more flexibility to maintain sand pine on these blocks rather than the complete stand replacement as a result of prescribed burns. This structure and forage opportunities for migratory and resident birds, as well as squirrels.

The creation of approximately 3 acres of new tidal wetlands provides benefits, particularly for wading birds and fisheries. However, increases in public use along boardwalks and in kayaks may disrupt this use during peak visitation. Increases in public use may also bring increases in litter attracting raccoons and crows, resulting in artificially high numbers. Construction of a mangrove shelf along reaches of the Indian River Lagoon and Loxahatchee River would eventually increase structure and shade, increasing habitat diversity for fish and invertebrates.

c. Impacts from Alternative 2

Impacts to general wildlife under this alternative would be similar to Alternative 1, except that there would be no new wetland construction on the north of County Road 707, and the new tidal wetland south of County Road 707 would have only one entrance, supporting more effective tidal flushing. Installation of mangrove balls along shallow shorelines could eventually provide limited shade or structure along the Indian River Lagoon and Loxahatchee River, but higher public use of the area because of the boat mooring facilities could reduce their viability and would potentially increase harassment and shoreline disturbances.

This Alternative proposes the removal of the Brazilian pepper, Australian pine and other invasive species from Lot 17 at one time. This would remove structure and forage opportunities within the area without providing opportunities for temporary alternative habitat.

d. Impacts from No Action Alternative

The No Action Alternative eliminate the affects of construction activities related to trail, parking area, boardwalk and other visitor use facilities. There would be no invasive removal in Lot 17, which would result in the continuation of a seed source for other areas of the ONA already in a maintenance mode. There would be no prescribed fire used to renovate scrub habitats in south of County Road 707.

8. Special Status Species

a. Impacts from Preferred Alternative

Plants/Lichen Species

Curtiss' milkweed (*Asclepias curtissii*) - This species is expected to benefit from shorter rotation burns and its distribution on the tract should expand in disturbed scrub areas as invasive species are removed and fire is reintroduced. Restoration of the scrub areas in Lot 17 has the potential to provide additional suitable habitat for this species.

Four-petal pawpaw (*Asimina tetramera*) – Four-petal pawpaw could be affected by implementation of the prescribed burn program, integrated weed management program, construction of public use facilities, research activities, and population augmentation.

All of the four-petal pawpaws in the ONA are located in areas where the habitat objective would be to maintain scrub height below 5.5 feet. Prescribed fire would be used as the primary management tool with some hand clearing and root raking as needed to maintain 10-30% open sand. Although hand clearing may be used in the vicinity of pawpaw, no root raking would be conducted in immediate vicinity of four-petal pawpaw. Fire damages or removes the aboveground portions of this long-lived shrub, but the below ground stems re-sprout robustly and the new growth supports significantly increased flowering and fruiting (Cox 1998). In addition, decadent growth tends to be highly branched which, according to Anne Cox, (pers. communication) may reduce the capacity for the plant to support viable fruit. The most appropriate fire interval for four-petal pawpaw has not been established and, although there are indications that regular applications of fire benefits this species, the optimum interval is not known. Adjustments in the fire interval could be made in response to future research. The proposed prescribed fire program is expected to benefit this four-petal pawpaw.

There is potential for this species to be affected by integrated weed management activities, however the four naturally occurring plants are well documented and tagged. The planted pawpaws are still individually flagged and more obvious because of the remaining drip lines in the planting area. The pawpaws are located in areas of intact scrub where hand pulling is generally sufficient to remove natal grass, the most common invasive in Lot 15. Weed crews/ applicators are familiar with the species and know the locations of the existing plants. No herbicide applications will be made on days when there is potential for drift to affect non-target species. Overall, habitat conditions in the scrub would improve with ongoing efforts to control invasive plants. The integrated weed management activities are not expected to have an adverse affect on four-petal pawpaw.

Construction of a parking area and trail system has the potential to affect four-petal pawpaw. There are currently no formal trails or signage at the site; however with the greater visibility of the ONA designation, visitation is expected to increase, and there is a need to provide for controlled public access through the site. Currently most visitors use an existing management road along the south side of Lot 16 chain link fence to access the site and the constructed wetlands to the east along the Indian River Lagoon (Intracoastal Waterway). This management road passes by two of the naturally occurring four-petal pawpaw. This road is expected to be closed in this alternative and vehicle access, for management purposes only, would be rerouted through Lot 16, using existing asphalt roads. Although neither of the naturally occurring pawpaw in this portion of Lot 15 shows signs of damage from the current vehicle use, it is resulting in rutting and road widening at the bottom of the hill. With the expected increase in public use the lack of a formal trail system and appropriate signage increases the potential for trampling of the smaller planted pawpaw. There is some potential for visitors to take ripe fruit, however the fruit ripens in the middle of the summer when public visitation is generally low. A formal trail system is expected to funnel visitors through the site and provide for interpretation of the resource values, including the endemic scrub plants. Adoption and enforcement of the Palm Beach County natural area ordinance as special rules for Jupiter Inlet and ultimately staffing the site with a full time manager will provide additional protection for resources and ensure visitor compliance. The trail system as proposed in the plan is conceptual and the exact routing will be determined onsite with the trail being routed around woody vegetation and special status plants, including four-petal pawpaw, and in coordination with Vero Beach Fish and Wildlife Service staff.

Ongoing research and population augmentation within suitable habitat for this species would support the recovery objectives for this species. This action would establish a large and genetically diverse population at the ONA to protect this species from further loss of germplasm and a decline in remaining plant numbers across its limited range. Individual proposals would be coordinated with U. S. Fish and Wildlife Service. Augmentation is planned only in those blocks where the fire interval would maintain open, low oak scrub. This species responds well to fire after it is established.

Perforate reindeer lichen (*Cladonia perforata*) - Perforate lichen could be affected by implementation of the prescribed burn program, integrated weed management program, construction of public use facilities, construction of new fencing and screens associated Jupiter Lighthouse Park and monitoring activities.

The effects of fire on this extremely rare lichen are not well understood. Ecological Consultants quoted Johnson and Abrahamson (1990), "*Cladonia and Cladina sp.* are destroyed by fire and take 10 to 12 years to recover to preburn levels". They also cited another recent study from Archbold Biological Station which indicates that lichens may recolonize burned sites within three to five, but at lower densities than prior to the burn (Menges 1995, in press). Mechanical disturbance is also likely to be detrimental to this species. As such, areas supporting concentrations of Florida perforate lichen would be excluded from mechanical disturbance and buffered from prescribed fire. Prior to prescribed burns under this alternative, perforate lichen would be moved from vulnerable locations, under sand pines and in dense litter, to suitable habitat including unoccupied habitats in other areas of the ONA. This option may expand the current population and provide refugia for this species during subsequent burns. Because pre-burn activities and prescribed burns are likely to result in adverse affects to this federally listed species BLM is required to consult with the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service is currently preparing a programmatic biological opinion which is likely to address many of the options discussed above. Once that document is prepared, BLM will consult with Fish and Wildlife Service and incorporate approved best management practices into all pre-burn and prescribed fire activities.

In management blocks where shorter prescribed burn rotations perforate lichen is expected to be excluded, except where open sand provides refugia. Overall, the prescribed burn program is considered necessary to maintain the scrub habitats of this species and would benefit the long term maintenance of this species at the ONA, but there is potential for individuals to be killed during prescribed burns at the ONA.

The integrated weed management program has the potential to affect perforate lichen. In general, perforate lichen occurs in intact scrub areas where there are few invasive plant species. Natal grass (*Rhynchelytrum repens*) is the most common invasive occurring in proximity to perforate lichen. Even with occasional hand pulling there is the potential to trample individual perforate liche, particularly in mixed beds of lichen and in areas with hard to identify smaller thalli. Limiting the number of people in these cases to one or two people capable of identifying the species and understanding the need to avoid trampling would help to minimize loss. Hand pulling and bagging with as little ground disturbance as possible, rather than herbicide use would be required in areas with perforate lichen. Timing the work during the morning hours or during periods of high humidity may help reduce fragmentation of thalli, as would combining the effort with annual monitoring to reduce the overall foot traffic in the area.

Construction of visitor use facilities has limited potential to affect perforate lichen. No trails are proposed for Lot 19, where the bulk of the perforate lichen occurs, nor are there trails planned near the single population in the southwest corner of Lot 15. There are trails proposed in Lot 15 that will be routed around the three recent transplant locations. PVC pipe frames have been placed over the transplanted lichen to protect against inadvertent trampling by the public. The proposed trail closest to the eastern two transplant areas is proposed as a handicap accessible trail, the formal trail system and interpretive signage is expected to reduce potential trampling off the trail. Interpretive signage and environmental education is expected to limit public use off the trail system and enforcement of special rules will ensure compliance.

Scrub habitats within Lot 19 and perforate lichen are being negatively affected by public use and maintenance activities at Jupiter Lighthouse Park. Trash and overspray from the irrigation system has

degraded scrub habitat bordering the fields and increased the cover of invasives and non-scrub plants. Increased fragmentation of lichen thalli in at least one area is likely due to occasional foot traffic. Trash and trampling have also been observed behind the tennis courts as people enter the area to retrieve balls and other activities. Actions are proposed in the plan to reduce the potential impact in these areas. Perforate lichen is expected to benefit from the installation of new fencing east of the ballfields in Jupiter Lighthouse Park. Chain link fencing and the installation of a native species shrub will substantially reduce litter being blown into the natural area, discourage foot traffic and the shrubs, when mature, will deflect some of the overspray from the ball field sprinklers. The overspray contributes to the establishment of non-native grasses and forbs in the natural area, reducing habitat quality in this scrub habitat to the detriment of perforate lichen. Installation of a screen over the tennis courts and locking the gates on the north side of the tennis courts would reduce impacts to perforate lichen by eliminating foot traffic and associated soil disturbance in the area of the ONA near the densest populations of perforate lichen.

Monitoring perforate lichen will include mapping the extent and establishing relative density of the current population with annual follow-up, as well as ongoing annual monitoring of the survivorship of the transplanted perforate lichen thalli. BLM would incorporate standardized monitoring protocols approved for this species by U.S. Fish and Wildlife Service.

Large-leaved rosemary (*Conradina graniflora*) - This fire-dependent scrub endemic is expected to respond favorably to fire, and its distribution and numbers are expected to increase as a result of the prescribed fire program.

Nodding pinweed (*Lechea cernua*) - This species is fire-adapted and expected to benefit from the proposed management program. This species could be vulnerable to overspray during herbicide applications to treat invasive weeds, particularly natal grass. Mechanical treatments in lieu of burning in management blocks along U.S. Highway 1 may not provide adequate open sand for this species in those management blocks. Restoration of the scrub areas in Lot 17 has the potential to improve and expand habitat for this species.

Pine pinweed (*Lechea divaricata*) - Only a few individuals of this species are present on the tract. The management program is expected to improve habitat conditions for this species particularly in those blocks bordering U.S. Highway 1. An increased emphasis on the use of mechanical manipulations in these blocks would provide some flexibility in avoiding trees supporting these epiphytes.

Golden polypody (*Phlebodium aureum*) - This epiphytic fern is fire adapted and is expected to resprout shortly after burning.

Sand spikemoss (*Selaginella arenicola*) - This species tends to occur in open sand areas where fire is not likely to carry and where mechanical manipulations are generally not necessary. There is potential for this species to be negatively impacted by mechanized equipment crossing open sand areas and during site preparation for prescribed burns. This species is expected to benefit from increased protection of Lot 19, where most of the population occurs. This species, like perforate lichen, is vulnerable to trampling and is outcompeted by weedy plants supported by overspray from sprinklers. Reducing foot traffic in Lot 19 and protecting arid scrub conditions is expected to benefit this species.

Tillandsia sp. - All of the special status bromeliads are sensitive to fire and individuals would be killed during prescribed burns. Management blocks are expected to be recolonized from seed sources in adjacent blocks. An increased emphasis on the use of mechanical manipulations in these blocks would provide some flexibility in avoiding trees supporting these epiphytes. However, the shorter burn rotations in management blocks 1, 2, and 3 are likely to limit numbers.

Shoestring fern (*Vittaria lineata*) - Primarily a hammock species, there is the potential for some plants may be lost during prescribed burns in adjacent areas.

Wildlife Species

Brown Pelican (*Pelecanus occidentalis*) - Brown pelican is not expected to be adversely affected by the proposed actions in upland areas. Potential affects related to shoreline stabilization would be covered under analysis based on the final selected design.

Florida scrub jay (*Aphelocoma coerulescens*) - Although there are no longer Florida scrub-jays on site at Jupiter Inlet, the ONA continues to provide suitable habitat and there is some potential for dispersing birds to reoccupy the site. The proposed plan would continue to provide near optimal habitat across at least 20 acres, while maximizing the habitat values for other scrub endemics. The scrub management in the ONA would be balanced between the needs to maintain habitat for Florida Scrub-jay and other scrub endemics in the more interior prescribed burn management blocks (#1, #2 and #5), and the longer burn intervals needed to maximize habitat for *C. perforata*, epiphytes, and rosemary in blocks #3, #4, and #6 totaling about 25 acres. These other blocks would continue to provide suitable, if not optimal Florida scrub-jay habitat.

The ONA is likely too small to warrant transplant efforts, but the maintenance of habitat improves chances of dispersing individuals utilizing the site, if or when the south Florida population stabilizes.

Annual monitoring for the presence of Florida Scrub-jay would continue using the most up to date protocol approved by the U.S. Fish and Wildlife Service. The monitoring would be expanded to meet current standards if Florida scrub-jays occupy the site.

Florida mouse (*Peromyscus floridanus*) – Habitat conditions are expected to be maintained under this Alternative and reintroduction efforts, if successful, would provide an additional population of this rare Florida species.

Gopher tortoise (*Gopherus polyphemus*) – Gopher tortoise could be affected by the proposed prescribed burn program, integrated weed management program, construction of public use facilities and fence construction. The continuation of the prescribed burn program is expected to benefit gopher tortoise by continuing to promote native herbaceous forage species. The restoration activities in Lot 17 are also expected improve and extend scrub habitat for this species in the upland portions of this area. A gopher tortoise survey would be required prior to mechanical treatments and treatments would be excluded from operating within 25 feet of active, inactive or abandoned burrow. Woody invasives within the 25 foot burrow buffer would be killed in place to avoid the potential of collapsing the burrow.

The integrated weed management plan in general benefits gopher tortoise by facilitating the establishment of native grasses and groundcovers, however there is potential for crews to inadvertently crush shallow burrows. Crew briefings ahead of the work would reduce the potential for damaging burrows. The only herbicide planned for use on potential forage species is glyphosate, which has low toxicity for wildlife, although there appear to be no studies on ingestion by tortoise. Glyphosate residues in plant tissues tend to remain until foliage is shed or the plant dies and tissues begin to decay. The reported half-lives of glyphosate in vegetation typically are less than 24 days and glyphosate does not bioaccumulate ([Giesy et al. 2000](#)). The potential for ingestion is expected to be negligible given the spot application and short exposure time, and there is no evidence that limited exposure would result in toxic effects.

The construction of public use facilities has the potential to affect gopher tortoise. There are no gopher tortoise burrows near the proposed parking area north of County Road 707, but there are burrows within 100 feet of the area of the proposed handicap accessible trail in Lot 15. Construction activities and the increased public use may alter foraging use by tortoises, at least temporarily.

All perimeter fences are split rail and would not restrict gopher tortoise movement, nor would they keep gopher tortoise from attempting to cross County Road 707. While there has been no evidence of road killed tortoise along this section of road it should be monitored and remedial actions taken, if needed. The new chain link fence along the ball fields would exclude tortoises, but also reduces the chance of interactions with people and lawn maintenance equipment and prevents the tortoises from becoming dependent on turf.

Eastern indigo snake (*Drymarchon couperi*) - Indigo snakes have not be documented at Jupiter Inlet, but there is suitable habitat. The prescribed burn program and integrated weed management program are expected to ultimately benefit indigo snake by maintaining or improving habitat quality, but there is potential to affect individuals during these activities. A though inventory of potential refugia (i.e. stumps, debris piles, etc.) prior to prescribed burns, briefing of the burn crew on identifying and protocol if seen, as well as avoiding use of ring fires that could trap wildlife, would help to reduce the potential to adversely affect this species.

There is also the potential for entanglement in erosion control fabrics used in bank stabilization. Standard best management practices would include using only properly prepared and geofabrics that do not pose and entanglement threat.

Scrub lizard (*Sceloporus woodi*) - This species is expected to benefit from the maintenance of a mosaic of scrub habitats, particularly sand pine scrub edges on the western side management blocks 3 and 4.

West Indian Manatee (*Trichechus manatus*) – The proposed shoreline stabilization project would occur within designated critical habitat for this species. These shoreline areas do not currently support seagrasses, but stabilization would reduce sedimentation in the general area, including nearby seagrass beds. Impacts to this species, particularly related to the manatee travel corridor along the shore line, would depend on the selected project design, and will require a separate and more in-depth analysis beyond the scope of this document.

Wading Birds (Reddish Egret, Snowy Egret, Little Blue Heron, Tri-colored Heron, and White Ibis) and Osprey

These species use shoreline habitats where increases in public use are expected. The construction of the proposed boardwalk west of the tidal wetland north of County Road 707 would temporarily displace herons, egrets and osprey during construction activities. Increases in public use, as a result of the boardwalk and overlook could temporarily reduce overall suitability for foraging and loafing by these birds. Placing the boardwalk in the adjacent hammock would buffer birds visually and reduce that impact. Most wading birds and osprey are expected to eventually habituate to routine use of the boardwalk and overlook and the area is expected to continue to provide suitable habitat for foraging and loafing.

Royal Tern

This species is not expected to be affected by the implementation of this plan.

Merlin

In general, no actions are expected to affect this species, but improving habitats for native species, including song birds would benefit this winter visitor.

Painted Bunting

In general, no actions are expected to affect this species, but habitat improvements projects, including restoration of Lot 17 would benefit this winter visitor.

b. Impacts from Alternative 1

Plants/Lichen Species

Curtiss' milkweed (*Asclepias curtissii*) – Impacts to this species would be similar to the Preferred Alternative, however mechanical manipulations in the management blocks along U.S. Highway may not provide optimal habitat and the use of mechanized equipment may result in inadvertent impacts to unidentified individuals.

Four-petal pawpaw (*Asimina tetramera*) – Same as the Preferred Alternative, although the population target is set at 500, while the Preferred Alternative is undefined and target would be assessed for each augmentation project.

Perforate reindeer lichen (*Cladonia perforata*) – Same as the Preferred Alternative, except an increased emphasis on mechanical disturbance in management blocks along U.S. Highway 1 is less likely to create suitable habitat. Areas supporting concentrations of Florida perforate lichen would be excluded from mechanical disturbance and buffered from prescribed fire.

Large-leaved rosemary (*Conradina graniflora*) – Same as the Preferred Alternative, except an increased emphasis on mechanical disturbance in management blocks along U.S. Highway 1 is less likely to create suitable habitat.

Nodding pinweed (*Lechea cernua*) - Mechanical treatments in lieu of burning in management blocks along U.S. Highway 1 may not provide adequate open sand for this species in those management blocks. Less focus on early intervention following prescribed burns and other disturbances would increase the potential for the spread of this species and the need to use herbicides for its control, with potential to inadvertently treat this species.

Pine pinweed (*Lechea divaricata*) - Only a few individuals of this species are present on the tract. Although the management program is expected to improve habitat conditions for this species, this Alternative provides more flexible options for avoiding individual plants during mechanical manipulations.

Golden polypody (*Phlebodium aureum*) – Same as the Preferred Alternative, except that this Alternative provides more flexible options for avoiding individual plants during mechanical manipulations.

Sand spikemoss (*Selaginella arenicola*) – Same as the Preferred Alternative, except mechanical treatments in lieu of burning in management blocks along U.S. Highway 1 may not provide adequate open sand for this species in those management blocks.

Tillandsia sp. - All of the special status bromeliads are sensitive to fire and individuals would be killed during prescribed burns. Management blocks are expected to be recolonized from seed sources in adjacent blocks. However, the shorter burn rotations in management blocks 1, 2, and 3 are likely to limit numbers. Mechanical manipulation in the management blocks along Highway 1 provides additional flexibility to retain individual pines or oaks supporting these epiphytes.

Shoestring fern (*Vittaria lineata*) - Primarily a hammock species, some plants may be lost during scrub restoration activities.

Wildlife Species

Florida scrub jay (*Aphelocoma coerulescens*) - Same as the Preferred Alternative, expect that the increased emphasis on mechanical manipulations in management blocks along U.S. Highway 1 would be less likely to provide optimal habitat. Also, this Alternative sets the anticipated burn interval, rather than a more adaptive approach to maintain suitable scrub conditions. This approach reduces management flexibility in responding to these natural processes. Initially, fifteen years may not be a short enough interval to exclude sand pine regeneration and droughty conditions could require that the burn schedule be extended to meet the required prescription.

Florida mouse (*Peromyscus floridanus*) – Same as the Preferred Alternative. Mechanical treatments in lieu of burning in management blocks along U.S. Highway 1 may not remove leaf litter or provide sufficient open sand optimize habitat for this species in those management blocks.

Gopher tortoise (*Gopherus polyphemus*) –The continuation of the prescribed burn program is expected to benefit gopher tortoise by continuing to promote herbaceous forage species. The restoration activities in Lot 17 are expected improve habitat for this species in the upland areas, particularly the restoration of scrub habitats in the western areas. A gopher tortoise survey would be required prior to mechanical treatments and mechanical treatments would be excluded from operating within 25 feet of active, inactive or abandoned burrow.

Scrub lizard (*Sceloporus woodi*) - This species is expected to benefit from the maintenance of a mosaic of scrub habitats, particularly sand pine scrub edges.

West Indian Manatee (*Trichechus manatus*) – Same as the Preferred Alternative.

Wading Birds (Reddish Egret, Snowy Egret, Little Blue Heron, Tri-colored Heron, and White Ibis) and Osprey

Same as Alternative 1, except that the construction of new tidal wetlands would provide additional habitat for these birds.

Royal Tern (*Sterna maxima*)

Same as Alternative 1.

Merlin (*Falco columbarius*)

Same as Alternative 1.

Painted Bunting (*Passerina ciris*)

Same as Alternative 1.

c. Impacts from Alternative 2

Plants

Curtiss' milkweed (*Asclepias curtissii*) - This species is expected to benefit from including the management blocks along U.S. Highway 1 in the prescribed burn program which has the best option to create open sand and to avoid soil disturbance.

Four-petal pawpaw (*Asimina tetramera*) – All of the known four-petal pawpaw in the ONA are located in areas where the burns are expected to be used to maintain low (4 – 5.5 feet) shrub layers. While fire damages or removes the aboveground portions of this long-lived shrub, the below ground stems of this fire adapted shrub re-sprout quickly and the new growth supports increased flowering and fruiting. The augmentation target under this Alternative is 300 rather the unspecified number in the Preferred Alternative, which would be a more adaptive approach to augmentation based on the results of the initial transplant.

Perforate reindeer lichen (*Cladonia perforata*) – Same as the Preferred Alternative, except that perforate lichen could only be moved within currently occupied habitat. Since this species is only known to reproduce by vegetative means this would not result in any additional populations within the ONA. It would also restrict management options during site preparation for prescribed burns. It does represent the lowest risk to individual thalli. Under this Alternative the doors on the north side of the tennis courts would remain unlocked leaving some of the best populations of this species vulnerable to trampling.

Large-leaved rosemary (*Conradina graniflora*) - This fire-dependent scrub endemic is expected to respond favorably to fire, and its distribution and numbers are expected to increase.

Nodding pinweed (*Lechea cernua*) - This perennial herb is fire-adapted, resprouting and seeding after burns and is expected to benefit from the proposed management program. This species could be vulnerable to overspray during herbicide applications to treat invasive weeds, particularly natal grass. Mechanical treatments in lieu of burning in management blocks along Highway 1 may not provide adequate open sand or prompt the same seeding response in these management blocks.

Pine pinweed (*Lechea divaricata*) - At most, only a few individuals of this species are present on the tract. Although the management program is expected to improve habitat conditions for this species, special care would be required to avoid individual plants during initial mechanical manipulations.

Golden polypody (*Phlebodium aureum*) - This epiphytic fern is fire-adapted and is expected to resprout shortly after burning.

Sand spikemoss (*Selaginella arenicola*) - Same as Preferred Alternative, except that the doors on the north side of the tennis courts would remain unlocked leaving some of the best populations of this species vulnerable to trampling.

Tillandsia sp. - All of the special status bromeliads are sensitive to fire and individuals would be killed during prescribed burns. Management blocks are expected to be recolonized from seed sources in adjacent blocks. However, the shorter burn rotations in management blocks 1, 2, and 3 are likely to limit numbers. The initial prescribed burn in the management blocks along U.S. Highway 1 would kill most of

the bromeliads. While the longer burn rotation would eventually allow for the more mature structure needed for these plants, there may be reduced seed sources in the adjacent more frequently burned management blocks.

Shoestring fern (*Vittaria lineata*) - Primarily a hammock species, some plants may be lost during prescribed burns.

Wildlife

Florida scrub jay (*Aphelocoma coerulescens*) – Same as Alternative 1, however increased focus on mechanical manipulation in the management blocks along Highway 1 would not provide optimal habitat for this species in those areas.

Florida mouse (*Peromyscus floridanus*) – Habitat conditions are likely to improve under this Alternative, but without a transplant program there is little chance of this species maintaining a sustainable population in the ONA.

Gopher tortoise (*Gopherus polyphemus*) –The continuation of the prescribed burn program is expected to benefit gopher tortoise by continuing to promote herbaceous forage species. The restoration activities in Lot 17 are expected improve habitat for this species in the upland areas. A gopher tortoise survey would be required prior to mechanical treatments and mechanical treatments would be excluded from operating within 25 feet of active, inactive or abandoned burrow.

Scrub lizard (*Sceloporus woodi*) - This species is expected to benefit from the maintenance of a mosaic of scrub habitats, particularly sand pine scrub edges.

West Indian Manatee (*Trichechus manatus*) – Same as the Preferred Alternative.

Wading Birds (Reddish Egret, Snowy Egret, Little Blue Heron, Tri-colored Heron, and White Ibis) and Osprey

Same as Alternative 1, except that the construction of new tidal wetlands would provide additional habitat for these birds.

Royal Tern (*Sterna maxima*)

Same as Alternative 1.

Merlin (*Falco columbarius*)

Same as Alternative 1.

Painted Bunting (*Passerina ciris*)

Same as Alternative 1.

c. Impacts from No Action Alternative

Under this Alternative, there would be no impacts from the construction of visitor use facilities, however, increases in public use are expected to occur regardless due increased visibility, and media attention. Without a trail system to guide visitors through the ONA there would be increased potential

for habitat damage as a result of trampling and the potential for smaller plants and lichen, including perforate lichen, nodding pinweed, small Curtiss milkweed to be impacted by inadvertent foot traffic. There is also an increased potential for gopher tortoise burrows to be damaged and tortoises harassed by curious visitors without constraining trail system and public education. Without additional protections, including new fencing along the ball fields, and locking and covering the tennis courts foot traffic is expected to continue to degrade habitat for the endangered perforate lichen. Foot traffic in this area damages soil crusts, encourages weedy species and results in crushing or fragmentation of lichen thalli.

The management road south of the U.S. Coast Guard communication site would remain open. Vehicle travel on this road is rutting the deep sand particularly at the bottom of the hill where vehicles must make a sharp left turn. This is in the immediate vicinity of the largest original four petal pawpaw and leaves it vulnerable to inadvertent damage.

Although the prescribed burn program would be similar to the Preferred Alternative, under this Alternative there would be no habitat restoration activities in Lot 17. Without removal of the exotic species, this area has very limited capacity to support the endemic species normally associated with the original scrub and hardwood hammock habitats.

Throughout scrub habitats there would be no action taken to maintain and enhance open sandy areas. Burned oak scrubs can develop into thick stands which can hamper the germination and growth of many scrub endemics requiring open sand.

Under this Alternative there would be no actions taken to remove feral cats which could increase predation of Florida scrub lizards and hatchling tortoise. There would be no Florida mouse relocations in this alternative. Without augmentation this population is not expected to be viable, if it currently exists.

Perforate lichen would not be moved under this Alternative, which may jeopardize the implementation of prescribed burns in the areas where it is most numerous. Without burning these areas habitat is expected to continue to decline and this population is expected to be compromised.

9. Invasive, Non-native Species

a. Impacts from Preferred Alternative

Control of invasive, non-native plants would be coordinated across the ONA through the Coordinated Weed Management Area. This alternative provides the greatest level of coordination and collaboration across administrative boundaries. Under this alternative the partners would collaborate on contracts, methods and timing which would lead to more effective control.

The ongoing suppression of invasive and exotic plant species would reduce competition with endemic scrub species and allow for restoration of native plant communities. Outside of Lot 17, control of invasive plant species is primarily an ongoing program of suppressing herbaceous annuals and vines. In most cases this can be attained by hand pulling with limited foliar herbicide application in areas with dense stands or heavy vines, or stump treatment of woody regrowth. There is potential to affect non-target vegetation in dense stands of invasives, particularly invasive grasses and vines.

In Lot 17, woody invasives would be removed incrementally west to east over a period of three years. This would allow for some invasive species to reseed treated areas and require increased retreatment by hand-pulling and herbicide application to accomplish adequate control.

In the long-term, though, mangroves and other wetland species are expected to benefit from the restoration of a more natural hydrologic regime and reduced competition with non-native plant species along the shoreline.

b. Impacts from Alternative 1

Same as Preferred Alternative, except that invasive plant treatment would be scheduled semi-annually. While this would provide a good level of control, it does not provide the flexibility for early detection and follow-up after prescribed fire and other disturbances. Many of the target species respond quickly to disturbance and can flower and seed within months. Delaying treatment allows additional spread of these species, increasing the cost of removal and the use of herbicide to obtain sufficient control.

c. Impacts from Alternative 2

Impacts under this alternative would be similar to Alternative 1, except that each entity would be responsible for their own invasive, non-native program. While this could be effective, budget issues, differences in prioritization, and contract timing is likely to result in implementation gaps, resulting in non-treatment of some areas which could subsequently act as seed sources.

Weed treatment techniques and the associated impacts would be similar to Alternative 1.

Under this alternative, mature woody vegetation in Lot 17 would be removed at one time, leaving only the most eastern portion untreated until after the shoreline has been fully stabilized. This method would reduce the number of retreatments and amount of herbicide needed to suppress the regrowth of non-native species.

d. Impacts from the No Action Alternative

Impacts would be similar to Alternative 2, except that under this alternative there would be no invasive removal in Lot 17. This is the last major acreage within the ONA with woody invasives. Not treating this area would be a lost opportunity to restore native habitat values on these 23 acres and the area would continue to provide a seed source for exotic species in adjacent areas of the ONA.

10. Wetland/Riparian Zones

a. Impacts from the Preferred Alternative

Under this Alternative, no additional wetlands would be constructed. Shoreline stabilization projects, including the construction of an intertidal mangrove shelf are planned for both the Indian River Lagoon and the areas along the Loxahatchee River. These projects are outside the scope of this document and would be addressed in-depth in a separate analysis.

b. Impacts from the Alternative 1

This Alternative would result in the construction of approximately three acres of new tidal wetland components through the extension of the existing tidal lagoon and creation of an additional opening, the creation of a new tidal lagoon with two entrances south of Cato Bridge. There is potential for the second opening on the existing tidal lagoon to dissipate the flushing capacity of that lagoon, and increase the need for future maintenance to keep the openings from silting in. The same would be true for the second tidal lagoon proposed south of Cato Bridge.

c. Impacts from Alternative 2

Under this alternative, there would be no new wetland construction. The new tidal wetland proposed south of Cato Bridge in this alternative would have only one inlet and is expected to be more efficient in flushing sediments, requiring less maintenance and reducing the disturbance related to that maintenance.

d. Impacts from the No Action Alternative

Under this Alternative, there would be no new wetland construction or shoreline stabilization. Without shoreline stabilization, the erosion on both the Indian River Lagoon and the Loxahatchee River would continue to degrade shoreline habitats and leave them vulnerable to catastrophic loss during hurricane storm surges.

11. Recreation and Public Use

a. Preferred Alternative

This alternative provides new public access to the northern portion of the ONA through construction of a small parking area and ADA compatible trail/boardwalk and overlook to the tidal lagoon. Associated interpretive signage would increase public awareness of the special resources of the ONA and should increase compliance with special rules to protect those resources.

Within Lots 18 and 20 new facilities would be constructed to more effectively accommodate increased public visitation while protecting the historic and cultural resources. The area behind the Station J building would be filled, and capped with geofabric and resodded to cap the existing midden. Pavers would be installed in high use areas as additional protection and to provide a level, stable surface for visiting public. A deck would be constructed at the base of the lighthouse under the council fig tree, to protect the site of the original lighthouse keeper's house, and provide seating and a waiting area for lighthouse visitors. This also provides an additional opportunity for public interpretation. The visiting public's experience would be further enhanced by access to the restored Lighthouse Keeper's Workshop, which would broaden the public's understanding of the life of early lighthouse keepers.

Impacts from the Alternative 1

This alternative provides the most public access to the interior of the ONA. The public would be directed from two new parking areas to a system of accessible trails to the primary destinations and viewing spots, as well as a series of soft trails that loop through the site. Observation decks would be constructed at the two major overlooks, the existing tidal wetland and Jupiter inlet. Elevated boardwalks along wetlands would be constructed along mangrove wetlands and on the south side in particular would provide a view of the crystal clear incoming tide that has made this site such a destination for snorkeling. The north and south trail systems would be linked under Cato Bridge, reducing the need for the public to cross County Road 707 to access both sides of the ONA.

Impacts on Lot 18 and 20 would be similar to the Preferred Alternative except that under this Alternative a water taxi dock would be constructed behind the Station J building. This water taxi would provide an additional access point to the ONA. It could also provide additional parking for visitors using the ONA as a departure point for other water taxi locations. The parking capacity is likely to be exceeded during Saturdays when the ball fields are being used for organized sports. The water taxi dock increases unmonitored access to the Station J building during the night.

b. Impacts from Alternative 2

This alternative provides less connected access through the ONA. There would be no new parking areas, requiring visitors to park at Jupiter Lighthouse Park and walk across County Road 707. A traffic light and a cross walk are proposed to provide for that crossing. There would be no overlook south of County Road 707, and the public would be able to view Jupiter inlet only while passing on the trail. There would be only one elevated boardwalk constructed to the existing tidal wetland. The public would view the Indian River Lagoon from a shell rock loop trail from a trail head south of Cato Bridge.

Like Alternative 1, new facilities would be constructed to more effectively accommodate increased public visitation while protecting the historic and cultural resources. The area behind the Station J building would be filled, and capped with a deck to protect the midden area and provide for higher public use. Like Alternative 1, a deck would be constructed at the base of the lighthouse under the council fig tree, to protect the site of the original lighthouse keeper's house, and provide seating and a waiting area for lighthouse visitors. The Lighthouse Keeper's Workshop would also be restored. Both of these actions provide additional opportunities for public interpretation.

c. Impacts from the No Action Alternative

Without the construction of additional public access facilities the majority of the ONA would remain inaccessible for most visitors. Lack of signage and parking would dissuade most people from venturing from the existing facilities associated with Lighthouse Park and the Loxahatchee River Historical Society. Although increases in general public visitation due to increased visibility and media attention, public use would be dispersed across the natural areas. Lack of interpretation and public education is likely to lead to inappropriate uses by uninformed visitors. The unauthorized use along the Indian River Lagoon would continue to be difficult to control and degradation of the site would continue.

12. Visual Resources

a. Impacts from the Preferred Alternative

As described in other sections of this plan, a fundamental intent of Congress in designating the ONA is "the conservation and enhancement of healthy, functioning ecological systems". Because of years of invasive plant development, this has required intensive management activities to remove trees such as Brazilian Pepper and Australian Pine, which has caused change in what had been the typical setting at the site: acres of trees have been cut down, understory vegetation has been cut, pulled and removed, and prescribed burns have blackened and charred both native and non-native plants. In Lot 17 similar actions would take place. Experience over the past ten years in Lot 15 has shown that understory grasses, shrubs and forbs are quick to reemerge. Within several growing seasons, the rapid growth of some shrubs adds a vertical canopy to the landscape. The most significant visual change that has resulted from the past habitat management and future proposed actions would be the temporary loss of the tree canopy from invasive trees. In the VRM program, short-term (up to 1 year) and medium term (up to 5 years) changes are considered temporary changes in the landscape, and are not usually mitigated during the recovery process. In hardwood hammock habitats, including most of Lot 17, tree species tend to be relatively fast growing and a new canopy is expected to be established within 10 to 15 years. Sand pines would respond quickly, particularly in response to fire and could be a dominant feature after 15 years. The canopy would not be replaced in scrub oak areas.

The removal of Australian pine in the vicinity of the Jupiter Inlet Lighthouse would alter the backdrop of this iconic structure. This is in keeping with returning the site to a natural state and would recreate more historically accurate view from the surrounding area.

From the observation points, very little of the facilities would be seen other than the trailhead parking lot and signs. Any visual impacts from the construction of the recreation facilities would be minor, and would not conflict with the VRM class III rating for the site. The historic renovations would be focused on preserving the setting and character of the structures, and the work involved would not generally be visible to from the observation points. Other proposed fencing around the ONA would be unfinished split rail.

Shoreline hardening is common along various parts of the inlet, and rivers. Mangroves planted along the shoreline would reduce their visual impact, increase the amount of mangrove habitat in the area, and keep the public out of the shoreline natural areas. All wood structures would be left unfinished and allowed to weather to help them match their surroundings. The chain link fence proposed between the sports fields and lot 17 would be black chain link fence, which is very low visibility against the dense vegetation behind it. The portal signs proposed in the plan would replace signs in similar locations as the existing portal signs, and directional signs would be placed to use existing sign structures wherever possible, as approved by the various transportation departments involved.

b. Impacts from Alternative 1

Same as the Preferred Alternative except that there is an increased emphasis on mechanical manipulation of habitats along U.S. Highway 1 rather than prescribed fire. This would make any changes to the vegetation more gradual and less obvious to the public.

c. Impacts from Alternative 2

Impacts under Alternative 2 would be similar to Alternative 1, except that all of the woody invasives in Lot 17 would be removed during the same year, increasing the impacts to visual resources, particularly when viewed from Jupiter Inlet Colony and from boats on the Indian River Lagoon. This would be relatively short term, as most hardwood hammock species grow relatively quickly. Vegetation structure is expected begin to return within three to four years and should be close to the existing structure within ten to fifteen years.

d. Impacts from No Action Alternative

Under the No Action Alternative there would be no removal of invasive trees from Lot 17, nor shoreline stabilization project. While this alternative maintains the existing vegetation cover avoiding short term impacts to visual resources, over the long term this alternative is would result in continuing erosion of the bank along the Indian River Lagoon and the continued coverage of exotic invasive plants, contrary to accepted public land management practices.

E. Cumulative Impacts

1. Cumulative Impacts from the Preferred Alternative

Implementation of the Preferred Alternative is not expected to prompt any development outside of the ONA. However, once completed, the public use facilities would encourage appropriate uses in the natural areas. Improved infrastructure and interpretive facilities associated with the Jupiter Inlet Lighthouse are expected to continue to increase the number of local, national and international visitors.

The prescribed fire and invasive species control programs would support scrub maintenance on one of the largest tracts of scrub remaining in Palm Beach County. The 120-acre ONA contributes to over

165,000 acres of conservation land in the County. The ONA is the only Federal property to support both four-petal pawpaw and perforate lichen. The proposed actions are expected to increase the numbers and viability of both populations at the site. Habitat management actions are also expected to retain scrub characteristics suitable for the Florida scrub jay. BLM has determined that implementation of the plan “may affect, but is not likely to adversely affect” the four-petal pawpaw, perforate lichen and Florida Scrub jay. The U.S. Fish and Wildlife Service concurred with that finding in a memo dated March 5, 2010, except that the prescribed burn program will require an additional consultation to address impacts and best management practices for burning in areas supporting perforate lichen.

Part VI. Appendices



A. Public Law 110-229, Section 202

LIGHTHOUSE OUTSTANDING NATURAL AREA.

(a) Definitions.--In this section:

- (1) Commandant.--The term "Commandant" means the Commandant of the Coast Guard.
- (2) Lighthouse.--The term "Lighthouse" means the Jupiter Inlet Lighthouse located in Palm Beach County, Florida.
- (3) Local partners.--The term "Local Partners" includes--
 - (A) Palm Beach County, Florida;
 - (B) the Town of Jupiter, Florida;
 - (C) the Village of Tequesta, Florida; and
 - (D) the Loxahatchee River Historical Society.
- (4) Management plan.--The term "management plan" means the management plan developed under subsection (c)(1).
- (5) Map.--The term "map" means the map entitled "Jupiter Inlet Lighthouse Outstanding Natural Area" and dated October 29, 2007.
- (6) Outstanding natural area.--The term "Outstanding Natural Area" means the Jupiter Inlet Lighthouse Outstanding Natural Area established by subsection (b)(1).
- (7) Public land.--The term "public land" has the meaning given the term "public lands" in section 103(e) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1702(e)).
- (8) Secretary.--The term "Secretary" means the Secretary of the Interior.
- (9) State.--The term "State" means the State of Florida.

(b) Establishment of the Jupiter Inlet Lighthouse Outstanding Natural Area.--

- (1) Establishment.--Subject to valid existing rights, there is established for the purposes described in paragraph (2) the Jupiter Inlet Lighthouse Outstanding Natural Area, the boundaries of which are depicted on the map.
- (2) Purposes.--The purposes of the Outstanding Natural Area are to protect, conserve, and enhance the unique and nationally important historic, natural, cultural, scientific, educational, scenic, and recreational values of the Federal land

[[Page 122 STAT. 764]]

surrounding the Lighthouse for the benefit of present generations and future generations of people in the United States, while--

- (A) allowing certain recreational and research activities to continue in the Outstanding Natural Area; and
 - (B) ensuring that Coast Guard operations and activities are unimpeded within the boundaries of the Outstanding Natural Area.
- (3) Availability of map.--The map shall be on file and available for public inspection in appropriate offices of the

Bureau of Land Management.

(4) Withdrawal.--

(A) In general.--Subject to valid existing rights, subsection (e), and any existing withdrawals under the Executive orders and public land order described in subparagraph (B), the Federal land and any interests in the Federal land included in the Outstanding Natural Area are withdrawn from--

- (i) all forms of entry, appropriation, or disposal under the public land laws;
- (ii) location, entry, and patent under the mining laws; and
- (iii) operation of the mineral leasing and geothermal leasing laws and the mineral materials laws.

(B) Description of executive orders.--The Executive orders and public land order described in subparagraph (A) are--

- (i) the Executive Order dated October 22, 1854;
- (ii) Executive Order No. 4254 (June 12, 1925); and
- (iii) Public Land Order No. 7202 (61 Fed. Reg. 29758).

(c) Management Plan.--

(1) In general.--Not <<NOTE: Deadline.>> later than 3 years after the date of enactment of this Act, the Secretary, in consultation with the Commandant, shall develop a comprehensive management plan in accordance with section 202 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1712) to--

- (A) provide long-term management guidance for the public land in the Outstanding Natural Area; and
- (B) ensure that the Outstanding Natural Area fulfills the purposes for which the Outstanding Natural Area is established.

(2) Consultation; public participation.--The management plan shall be developed--

- (A) in consultation with appropriate Federal, State, county, and local government agencies, the Commandant, the Local Partners, and other partners; and
- (B) in a manner that ensures full public participation.

(3) Existing plans.--The management plan shall, to the maximum extent practicable, be consistent with existing resource plans, policies, and programs.

(4) Inclusions.--The management plan shall include--

- (A) objectives and provisions to ensure--
 - (i) the protection and conservation of the resource values of the Outstanding Natural Area;
- and

[[Page 122 STAT. 765]]

- (ii) the restoration of native plant communities and estuaries in the Outstanding Natural Area, with an emphasis on the conservation and enhancement of healthy, functioning ecological systems in perpetuity;
 - (B) objectives and provisions to maintain or recreate historic structures;
 - (C) an implementation plan for a program of interpretation and public education about the natural and cultural resources of the Lighthouse, the public land surrounding the Lighthouse, and associated structures;
 - (D) a proposal for administrative and public facilities to be developed or improved that--
 - (i) are compatible with achieving the resource objectives for the Outstanding Natural Area described in subsection (d)(1)(A)(ii); and
 - (ii) would accommodate visitors to the Outstanding Natural Area;
 - (E) natural and cultural resource management strategies for the Outstanding Natural Area, to be developed in consultation with appropriate departments of the State, the Local Partners, and the Commandant, with an emphasis on resource conservation in the Outstanding Natural Area and the interpretive, educational, and long-term scientific uses of the resources; and
 - (F) recreational use strategies for the Outstanding Natural Area, to be prepared in consultation with the Local Partners, appropriate departments of the State, and the Coast Guard, with an emphasis on passive recreation.
- (5) Interim plan.--Until a management plan is adopted for the Outstanding Natural Area, the Jupiter Inlet Coordinated Resource Management Plan (including any updates or amendments to the Jupiter Inlet Coordinated Resource Management Plan) shall be in effect.

(d) Management of the Jupiter Inlet Lighthouse Outstanding Natural Area.--

(1) Management.--

- (A) In general.--The Secretary, in consultation with the Local Partners and the Commandant, shall manage the Outstanding Natural Area--
 - (i) as part of the National Landscape Conservation System;
 - (ii) in a manner that conserves, protects, and enhances the unique and nationally important

historical, natural, cultural, scientific, educational, scenic, and recreational values of the Outstanding Natural Area, including an emphasis on the restoration of native ecological systems; and

(iii) in accordance with the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) and other applicable laws.

(B) Limitation.--In managing the Outstanding Natural Area, the Secretary shall not take any action that precludes, prohibits, or otherwise affects the conduct of ongoing or future Coast Guard operations or activities on lots 16 and 18, as depicted on the map.

(2) Uses.--Subject to valid existing rights and subsection (e), the Secretary shall only allow uses of the Outstanding

[[Page 122 STAT. 766]]

Natural Area that the Secretary, in consultation with the Commandant and Local Partners, determines would likely further the purposes for which the Outstanding Natural Area is established.

(3) Cooperative agreements.--To facilitate implementation of the management plan and to continue the successful partnerships with local communities and other partners, the Secretary may, in accordance with section 307(b) of the Federal Land Management Policy and Management Act of 1976 (43 U.S.C. 1737(b)), enter into cooperative agreements with the appropriate Federal, State, county, other local government agencies, and other partners (including the Loxahatchee River Historical Society) for the long-term management of the Outstanding Natural Area.

(4) Research activities.--To continue successful research partnerships, pursue future research partnerships, and assist in the development and implementation of the management plan, the Secretary may, in accordance with section 307(a) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1737(a)), authorize the conduct of appropriate research activities in the Outstanding Natural Area for the purposes described in subsection (b)(2).

(5) Acquisition of land.--

(A) In general.--Subject to subparagraph (B), the Secretary may acquire for inclusion in the Outstanding Natural Area any State or private land or any interest in State or private land that is--

- (i) adjacent to the Outstanding Natural Area;
- and
- (ii) identified in the management plan as appropriate for acquisition.

(B) Means of acquisition.--Land or an interest in land may be acquired under subparagraph (A) only by donation, exchange, or purchase from a willing seller

with donated or appropriated funds.

(C) Additions to the outstanding natural area.--Any land or interest in land adjacent to the Outstanding Natural Area acquired by the United States after the date of enactment of this Act under subparagraph (A) shall be added to, and administered as part of, the Outstanding Natural Area.

(6) Law enforcement activities.--Nothing in this section, the management plan, or the Jupiter Inlet Coordinated Resource Management Plan (including any updates or amendments to the Jupiter Inlet Coordinated Resource Management Plan) precludes, prohibits, or otherwise affects--

(A) any maritime security, maritime safety, or environmental protection mission or activity of the Coast Guard;

(B) any border security operation or law enforcement activity by the Department of Homeland Security or the Department of Justice; or

(C) any law enforcement activity of any Federal, State, or local law enforcement agency in the Outstanding Natural Area.

(7) Future disposition of coast guard facilities.--If the Commandant determines, after the date of enactment of this Act, that Coast Guard facilities within the Outstanding

[[Page 122 STAT. 767]]

Natural Area exceed the needs of the Coast Guard, the Commandant may relinquish the facilities to the Secretary without removal, subject only to any environmental remediation that may be required by law.

(e) Effect on Ongoing and Future Coast Guard Operations.--Nothing in this section, the management plan, or the Jupiter Inlet Coordinated Resource Management Plan (including updates or amendments to the Jupiter Inlet Coordinated Resource Management Plan) precludes, prohibits, or otherwise affects ongoing or future Coast Guard operations or activities in the Outstanding Natural Area, including--

(1) the continued and future operation of, access to, maintenance of, and, as may be necessitated for Coast Guard missions, the expansion, enhancement, or replacement of, the Coast Guard High Frequency antenna site on lot 16;

(2) the continued and future operation of, access to, maintenance of, and, as may be necessitated for Coast Guard missions, the expansion, enhancement, or replacement of, the military family housing area on lot 18;

(3) the continued and future use of, access to, maintenance of, and, as may be necessitated for Coast Guard missions, the expansion, enhancement, or replacement of, the pier on lot 18;

(4) the existing lease of the Jupiter Inlet Lighthouse on lot 18 from the Coast Guard to the Loxahatchee River Historical

Society; or

(5) any easements or other less-than-fee interests in property appurtenant to existing Coast Guard facilities on lots 16 and 18.

(f) Authorization of Appropriations.--There are authorized to be appropriated such sums as are necessary to carry out this section.

B. Master Species Lists

SCIENTIFIC NAME	COMMON NAME	STATUS			
		USFWS	FDAC S	FNAI	FLEPPC
Fungi					
Geastrum floriforme	Earthstar				
Lichens					
Cladonia evansii	Cladonia				
Cladonia leporina	British Solders				
Cladonia perforata	Perforate Reindeer Lichen	E	E	G1/S1	
Cladonia prostrata	Cladonia				
Cladonia subtenuis	Cladonia				
Ferns and fern allies					
Acrostichum danaeifolium	Giant Leather Fern				
Blechnum serrulatum	Swamp Fern				
Nephrolepis cordifolia	Sword Fern				Category I
Phlebodium aureum	Golden Polypody				
Polypodium polypodioides	Resurrection Fern				
var. michauxianum					
Pteridium aquilinum	Bracken Fern				
Selaginella arenicola	Sand Spikemoss				
Vittaria lineata	Shoestring Fern				
Gymnosperms					
Pinus clausa	Sand Pine				
Monocots					
AGAVACEAE {agave family}					
Agave americana	Century Plant				exotic
ARECACEAE formerly PALMAE {palm family}					
Phoenix reclinata	Senegal date Palm				exotic
Sabal palmetto	Sabal Palm; Cabbage Palm				
Serenoa repens	Saw Palmetto				
ASPARAGACEAE {asparagus family}					
Asparagus densiflorus	Asparagus Fern				Category I
BROMELIACEAE {pineapple family}					
Tillandsia flexuosa	Banded Air Plant		T	G5/S3	
Tillandsia paucifolia	Pot-bellied Tillandsia				
Tillandsia recurvata	Ball Moss				

Tillandsia usneoides	Spanish Moss				
Tillandsia utriculata	Giant Wild Pine		E		
COMMELINACEAE {spiderwort family}					
Commelina erecta	Whitemouth Dayflower, Erect				
Tradescantia spathacea	Oyster Plant				
CYPERACEAE {sedge family}					
Bulbostylis ciliatifolia	Hairsedge				
Cladium jamaicense	Sawgrass				
Cyperus globulosus	Globe Sedge				
Cyperus ligularis	Large Cyperus				
Cyperus planifolius	Glaucus Cyperus				
Cyperus retrorsus	Flatsedge				
Fimbristylis castanea	Fimbristylis				
Fimbristylis spathacea	Hurricanegrass				
Rhynchospora megalocarpa	Large-seeded Beakrush				
IRIDACEAE {iris family}					
Sisyrinchium xeriphyllum	Blue-eyed Grass				
POACEAE {grass family}					
Andropogon virginicus	Broomsedge				
Aristida gyrans	Corkscrew Threawn				
Cenchrus incertus	Coast Sandspur				
Cynodon dactylon	Bermudagrass				exotic
Dactyloctenium aegyptium	Crowfootgrass				
Dichantherium portoricense	Panic-grass				
Distichlis spicata	Saltgrass				
Eragrostis sp.	Love Grass				
Eremochloa ophiuroides	Centipede grass				exotic
Eustachys petraea	Eustachys				
Panicum repens	Torpedograss				Category I
Paspalum distichum	Seashore Paspalum				
Paspalum notatum	Bahiagrass				Category I
Paspalum setaceum	Thin Paspalum				
Rhynchelytrum repens	Natal Grass				Category II
Setaria sp.	Foxtail				
Spartina bakeri	Sand Cordgrass				
Spartina patens	Saltmeadow				

	Cordgrass				
Sporobolus indicus	Smutgrass				exotic
Stenotaphrum secundatum	St. Augustine Grass				exotic
RUSCACEAE {bowstring-hemp family}					
Sansevieria hyacinthoides	Bowstring-Hemp				Category II
SMILACACEAE (greenbriar family)					
Smilax auriculata	Greenbrier; Catbrier				
Smilax bona-nox	Greenbrier; Catbrier				
Dicots					
AIZOACEAE					
Sesuvium portulacastrum	Sea Purslane				
AMARANTHACEAE {including former CHENOPODIACEAE, amaranth family}					
Chenopodium ambrosioides	Mexican Tea				exotic
Iresine diffusa	Bloodleaf				
Salicornia virginica	Perennial Glasswort				
Suaeda linearis	Sea Blite				
ANACARDIACEAE {cashew family}					
Metopium toxiferum	Poisonwood				
Schinus terebinthifolius	Brazilian Pepper				Category I
ANNONACEAE					
Annon glabra	Pond Apple				
Asimina reticulata	Gopher-berry pawpaw				
Asimina tetramera	Four-petal pawpaw	E	E	G1/S1	
APOCYNACEAE					
Catharanthus roseus	Periwinkle				exotic
Cynanchum angustifolium	Cynanchum				
Rhabdadenia biflora	Rubber Vine				
ARALICEAE {ginseng family}					
Schefflera actnophylla	Australian Umbrella Tree; Schefflera				Category I
ASCLEPIADACEAE {milkweed family}					

<i>Asclepia feayi</i>	Feay's Milkweed				
<i>Asclepias curtissii</i>	Curtiss' Milkweed		E		
<i>Citharexylum fruticosum</i>	Fiddlewood				
ASTERACEAE {formerly COMPOSITAE}					
<i>Ambrosia artemisiifolia</i>	Common Ragweed				
<i>Balduina angustifolia</i>	Yellow Buttons				
<i>Bidens alba</i> var. <i>radiata</i>	Beggar Ticks				
<i>Borrchia frutescens</i>	Sea Daisies; Sea Oxeye				
<i>Conyza canadensis</i> var. <i>pusilla</i>	Dwarf Horseweed				
<i>Eupatorium leptophyllum</i>	Lopsided Dog Fennel				
<i>Flaveria linearis</i>	Narrowleaf Yellowtops				
<i>Helianthus debilis</i> var. <i>debilis</i>	Dune Sunflower				
<i>Iva frutescens</i>	Marsh-elder				
<i>Mikania scandens</i>	Climbing Hempweed				
<i>Palafoxia feayi</i>	Palafoxia				
<i>Palafoxia integrifolia</i>	Pink Lace				
<i>Pityopsis graminifolia</i>	Pityopsis; Grass-leaved Golden Aster				
<i>Solidago odora</i> var. <i>chapmanii</i>	Chapman's Goldenrod				
<i>Sonchus oleraceus</i>	Fire Weed				exotic
<i>Tridax procumbens</i>	Tridax				exotic
<i>Verbesina virginica</i>	Frostweed				
<i>Wedelia trilobata</i>	Creeping Oxeye				Category II
BATACEAE					
<i>Batis maritima</i>	Saltwort				
BIGNONIACEAE {trumpet creeper family}					
<i>Tecomaria capensis</i>	Cape Honeysuckle				exotic
BURSERACEAE					
<i>Bursera simaruba</i>	Gumbo-limbo				
CACTACEAE {cactus family}					
<i>Cereus undatus</i>	Night-				Category

	blooming cereus				II
Opuntia humifusa	Prickly-pear Cactus				
CAPPARARACEAE					
Polanisia tenuifolia	Polanisia				
CARICACEAE					
Carica papaya	Papaya				exotic
CARYOPHYLLACEAE {pink family}					
Paronychia americana	Ground Squares				
Stipulicida setacea	Stipulicida				
CASUARINACEAE					
Casuarina equisetifolia	Australian Pine				Category I
CHRYSOBALANACEAE					
Chrysobalanus icaco	Coco-plum				
Licania michauxii	Gopher Apple				
CISTACEAE {rockrose family}					
Helianthemum nashii	Scrub Frostweed				
Lechea cernua	Nodding pinweed		T	G3/S3	
Lechea deckertii	Woody Pinweed				
COMBRETACEAE					
Conocarpus erecta	Buttonwood				
Laguncularia racemosa	White Mangrove				
CONVOLVULACEAE {morning glory family}					
Ipomoea pes-caprae	Railroad-vine				
Stylisma villosa	Hairy Dawnflower				
CRASSULACEAE					
Kalanchoe pinnata	Life Plant				Category II
Kalanchoe tubiflora	Chandelier Plant				exotic
CUCURBITACEAE					
Momordica charantia	Balsam apple				exotic

EMPETRACEAE					
Ceratiola ericoides	Rosemary				
ERICACEAE {heath family}					
Lyonia ferruginea	Rusty Lyonia				
EUPHORBACEAE					
Chamaesyce cordifolia	Spurge				
Cnidocolus stimulosus	Tread Softly; Stinging Nettles				
Croton glandulosus	Simpson's Croton				
Phyllanthus sp.	Phyllanthus				exotic
Poinsettia cyathophora	Painted-leaf				
Sapium sebiferum	Popcorn Tree; Chinese Tallow Tree				Category I
FABACEAE {pea family}					
Abrus precatorius	Rosary Pea, Crab's-eye				Category I
Acacia aunculiformis	Ear-leaf Acacia				Category I
Albizia lebbeck	Womans- tongue-tree				Category II
Canavalia rosea	Baybean				
Chamaecrista fasciculata	Partridge-pea				
Crotalaria pallida ovovata	Rattlebox				exotic
Crotalaria rotundifolia	Rabbit-bells; Rattle-box				
Dalbergia ecastophyllum	Coin Vine				
Desmodium incanum	Beggar's Lice; Common Tick- trefoil				exotic
Galactia elliottii	Elliott's Milk Pea				
Galactia regularis	Milk Pea				
Luecaena leucocephala	Lead tree				Category II
Vigna luteola	Cowpea				
FAGACEAE					
Quercus chapmanii	Chapman's Oak				
Quercus geminata	Sand Live Oak				
Quercus myrtifolia	Myrtle Oak				
GENTIANACEAE {gentian family}					
Eustoma exaltatum	Marsh Gentian				

LAMIACEAE					
Conradina grandiflora	Large-flowered Rosemary		T	G3/S3	
Trichostema dichotomum	Forked Blue-curls				
LAURACEAE					
Cassytha filiformis	Love Vine				
LOASACEAE					
Mentzelia floridana	Poorman's Patch				
LOGANIACEAE					
Polypremum procumbens	Rustweed				
MALVACEAE					
Hibiscus furcellatus	Hibiscus				
Hibiscus tiliaceus	Mahoe				Category II
Kosteletzkya virginica	Saltmarsh Mallow				
Sida acuta	Broomweed				exotic
Sida cordifolia	Sida				exotic
Thespesia populnea	Seaside Mahoe				Category I
MORACEAE {fig family}					
Ficus aurea	Strangler Fig				
Ficus microcarpa	Laurel Fig				Category I
MYRSINACEAE					
Ardisia escallonioides	Marlberry				
Raphanea punctata	Myrsine				
MYRTACEAE					
Eugenia uniflora	Surinam Cherry				Category I
Melaleuca quinquenervia	Punk Tree; Cajeput				
Psidium guajava	Guava				Category I
OLACACEAE					
Ximenia americana	Tallow Wood; Hog Plum				
ONAGRACEAE					
Gaura angustifolia	Southern Gaura, Southern				

	beeblossum				
OROBANCHACEAE {broomrape family}					
Buchnera americana	Blueheart				
Seymeria pectinata	Seymeria				
Oenothera laciniata	Cut-leaved Evening Primrose				
PAPILIONACEAE					
Lupinus diffusus	Sky-blue Lupin				
PHYTOLACCACEAE {pokeweed family}					
Rivina humilis	Rouge Plant				
PLANTAGINACEAE					
Bacopa monnieri	Water Hyssop				
Linaria canadensis	Canadian toadflax				
Scoparia dulcis	Sweet Broom				
Bacopa monnieri	Water Hyssop				
PLUMBAGINACEAE {leadwort family}					
Plumbago scandens	Wild Plumbago				
POLYGALACEAE {milkwort family}					
Polygala grandiflora	Large-flowered Milkwort				
POLYGONACEAE {buckwheat family}					
Coccoloba uvifera	Sea Grape				
Polygonella ciliata	Wireweed				
Polygonella polygama	Jointweed				
Polygonella robusta	Sandhill Wireweed				
PORTULACACEAE {purslane family}					
Portulaca pilosa	Pink Purslane				
RHIZOPHORACEAE {mangrove family}					
Rhizophora mangle	Red Mangrove				
RUBIACEAE {madder family}					
Chiococca alba	Snowberry				
Diodia teres	Poor Joe				
Galium hispidulum	Bedstraw				
Hamelia patens	Firebush				
Psychotria nervosa	Wild Coffee				
Randia aculeata	Randia; Box-				

	brier; White Indigo-berry				
Richardia brasiliensis	Richardia				exotic
Richardia grandiflora	Large-flowered Richardia				exotic
Spermacoce verticillata	Shrubby False Buttonweed				exotic
RUTACEAE {rue or citrus family}					
Zanthoxylum clava-herculis	Hercules-club				
Zanthoxylum fagara	Wild Lime				
SAPOTACEAE {sapodilla family}					
Bumelia salicifolia	Willow Busic				
Bumelia tenax	Tough Buckthorn				
SIMAROUBACEAE					
Simarouba glauca	Paradise Tree				
SOLANACEAE {nightshade family}					
Physalis viscosa var. maritima	Physalis				
VERBENACEAE {vervain family}					
Avicennia germinans	Black Mangrove				
Callicarpa americana	Beauty Berry; Beauty Bush				
Lantana camara	Shrub Verbena				Category I
Lantana involucrata	Lantana				
Lippia nodiflora	Frog-fruit; Carpetweed				
VITACEAE {grape family}					
Parthenocissis quinquefolia	Virginia Creeper				
Vitis munsoniana	So. Fox Grape; Scuppernong; Muscadine				
ZYGOPHYLLACEAE					
Tribulus cistoides	Burnut; Bicycle-tire-poppers				Category II

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FDACS - Florida Department of Agriculture and Consumer Affairs - Plants

E - Endangered: 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 species or threatened species pursuant to the federal Endangered Species Act of 1973, as amended. Pub. L. No. 93-205(87 Stat. 884).

T – Threatened: 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

CE – Commercially Exploited: Species native to the state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale

FNAI - Florida Natural Areas Inventory - Plants, Animals and Natural Communities FNAI ranks indicate the global (G) or state (S) status of a species or exemplary natural community; definitions are from FNAI (2008), updated as of March 2009.

Global Rank Definitions

G1: Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1,000 individuals) or because of extreme vulnerability to extinction due to some natural or human factor

G2: Imperiled globally because of rarity (6 to 20 occurrences or fewer than 3,000 individuals) or because of vulnerability to extinction due to some natural or human factor

G3: Either very rare and local throughout its range (21 to 100 occurrences or fewer than 10,000 individuals), or found locally in a restricted range, or vulnerable to extinction from other factors

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

G5: Demonstrably secure globally

State Rank Definitions

State ranks follow the same system and have the same definitions as global ranks, except that they apply only to Florida.

FLEPPC - Florida Exotic Pest Plant Council Invasive Plant Lists

Category I invasives when they are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.

Category II invasive exotics have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These species may become Category I if ecological damage is demonstrated.

Exotic - Non-native species not listed as Category I or II by FLEPPC

Note: All of these organizations have other listing/ranking criteria which did not pertain to this species list and which were omitted from the definitions, for example extinct species or species extirpated from the wild.

SCIENTIFIC NAME	COMMON NAME	STATUS			
		USFWS	FWC	FNAI	BCC
Mammals (Names and sequence from <i>Revised Checklist of</i> North American Mammals)					
Virginia opossum	<i>Didelphis virginiana</i>				
Eastern mole	<i>Scalopus aquaticus</i>				
Nine-banded armadillo	<i>Dasybus novemcinctus</i>				
Eastern cottontail	<i>Sylvilagus floridanus</i>			G5	
Gray squirrel	<i>Sciurus carolinensis</i>				
Cotton mouse	<i>Peromyscus gossypinus</i>				
Oldfield mouse	<i>Peromyscus polionotus</i>				
Florida mouse	<i>Peromyscus floridanus</i>		SSC	G3T2/ S3	
Cotton rat	<i>Sigmodon hispidus</i>				
Gray fox	<i>Urocyon cinereoargenteus</i>				
Raccoon	<i>Procyon lotor</i>				
Northern river otter	<i>Lutra canadensis</i>				
Bobcat	<i>Lynx rufus</i>				
White-tailed deer	<i>Odocoileus virginianus</i>				
West Indian manatee	<i>Trichechus manatus</i>	E	E	G2/S2	
Birds (Names and sequence from A.O.U. Check-list of North American Birds)					
American White Pelican	<i>Pelecanus erythrorhynchos</i>				
Brown Pelican	<i>Pelecanus occidentalis</i>		SSC	G3/S3	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>				
Great Blue Heron	<i>Ardea herodias</i>				
Reddish Egret	<i>Egretta rufescens</i>		SSC	G4/S2	
Great Egret	<i>Casmerodius albus</i>			G5/S4	
Snowy Egret	<i>Egretta thula</i>		SSC (1)	G5/S3	
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>			G5/S3	
Little Blue Heron	<i>Florida caerulea</i>		SSC	G5/S4	
Tri-colored Heron	<i>Hydranassa tricolor</i>		SSC	G5/S4	
Cattle Egret	<i>Bubulcus ibis</i>				
Green Heron	<i>Butorides virescens</i>				
White Ibis	<i>Eudocimus albus</i>		SSC	G5/S4	
Black Vulture	<i>Coragyps atratus</i>				
Turkey Vulture	<i>Cathartes aura</i>				
Muscovy Duck (non-native)	<i>Cairina moschata</i>			G4	
American Wigeon	<i>Anas americana</i>				
Mottled Duck	<i>Anas fulvigula</i>			G4	
Osprey	<i>Pandion haliaetus</i>		SSC	G5/S3 S4	

Sharp-shinned Hawk	<i>Accipiter striatus</i>				
Cooper's Hawk	<i>Accipiter cooperii</i>			G5/S3	
Red-shouldered Hawk	<i>Buteo lineatus</i>				
Red-tailed Hawk	<i>Buteo jamaicensis</i>				
American Kestrel	<i>Falco sparverius</i>				
Merlin	<i>Falco columbarius</i>			G5/S2	
Black-bellied Plover	<i>Pluvialis squatarola</i>				
Killdeer	<i>Charadrius vociferus</i>				
Spotted Sandpiper	<i>Actitis macularia</i>				
Laughing Gull	<i>Larus atricilla</i>				
Ring-billed Gull	<i>Larus delawarensis</i>				
Royal Tern	<i>Sterna maxima</i>			G5/S3	
Rock Pigeon	<i>Columba livia</i>				
Common Ground Dove	<i>Columbina passerina</i>				BCC
Eurasian Collared-Dove (non-native)	<i>Streptopelia decaocto</i>				
White-winged Dove	<i>Zenaida asiatica</i>				
Mourning Dove	<i>Zenaida macroura</i>				
Eastern Screech Owl	<i>Otus asio</i>				
Great-horned Owl	<i>Bubo virginianus</i>				
Barred Owl	<i>Strix varia</i>				
Chuck-will's-widow	<i>Caprimulgus carolinensis</i>				BCC
Common Nighthawk	<i>Chordeiles minor</i>				
Chimney Swift	<i>Chaetura pelagica</i>				
Belted Kingfisher	<i>Megaceryle alcyon</i>				
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>				
Downy Woodpecker	<i>Picoides pubescens</i>				
Northern Flicker	<i>Colaptes auratus</i>				
Pileated Woodpecker	<i>Dryocopus pileatus</i>				
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>				
Barn Swallow	<i>Hirundo rustica</i>				
Eastern Phoebe	<i>Sayornis phoebe</i>				
Great Crested Flycatcher	<i>Myiarchus crinitus</i>				
Gray Kingbird	<i>Tyrannus dominicensis</i>				
Loggerhead Shrike	<i>Lanius ludovicianus</i>			G4	BCC?
White-eyed Vireo	<i>Vireo griseus</i>				
Blue-headed Vireo	<i>Vireo solitarius</i>				
Yellow-throated Vireo	<i>Vireo flavifrons</i>				
Blue-headed Vireo	<i>Vireo solitarius</i>				
Blue Jay	<i>Cyanocitta cristata</i>				
Florida Scrub Jay	<i>Aphelocoma coerulescens</i>	T	T	G2/S2	
American Crow	<i>Corvus brachyrhynchos</i>				
Fish Crow	<i>Corvus ossifragus</i>				
Tree Swallow	<i>Tachycineta bicolor</i>				
Carolina Wren	<i>Thryothorus ludovicianus</i>				
House Wren	<i>Troglodytes aedon</i>				
Ruby-crowned Kinglet	<i>Regulus calendula</i>				
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>				

American Robin	<i>Turdus migratorius</i>				
Gray Catbird	<i>Dumetella carolinensis</i>				
Northern Mockingbird	<i>Mimus polyglottos</i>				
Brown Thrasher	<i>Toxostoma rufum</i>				
European Starling (non-native)	<i>Sturnus vulgaris</i>				
Orange-crowned Warbler	<i>Vermivora celata</i>				
Northern Parula	<i>Parula americana</i>				
Yellow-throated Warbler	<i>Dendroica dominica</i>				
Cape May Warbler	* <i>Dendroica tigrina</i>				
Yellow-rumped Warbler	<i>Dendroica coronata</i>				
Pine Warbler	<i>Dendroica pinus</i>				
Prairie Warbler	<i>Dendroica discolor</i>			G5T3/ S3	BCC
Palm Warbler	<i>Dendroica palmarum</i>				
Black-and-white Warbler	<i>Mniotilta varia</i>				
Common Yellowthroat	<i>Geothlypis trichas</i>				
Eastern Towhee	<i>Pipilo erythrophthalmus</i>				
Northern Cardinal	<i>Cardinalis cardinalis</i>				
Painted Bunting	<i>Passerina ciris</i>			G5/S3	BCC nb
Common Grackle	<i>Quiscalus quiscula</i>				
Boat-tailed Grackle	<i>Quiscalus major</i>				
American Goldfinch	<i>Carduelis tristis</i>				
House Sparrow	<i>Passer domesticus</i>				
Reptiles					
Southern Black Racer	<i>Coluber constrictor</i>				
Coachwhip snake	<i>Masticophis flagellum</i>				
Gopher Tortoise	<i>Gopherus polyphemus</i>	Under review	T	G3/S3	
Six-lined Racerunner	<i>Cnemidophorus sexlineatus</i>				
Florida Scrub Lizard	<i>Sceloporus woodi</i>			G3/S3	
Green Anole	<i>Anolis carolinensis</i>				
Brown Anole*	<i>Anolis sagrei</i>				
Fox Gecko*	<i>Hemidactylus garnotii</i>				
Northern Curly-tailed Lizard*	<i>Leiocephalus carinatus armouri</i>				
Amphibians					
Oak Toad	<i>Bufo quercicus</i>				
Southern Toad	<i>Bufo terrestris</i>				
Marine Toad*	<i>Bufo marinus</i>				
Eastern Narrowmouth Toad	<i>Gastrophryne carolinensis</i>				
Cuban Treefrog *	<i>Osteopilus septentrionalis</i>				
Fox gecko *	<i>Hemidactylus garnotii</i>				
Fishes (observed since August 2000 in tidal lagoon)					
Bay Anchovy	<i>Anchoa mitchilli</i>				

Pork Fish	<i>Anisotremus virginicus</i>				
Sheepshead	<i>Archosargus probatocephalus</i>				
Hardhead Catfish	<i>Arius felis</i>				
Crevalle Jack	<i>Caranx hippos</i>				
Common Snook	<i>Centropomus undecimalis</i>				
Stingray	<i>Dasyatus</i> spp.				
Striped Mojarra	<i>Diapterus plumieri</i>				
Spotfin Mojarra	<i>Eucinostomus argenteus</i>				
Silver Jenny	<i>Eucinostomus gula</i>				
Eastern Mosquitofish	<i>Gambusia holbrooki</i>				
Yellowfin Mojarra	<i>Gerres cinereus</i>				
Scaled Sardine	<i>Harengula jaguana</i>				
Pin Fish	<i>Lagodon rhomboides</i>				
Gray Snapper	<i>Lutjanus griseus</i>				
Lane Snapper	<i>Lutjanus sunagris</i>				
Striped Mullet	<i>Mugil cephalus</i>				
White Mullet	<i>Mugil curema</i>				
Checkered Puffer	<i>Sphoeroides testudineus</i>				
Great Barracuda	<i>Sphyaena barracuda</i>				
Atlantic Needlefish	<i>Strongylura marina</i>				
Insects					
Green lynx spider	<i>Peucetia viridans</i>				
Beach wolf spider	<i>Arctosa littoralis</i>				
Vinegaroon	<i>Mastigoproctus giganteus</i>				
Bush Katydid	<i>Scudderia</i> sp.				
Cone-headed Grasshopper	<i>Neoconocephalus</i> sp.				
Southeastern Lubber Grasshopper	<i>Romalea microptera</i>				
Cicada	(?) <i>Tibicen</i> sp.				
Gulf Fritillary	<i>Agraulis vanillae</i>				
Cloudless sulphur butterfly	<i>Phoebis sennae</i>				
Corporal skimmer	<i>Libellula deplanata</i> (tentative id)				
	<i>Aethecernus hornii</i>				

* - Non-native species

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Under review – USFWS is reviewing species for consideration for listing

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CE – Commercially Exploited: Species native to the state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale

FWC - Florida Fish and Wildlife Conservation Commission - Animals

E - Endangered: As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is so few or depleted in number or so restricted in range or habitat due to any man-made or natural factors that it is in imminent danger of extinction.

T – Threatened: As designated by the Commission, a species, subspecies or isolated population of a species or subspecies which is facing a very high risk of extinction in the future.

SSC: Species of Special Concern: As designated by the Commission, a species, subspecies, or isolated population of a species or subspecies which is facing a moderate risk of extinction in the future.

FNAI - Florida Natural Areas Inventory - Plants, Animals and Natural Communities FNAI ranks indicate the global (G) or state (S) status of a species or exemplary natural community; definitions are from FNAI (2008), updated as of March 2009.

Global Rank Definitions

G1: Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1,000 individuals) or because of extreme vulnerability to extinction due to some natural or human factor

G2: Imperiled globally because of rarity (6 to 20 occurrences or fewer than 3,000 individuals) or because of vulnerability to extinction due to some natural or human factor

G3: Either very rare and local throughout its range (21 to 100 occurrences or fewer than 10,000 individuals), or found locally in a restricted range, or vulnerable to extinction from other factors

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

G5: Demonstrably secure globally

State Rank Definitions

State ranks follow the same system and have the same definitions as global ranks, except that they apply only to Florida.

FLEPPC - Florida Exotic Pest Plant Council Invasive Plant Lists

Category I invasives when they are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.

Category II invasive exotics have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. These species may become Category I if ecological damage is demonstrated.

Exotic - Non-native species not listed as Category 1 or II by FLEPPC

BCC – U.S. Fish and Wildlife Service’s list of Birds of Conservation Concern 2008. This publication identifies species, subspecies, and populations of migratory and nonmigratory birds in need of additional conservation actions.

BCC- Included on list

nb – Non-breeding in this region (BCR 31)

Note: All of these organizations have other listing/ranking criteria which did not pertain to this species list and which were omitted from the definitions, for example extinct species or species extirpated from the wild.

C. Palm Beach County Ordinances

Palm Beach County Natural Areas Ordinance 94-13

ARTICLE XI. NATURAL AREAS*

*Editor's note: Ord. No. 94-13, adopted June 21, 1994, effective June 27, 1994, amended this Code by adding provisions designated by the editor as ch. 11, art. XI, §§ 11-251--11-272.

Sec. 11-251. Short title; applicability.

- (a) This article shall be known as the "Palm Beach County Natural Areas Ordinance."
 - (b) The recitations set forth in the "WHEREAS" paragraphs included in Ordinance No. 94-13 are incorporated by reference herein as findings of fact upon which this article is based.
 - (c) All provisions of this article shall be effective within the unincorporated and incorporated areas of the county and shall set restrictions, constraints, and requirements to protect and preserve county-managed natural areas.
 - (d) This article shall be liberally construed to effect the purposes set forth herein.
- (Ord. No. 94-13, § 1, 6-21-94)

Sec. 11-252. Authority.

This article is adopted under the authority of chapter 125, Florida Statutes.
(Ord. No. 94-13, § 2, 6-21-94)

Sec. 11-253. Purpose.

The purpose of this article is to preserve and protect in perpetuity county-managed natural areas by regulating public uses of these lands.
(Ord. No. 94-13, § 3, 6-21-94)

Sec. 11-254. Definitions.

The following terms when used in this article shall have the meanings ascribed to them in this section:
Department means the department of environmental resources management.

Natural area means all public lands containing high-quality native ecosystems that are under the control of or assigned to the department for management, maintenance, and operation.

Natural areas property means all structures, facilities, plants, and animals contained within a natural area.

Parking area means a specially designed and publicly designated area set aside for the standing or temporary stationing of vehicles.

Permit means a document or certificate provided by the county administrator or his designee granting permission to conduct or take part in a specific activity at a specific location.

Vehicle means any wheeled conveyance for transportation of persons or materials whether:

- (1) Powered or drawn by motor such as an automobile, truck, motorcycle, scooter, or minibike.
- (2) Animal-drawn such as a carriage, wagon, or cart.
- (3) Self-propelled such as a bicycle.

Watercraft means any boat, kayak, canoe, raft, houseboat, barge, vessel, ship or any other floating device capable of transporting humans or objects over water.

(Ord. No. 94-13, § 4, 6-21-94)

Sec. 11-255. Scope.

This article applies only to county-owned or county-controlled natural areas and natural areas property that is assigned to the department of environmental resources management for management, maintenance and operation. Department staff and other authorized persons working under staff supervision shall be exempt from the provisions of this article when performing activities related to management plans.

(Ord. No. 94-13, § 5, 6-21-94)

Sec. 11-256. Buildings and other property.

(a) No person shall willfully mark, deface or damage in any way, or displace, remove or tamper with, any natural area building, fence, educational or informational structure, walkway, bridge, bench, railing, public utility, paving or paving material, or part or appurtenance thereof, natural area sign, notice or placard, monument, stake, post, or other boundary marker, or other structure or equipment, facility or natural area property or appurtenance that is located on a natural area.

(b) No person shall dig, move, or remove from any natural area any sand, soil, rocks, stones, trees, shrubs, or plants, fallen timber, or other wood or materials, or make any excavation by tool, equipment, blasting or other means.

(Ord. No. 94-13, § 6, 6-21-94)

Sec. 11-257. Plant and wildlife protection and preservation.

(a) Within any natural area, no person shall cut, carve, or damage the bark, or break off limbs or branches or mutilate in any way, or pick the flowers or seeds, of any tree or plant, or shrub, nor shall any person dig in or disturb grassy areas, or transplant or remove any tree or plant or part thereof, or in any other way damage or impair the natural beauty or usefulness of any natural area, nor shall any person deposit any debris or material on or about any tree or plant.

(b) Within any natural area, no person shall molest, harm, frighten, kill, trap, hunt, chase, shoot, throw objects at, harass, feed, or otherwise inhibit the natural movements and habits of any invertebrate, mammal, amphibian, reptile, fish or bird. No person shall remove or have in his or her possession the young of any wild animal, or the eggs or nests of any amphibian, reptile, fish, bird or invertebrate. The provisions of this section applying to fishes are not applicable in designated fishing areas.

(c) In order to prevent disruption of natural ecosystems and the spread of disease, no person shall introduce, plant, or release any plant or animal into any natural area.

(Ord. No. 94-13, § 7, 6-21-94)

Editor's note: As originally promulgated, Ord. No. 94-13 contained no § 8.

Sec. 11-258. Reserved.

Sec. 11-259. Fires.

No person shall build or attempt to build, light, or cause to be lighted any fire or fires within any natural area unless given permission under a written permit from the county administrator or his designee. No person shall drop, throw, or otherwise deposit lighted matches, burning cigarettes or cigars, tobacco paper, or other flammable materials within any natural area or on any county highway, road or street abutting or contiguous thereto.

(Ord. No. 94-13, § 9, 6-21-94)

Sec. 11-260. Boating.

(a) All provisions of chapter 327, Florida Statutes, shall apply to county-managed natural area waters.

(b) No person shall launch or operate any watercraft upon any watercourse, lagoon, lake, canal, pond, marsh, wet prairie or slough within a natural area except at such places that are designated for such use by the board of county commissioners or the county administrator or his designee.

(c) No person shall operate, moor, or anchor any watercraft within the waters of any natural area in a manner that results in damage or harm to the vegetation, wildlife or shoreline.
(Ord. No. 94-13, § 10, 6-21-94)

Sec. 11-261. Fishing.

Except where specifically designated, fishing, or the buying or selling of fish caught in any natural area waters, is prohibited in all natural areas.
(Ord. No. 94-13, § 11, 6-21-94)

Sec. 11-262. Prohibited activities.

The following are prohibited in county-managed natural areas:

- (a) Hunting, trapping, or the possession of any kind of trapping device. Licensed hunters and trappers authorized by the county administrator or his designee to remove nuisance and exotic animals are exempt from this prohibition, as are licensed hunters authorized by the county administrator or his designee to reduce excessive populations of animals causing environmental damage in a natural area.
 - (b) Use of firearms or other weapons potentially inimical to wildlife and dangerous to human safety by persons other than authorized law enforcement personnel and persons authorized to remove nuisance and exotic animals. This prohibition includes shooting into a natural area from beyond the boundaries of the natural area.
 - (c) The sale, purchase, consumption, or possession of alcoholic beverages as defined in section 561.01(4), Florida Statutes.
 - (d) Use, discharge or possession of fireworks, explosives, or substances that could be combined into an explosive mixture.
 - (e) Domestic animals and pets.
 - (f) Placement of beehives or other apicultural practices.
 - (g) Cultivation of plants.
 - (h) Vehicle repair.
 - (i) Use of airboats.
 - (j) Loud, unnecessary noise that disturbs wildlife and produces physical discomfort or annoyance to other people.
 - (k) Possession and release of inflated balloons.
- (Ord. No. 94-13, § 12, 6-21-94)

Sec. 11-263. Activities requiring a special permit.

The following activities may be allowed only if a written permit is obtained from the county administrator or his authorized designee. Written terms and conditions shall accompany each permit, and a fee will be charged as set by resolution of the board of county commissioners. The decision on whether or not to issue a permit will be based on the potential for damage to the natural resources of the site, the carrying capacity for that particular use, and any conflicts with a previously issued permit for the same use. The activities requiring a special permit are:

- (a) Camping.
 - (b) Erection of temporary or permanent structures.
 - (c) Horseback riding.
 - (d) Public demonstrations and gatherings.
 - (f) Collection of plant and animal specimens and use of watercraft in wetlands for scientific research.
 - (g) After-hours and night-time use of natural areas.
- (Ord. No. 94-13, § 13, 6-21-94)

Sec. 11-264. Merchandising, advertising and signs.

(a) No person shall expose or offer for sale, rent or trade any article or thing, or station or place any stand, cart, or vehicle for the transportation, sale or display of any article, merchandise, or other item within the limits of any natural area.

(b) No person shall use the natural area roadways or paths, or enter any natural area, for the purpose of announcing, displaying, advertising or calling attention to any person, political party, religious institution, or meetings or assemblies thereof, or for the purpose of demonstrating, advertising or calling attention to any article or service for sale or for hire; nor shall any signs, slogans, loudspeakers or advertising display be used for such purposes unless a written permit allows such activity.

(c) No person shall display, distribute, post, paste, glue, tack, or otherwise fix any handbill, pamphlet, circular, sign, placard or any other printed matter containing advertising within any natural area or upon any natural area tree, fence or other structure.

(Ord. No. 94-13, § 14, 6-21-94)

Sec. 11-265. Pollution of waters.

No person shall throw, discharge, or otherwise place or cause to be placed in the waters of any pond, lake, canal, slough, marsh, wet prairie, lagoon, or any other body of water or wetland in any natural area, any substance, matter, object or item which will or may result in pollution of those waters.

(Ord. No. 94-13, § 15, 6-21-94)

Sec. 11-266. Refuse and trash.

No person shall take into, dump or deposit on land of, or leave in, any natural area or county road abutting such natural area, bottles, broken glass, ashes, paper, boxes, cans, dirt, construction or agricultural debris, rubbish, waste, garbage, refuse, or any other solid or liquid discard. Such discard shall be placed in the proper receptacles where provided on a natural area. Where receptacles are not provided, all such discard shall be carried away from the natural area and properly disposed of by the person responsible for its presence.

(Ord. No. 94-13, § 16, 6-21-94)

Sec. 11-267. Public utilities.

No entity shall be allowed to place any new public service utility into, upon, or across natural area lands except by prior written permit from the county administrator or his designee.

(Ord. No. 94-13, § 17, 6-21-94)

Sec. 11-268. Closing of natural areas.

(a) Each natural area managed by the county shall be open to the public at hours and days that are determined to be appropriate and adopted as part of the management plan for that natural area. These hours shall be posted at each natural area.

(b) The county administrator or his designee may declare any section of a natural area closed to the public, either temporarily or at regularly stated intervals, in order to protect natural resource protection, public safety, health and/or welfare.

(c) No person shall remain in any natural area during the hours that the natural area is closed, unless he or she has a permit.

(Ord. No. 94-13, § 18, 6-21-94)

Sec. 11-269. Vehicles.

(a) All state vehicle laws and county traffic regulations shall be applicable in all natural areas. Municipal traffic ordinances shall be applicable in those natural areas located within municipalities.

(b) No person shall drive, operate, or propel any vehicle outside the boundaries of designated paved or improved natural area access roads or driveways unless specifically authorized by the county administrator or his designee.

(c) No person shall park any vehicle on a natural area at any place other than a designated parking area without prior authorization from the county administrator or his designee. No person shall park any vehicle in a manner that blocks or impedes access to a parking area or access road. No vehicle shall be left in a parking area or access road. No vehicle shall be left in a parking area overnight without prior authorization by the county administrator or his designee.

(Ord. No. 94-13, § 19, 6-21-94)

Sec. 11-270. Enforcement.

(a) It shall be the duty and responsibility of law enforcement officials to, within their jurisdiction, enforce all state laws, municipal ordinances, county ordinances, and county traffic regulations within and adjacent to the limits of all natural areas maintained and operated by the department.

(b) It shall be unlawful for any person to do any act forbidden, or fail to perform any act required, by this article or for any person to fail to comply with any lawful and reasonable order given by law enforcement officers or authorized department officials. It shall be the duty and responsibility of law enforcement officers and authorized department officials to enforce all natural areas rules.

(Ord. No. 94-13, § 20, 6-21-94)

Sec. 11-271. Penalties.

The violation of any provision of this article shall be punishable by a fine not to exceed five hundred dollars (\$500.00), or by imprisonment in the county jail not to exceed sixty (60) days, or by both such fine and imprisonment, or by such other penalty as may hereafter be provided in section 125.69, Florida Statutes.

(Ord. No. 94-13, § 21, 6-21-94)

Sec. 11-272. Municipal ordinances and land development regulations.

This article does not supersede any municipal ordinance or land development regulation.

(Ord. No. 94-13, § 23, 6-21-94)

Secs. 11-273--11-290. Reserved.

**Palm Beach County Parks and Recreation
ORDINANCE NO. 2004-022**

AN ORDINANCE OF THE BOARD OF COUNTY COMMISSIONERS OF PALM BEACH COUNTY, FLORIDA, KNOWN AS THE APALM BEACH COUNTY PARKS AND RECREATION ORDINANCE@; PROVIDING FOR THE AUTHORITY OF THE DIRECTOR OF PARKS AND RECREATION; PROVIDING FOR DEFINITIONS; PROVIDING FOR REGULATION OF PARK TRAFFIC, PROPERTY, WILDLIFE, AND RECREATIONAL ACTIVITIES; PROVIDING FOR REGULATION OF ANIMALS, FIREARMS, FIREWORKS AND ALCOHOLIC BEVERAGES; PROVIDING FOR PARK USAGE, RESERVED PARK/FACILITY AREAS, SANITATION AND POLLUTION CONTROL; PROVIDING FOR REGULATION OF COMMERCIAL ACTIVITIES, AIRCRAFT, AND PUBLIC UTILITIES; PROVIDING FOR PARK HOURS; PROVIDING FOR ENFORCEMENT, PROVIDING FOR PENALTIES; PROVIDING FOR REPEAL OF ORDINANCE NO. 96-44; PROVIDING FOR REPEAL OF LAWS IN CONFLICT; PROVIDING FOR INCLUSION IN THE CODE OF LAWS AND ORDINANCES OF PALM BEACH COUNTY; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE

WHEREAS, Section 125.01(f), Florida Statutes, grants Palm Beach County the power to provide parks, preserves, playgrounds, recreation areas and other recreational facilities for the welfare of its citizens; and

WHEREAS, it is necessary to repeal Ordinance No.96-44, to conform with federal and state law and to provide for more efficient and effective operations of Palm Beach County parks and recreation areas.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF PALM BEACH COUNTY, FLORIDA, that:

SECTION 1. TITLE

This Ordinance may be cited as the APalm Beach County Parks and Recreation Ordinance.@

SECTION 2. AUTHORITY OF THE DIRECTOR OF PARKS AND RECREATION

Subject to the direction of the Board of County Commissioners or the County Administrator, all powers, duties and authorities relating to the operation of the Palm Beach County Parks and Recreation system for the Board of County Commissioners, are vested in the Director of Parks and Recreation unless specifically vested elsewhere by the provisions of this Ordinance. In the absence of the Director of Parks and Recreation, a Supervisor over the Director of Parks and Recreation, or an individual specifically appointed by the County Administrator, may assume the powers, duties, and authority vested by this section.

SECTION 3. DEFINITIONS

The following terms when used in this Ordinance shall have the meanings ascribed to them in this section:

(A) BEACH, WATER AREA, WATERPARKS OR POOL. Any beach, water area, waterpark or pool designated by the Board of County Commissioners as such, within any park property, either on the ocean or inland, including the actual sand beach, if any, used for swimming and wading.

(B) DEPARTMENT. The term "the Department" when used herein is defined as the "Palm Beach County Parks and Recreation Department".

(C) DIRECTOR. The terms "Director" or "Parks Director" when used hereinafter are defined as the Director of the Palm Beach County Parks and Recreation Department or his designee

(D) EXOTIC ANIMAL. A non-native animal species that occurs in South Florida, as a result of direct or indirect, deliberate or accidental actions by humans, which may include, but not be limited to, domestic, semi-domestic or feral animals.

(E) NATIVE ANIMAL. An animal species that occurs naturally in or is indigenous to South Florida.

(F) PARK. The terms "park", "parkways", "recreational areas", "natural areas", "marinas" and "areas operated and maintained by the Department" may include, but is not limited to, parks, wayside parks, parkways, playgrounds, recreation fields, open green spaces, golf courses, community centers, museums,

auditoriums, ranges, lakes, streams, canals, lagoons, waterways, pools, waterparks, water areas and beaches therein and all on grounds, water areas, buildings and structures in Palm Beach County which are under the control of or assigned for upkeep, maintenance or operation by the Department.

(G) PARKING AREA. Any designated part of any park road, drive or area that is designated for the standing or stationing of any vehicles.

(H) PARK PROPERTY. The term park property is defined to cover all areas, grounds, buildings, locations and facilities described in the foregoing section "F".

(I)
PERMIT

. The term "permit" means a document or certificate provided by the Department granting permission for use of reserved park/facility areas and which sets forth terms and conditions applicable thereto.

(J) PERSON. The word "person" includes natural persons, firms, associations, joint ventures, partnerships, estates, trusts, business trusts, syndicates, fiduciaries, corporations, and all other groups and combinations.

(K) VEHICLE. The term "vehicle" means any wheeled conveyance (except a baby carriage or wheelchair) for transportation of persons or materials whether: (1) powered or drawn by motor such as an automobile, truck, motorcycle, scooter, minibike, or recreational vehicle; (2) animal-drawn such as a carriage, wagon, or cart; (3) self-propelled such as a bicycle, tricycle, or skateboard; or (4) towed such as a trailer of any size, kind or description. "Vehicle" does not include any recreational or park transportation service operated or authorized by the Department.

SECTION 4. REGULATION OF VEHICLES WITHIN PARKS

(A) All applicable state or local vehicle laws are enforceable within park property.

(B) All law enforcement officers shall direct traffic and enforce all motor vehicle, traffic and parking laws of this County including the Palm Beach County Parking Ordinance, codified in Chapter 19 of the County Code, as may be amended, and enforce all rules and regulations set forth by the Department within park property. Park personnel, authorized and designated by the Director, may direct traffic and enforce the rules and regulations set forth by the Department with park property.

(C) The Director shall determine and all persons shall carefully observe and obey all traffic signs indicating speed, direction, caution, stopping, or parking, and all other signs posted for proper control and the safeguarding of life and property.

(D) Notwithstanding Paragraph (A) above, where a public road traverses a County Park, said road shall be open to all through traffic permitted on any County road or highway, but such through traffic shall conform to park speed and traffic regulations.

(E) No person driving, operating, controlling or propelling any vehicle whether motorized, horse drawn, or self-propelled, shall use any other than the regularly designated paved or improved park roads, pathways, trails, or driveways, except when directed to do so by a law enforcement officer or Department employee or by official signs or markings. No driver or operator of any vehicle shall obstruct traffic or stop on any road or driveway except those places so designated.

(F) No person shall park a vehicle on park property at any place other than in the regular designated facilities provided for that particular type of vehicle, unless directed otherwise by a law enforcement officer or Department employee or by official signs or markings. No driver or operator of any vehicle shall park on any road or driveway except those places so designated. No driver or operator of any vehicle shall leave a vehicle parked on any road, driveway or park property after posted closing hours.

(G) No truck, commercial vehicle or bus shall be driven on any restricted service road or property without prior authorization from the Department for the purpose of park work, service, or activities.

(H) No person shall ride, drive or propel any bicycle, motorcycle, all-terrain vehicle (ATV), scooter, minibike or similar vehicle on any but the regular vehicle roads except for those areas designated for such specified use. The designated bicycle trails shall be used only by pedestrians and bicycles and other vehicles propelled by human power. It is expressly provided that no vehicles, motorcycles, scooters, minibikes, or similar vehicles shall be ridden on the designated nature trails located within

Palm Beach County parks. No person shall deviate from compliance with all applicable vehicle laws and regulations governing the operation of the above vehicles while on park property.

(I) No person shall change parts, repair, wash or grease a vehicle on any park roadway, parkway, driveway, parking lot or other park property. No driver of a vehicle using gasoline or any other explosive mixture as source of power shall at any time fail to use an adequate muffler or sound deadening device.

SECTION 5. BUILDINGS AND OTHER PROPERTY

(A) No person shall willfully mark, deface, injure in any way, displace, remove or tamper with any park buildings, bridges, tables, benches, fireplaces, railings, paving, water lines or other public utilities or parts of appurtenances thereof, park signs, notices or placards whether temporary or permanent, monuments, stakes, posts or other boundary markers, or other structures of equipment, facilities or park property or appurtenances whatsoever, either real or personal.

(B) No person shall dig, move or remove from any park area any beach sand, soil, rocks, stones, trees, shrubs, whether submerged or not, or plants, down-timber, or other wood or materials, or make any excavation by tool, equipment, or other means, or construct or erect any building or structure of whatever kind, whether permanent or temporary in character, or run or string any public service utility into, upon, or across such land, or affix any materials to any park property, except with the prior written approval of the Director.

(C) No person shall excavate or remove any artifact from any archeologically sensitive areas with particular concern to Native American burial grounds and living sites.

SECTION 6. FIRE

(A) No person shall build or attempt to build any fire within any park property except in such areas where fireplaces or grills are provided and under such regulations as are or may be specifically set forth by the Director. No person shall drop, throw, or otherwise deposit lighted matches, burning cigarettes or cigars, or other flammable material within any park property.

SECTION 7. PLANT AND WILDLIFE PROTECTION AND PRESERVATION

(A) Within any park, no person shall cut, carve, or injure the bark or break off limbs or branches or pick the flowers or seeds, of any tree, plant or shrub, nor shall any person dig in or otherwise disturb grass areas, or install any vegetation, or in any other way injure or impair the natural beauty or usefulness of any area, nor shall any person pile debris or material of any kind on or about any tree or plant, or attach any rope, wire, or other contrivance therein, whether temporary or permanent in character or use, without prior approval by the Director. No person shall tie or hitch any animal to any tree or plant within park property.

(B) No person shall remove, molest, harm, frighten, kill, trap, hunt, chase, shoot or throw any object at any animal, nor shall any person remove or possess the eggs, nests or young of any wild animal whether alive or dead without prior approval from the Director.

(C) It shall be unlawful for any person to knowingly interfere with or damage any humane animal trap owned by the department, or another county department or agent, or to molest or release any animal caught therein.

SECTION 8. CONTROL OF NUISANCE ANIMALS (A) The introduction, by any person, of any exotic animal or the placement, abandonment or leaving of any animal in a County park is strictly forbidden.

(B) The feeding, by any person, of any exotic or native animal in a County park is hereby strictly forbidden unless specifically authorized by the Department Director.

(C) Exotic animals, with the exception of those authorized by the Director, roaming free in County parks are hereby declared a nuisance. The Director has the authority to establish processes and procedures to control, and remove from the park, species that are declared to constitute a nuisance.

(D) The Director is hereby authorized to declare certain native species, located in identified parks, to constitute a nuisance. Native species shall be determined to be a nuisance when the Director deems that

the number, location, behavior or other characteristic of the native species constitutes a hazard to human health and/or safety or to the resources of the particular park.

SECTION 9. SWIMMING AND WADING

(A) No person shall swim or wade in any beach, water area, waterpark or pool within any park property, except where specifically designated and in compliance with such regulations as to hours of the day and safety limitations for such use as set by the Department.

(B) In areas designated for swimming and wading, all persons shall be so covered with clothing or a bathing suit so as to prevent any indecent exposure of the person.

SECTION 10. BOATING

(A) In addition to the provisions set forth in Chapter 327, Florida Statutes, the following regulations shall apply to recreational area waters within park property:

(1) No person shall bring into, launch, or operate any vessel (as defined in Section 327.02, Florida Statutes, as may be amended) upon any park property, including designated swimming areas, except at such places as are or may be designated for such use or purposes by the Board of County Commissioners or the Director. Such operation or use shall be in accordance with such rules and regulations as are now or may hereafter be adopted by the Department. Boating permits may be required by the Department for specific boating activities within park property.

(2) No person shall moor, anchor, or tie up to the bank or any wharf, dock, tree, building, rock or any object or structure on the bank in waters within park property or property managed by the Department unless said person does so in pursuit of recreational activities of a temporary nature or unless the owner of the vessel has obtained written permission from the Director, except in an emergency situation.

(3) No person shall launch, dock or operate any vessel on the waters of any park between the closing hour of the park at night and opening hour the following morning, with the exception of designated 24 hour boating facilities, nor shall any person be on, or remain on or in, any vessel in the park during the said closed hours of the park, except with prior approval of the Director.

(4) Boat operators shall be responsible for their own wake and liable for any damage it may cause.

(5) During the staging of Department approved special events, all non-participating vessels and spectators shall be prohibited from entering the boat pit area and from obstructing any race, ski courses or special event.

(6) No person shall operate airboats or hovercraft within park property except by approval from the Director.

(7) The Director shall have the authority to establish regulations and speed limits of vessels that utilize the water areas located within park property unless otherwise pre-empted by the State.

(B) The Department shall establish rules and regulations for use of the County's permanent boat slips for dockage of vessels, managed mooring fields and other marine facilities by the public. Rates for said usage shall be established by the Board of County Commissioners.

(C) No person shall rent, hire, or operate any vessel within park property for a commercial purpose unless so permitted by the Department.

SECTION 11. WATER SKIING

(A) No person shall water ski within park property except in such places as designated by the Director, and in compliance with rules and regulations as are now or may hereafter be adopted.

(B) No person shall water ski in such manner as to endanger bystanders, swimmers, other skiers, or occupants of other vessels.

(C) No person shall obstruct the takeoff and landing areas designated for water skiing for any purpose other than for normal water skiing activities.

(D) No water skiing is permitted after sunset or before sunrise, except in areas designated for such use.

SECTION 12. FISHING

(A) The buying or selling of fish is prohibited within park property.

(B) Sport fishing is allowed within park property except where specifically prohibited.

(C) The use of a troll line for fishing purposes is prohibited within park property. Set cane poles are permitted if attended.

(D) All applicable State laws pertaining to fishing and licensing shall be enforced within Park property.

(E) The Director may establish specific fishing regulations for various water bodies within park property.

SECTION 13. FIREARMS

No person shall use or possess firearms, weapons or trapping devices within any park property except with prior approval from the Director or in any area designated by the Department for such purpose. The Director shall establish rules and regulations pertaining to shooting or archery ranges. Shooting into park areas from beyond park boundaries is prohibited.

SECTION 14. PICNIC AREAS AND USE

(A) Except for reserved park/facility areas, individual picnic tables and associated grills are available on a first come, first served@ basis.

(B) No person shall use a grill or other device in such a manner as to burn, char, mar or blemish any bench, table, or other object of park property nor shall any person starting a fire leave the area without extinguishing said fire.

SECTION 15. CAMPING

No person shall camp within any park property except in areas designated by the Director for said purpose. The Department may establish rules and regulations for designated camping areas within park property. Rates for said use shall be established by the Board of County Commissioners. Camping units are to be of commercial manufacture and be of flame retardant material. House trailers are prohibited.

SECTION 16. HORSEBACK RIDING

No person shall engage in horseback riding within any park property except in areas designated by the Director for said purpose. In areas designated for horseback riding, horses must be thoroughly broken, properly restrained, and prevented from grazing and straying unattended. All riders must carry proof of their horse=s negative coggins test.

SECTION 17. ANIMALS

(A) Except in specified areas, domesticated animals are permitted within Park property. Said animals must be restrained at all times at a distance not greater than six (6) feet in length from their handler.

(B) No person shall bring into, nor allow to enter, any park property any non-domesticated animals including, but not limited to, cattle, mules, swine, sheep, goats, fowl or reptiles except where in conjunction with projects sponsored by County Departments or upon permit from the Director.

(C) Dangerous dogs, as defined in Chapter 767, Florida Statutes, are prohibited from park property.

(D) In conjunction with projects and facilities administered by County Departments or upon permit from the Director, animals may be allowed in designated areas of the parks at specified times without restraint.

SECTION 18. ALCOHOLIC BEVERAGES

(A) The sale, purchase, consumption, and possession of alcoholic beverages as defined in Section 561.01(4), Florida Statutes, is hereby prohibited within park property except as specifically provided in accordance with the provisions set forth herein.

(B) Notwithstanding the prohibition set forth in Paragraph (A) above, the possession of alcoholic beverages in sealed original packages in any vehicle, vessel, or conveyance for purposes of storing or transporting such and not for purposes of selling or consuming such within park property shall not be a violation of this Ordinance.

(C) The Director may designate specific areas in which alcoholic beverages may be possessed and/or consumed. Designated areas may include, but are not limited to, picnic areas, areas reserved for large groups, and facilities for food service. Kegs of beer or other alcoholic malt liquor will be authorized only by permit and in conjunction with a reserved park facility area.

(D) The Director may permit, in writing, the sale, possession, and/or consumption of alcoholic beverages incidental to a special event. Said permission may not exceed four consecutive days.

(E) The Board of County Commissioners may permit the sale of alcoholic beverages by private contractors who operate or manage facilities within park property including but not limited to food

service, performing arts, golf courses, and other facilities, as the Board of County Commissioner deems appropriate.

(F) At its option, the County may obtain, in its name, the necessary State licensing for the sale of alcoholic beverages. The County may, at its option, have such license transferred to a contractor=s or lessee=s name, provided, however, that such licensing shall immediately revert to the County upon termination, for any reason, of the contractor=s agreement or lessee=s lease with the County. The license holder shall take all action and execute all documents necessary to effect said transfer to the County.

(G) The permission granted under this Section shall be subject to all ordinances, laws rules and regulations applicable in Palm Beach County, and any grantee shall be responsible for compliance thereto. The permission granted may also be subject to, and granted with, specific conditions as set forth by the Department, and the grantee shall be responsible for insuring compliance thereto.

(H) No person who is intoxicated or under the influence of drugs will be permitted in parks or recreation areas.

SECTION 19. FIREWORKS AND EXPLOSIVES

(A) No person shall bring into or have in his possession, or set off or otherwise cause to explode or discharge or burn within any park property any firecrackers, torpedoes, rockets or other fireworks or explosives of flammable material, or discharge them or throw them onto any park property from land or water adjacent thereto. Parents or guardians shall be held strictly responsible and accountable for the actions of minors. Violators will be subject to prosecution accordingly.

(B) The Director may permit organizations and entities to conduct fireworks displays within Palm Beach County Parks, subject to full compliance with the Palm Beach County Fire Code or other applicable County Ordinances, or the ordinances of any municipality having jurisdiction to regulate said fireworks display.

SECTION 20. PARK USAGE

(A) It is the policy of Palm Beach County to afford all citizens the opportunity to utilize County parks and also to participate in free speech activities within park property to the fullest extent permitted by law. The Parks and Recreation Director has the authority to establish guidelines for the permitting of special events, demonstrations, gatherings, performances or other mass assemblages at county parks.

(B) No person shall be or remain in any part of any park property between sunset and sunrise or as specifically posted. The provisions of this section shall not apply to police officers or department employees while in the discharge of their duties nor to persons having a permit in writing issued by the department to be or remain in any part of the parks between such hours. The Department Director has the authority to establish exceptions to the closing hours as set forth above when it is in the interest of the public health, safety or welfare and such exceptions shall be posted.

(C) No person shall loiter in or around any park areas including, but not limited to, restrooms, dressing rooms or bathhouses, picnic shelters/areas, wooded or natural/undeveloped areas.

SECTION 21. COMMERCIAL ACTIVITIES

(A) No person shall park or station on any park property any vehicle displaying a sign or notice with the intent of offering said vehicle for sale or exchange.

(B) No person shall advertise or offer for sale any article, material, or service, nor place any stand, cart, or vehicle for the transportation, sale, trade or display of any article, material or service for sale or trade within any park area unless in conjunction with a permitted use of a reserved park/facility area.

(C) No person shall distribute, display or affix any printed materials or advertisements to or within any park property. Exceptions to this rule are printed materials or advertisements permanently affixed on vehicles or on clothing, distribution of printed handbills or leaflets the purpose of which is not solely commercial, announcements of park sponsored or sanctioned events; authorized signs located entirely within concession structures, and signs or distribution of printed materials in conjunction with a permitted use of reserved park/facility area.

SECTION 22. RESERVED PARK/FACILITY AREAS

Park/facility areas shall not be reserved except by permit issued by the Director. Said reserved park/facility areas include athletic fields, group picnic shelters and associated facilities, recreation and civic facilities, and those areas requested for use for special events. Persons permitted for use of reserved park/facility areas must comply with all applicable rules and regulations as may be established by the Department. Permits requested for use of reserved park/facility areas for for-profit activities require approval by the Board of County Commissioners.

SECTION 23. PERMITS

The Director has the authority to develop permitting systems and related rules and regulations for the use of Park facilities. Violations of permit requirements shall result in suspension or revocation of such permit.

SECTION 24. NOISE

No person shall make such loud, excessive, unnecessary noise so as to create a nuisance in any County park. Noise shall be considered a nuisance where it produces actual physical discomfort and annoyance to persons of ordinary sensibilities.

SECTION 25. AIRCRAFT

No one operating, directing or responsible for any aircraft, seaplane, helicopter, glider, balloon, dirigible, parachute or other aerial apparatus shall take off from or land within Park property except in emergency law enforcement situations or when written permission has been obtained from the Director.

SECTION 26. POLLUTION OF WATERS

No person shall throw, discharge or otherwise place or cause to be placed in the waters of any fountain, pond, lake, stream, bay or other body of water within Park property any substance, matter or thing, liquid or solid, which will or may result in the pollution of said waters.

SECTION 27. REFUSE, TRASH AND LITTER

(A) No person shall take into, dump, deposit or litter any bottles, broken glass, ashes, printed material, paper, boxes, cans, dirt, rubbish, waste, garbage, refuse or other trash upon any park property. Persons shall place all bottles, broken glass, ashes, printed material, paper, boxes, cans, dirt, rubbish, waste, garbage, refuse or other trash in the proper receptacles where provided; where receptacles are not provided, same shall be carried away from park property by the person or persons responsible for its presence and properly disposed of elsewhere.

(B) No person shall affix printed material or any other item to any vehicle within park property other than their own vehicle.

SECTION 28. PUBLIC UTILITIES

Public utilities serving park property or traversing park property shall be subject to reasonable regulations as may be hereafter adopted in the public interest in order to protect County parks from unsightly and inconveniently located fixtures, installations and facilities.

SECTION 29. PARK HOURS

(A) Except for unusual and unforeseen emergencies and twenty-four (24) hour boat launching, fishing and camping areas, all parks shall be open to the public every day of the year during hours designated by the Director. The opening and closing hours shall be posted at each park in order to give notice to the public.

(B) The Director, acting as agent of the Board of County Commissioners, may declare any section or part of any park closed to the public at any time and for any interval of time, either temporary or at regular and stated intervals (daily or otherwise) and either entirely or merely for certain uses.

(C) No unauthorized person shall be or remain within park property during those hours when the park is closed.

(D) No person shall enter upon park property which is under construction, in a state of disrepair, or withheld from general public usage in the interest of public safety, health and/or welfare.

SECTION 30. ENFORCEMENT

(A) It shall be the duty and responsibility of all law enforcement officers within their jurisdiction to enforce all State laws, municipal ordinances, County ordinances, and County traffic regulations within park property and other areas maintained and operated by the Department.

(B) It shall be the duty and responsibility of law enforcement officers and designated Department employees to enforce all park rules and regulations. It shall be unlawful for any person to do any act forbidden or fail to perform any act required by these rules or for any person to fail to comply with any lawful and reasonable order given by law enforcement officers. Violators of this Ordinance may be ordered to leave Park areas by law enforcement officers and designated Department employees. Failure to leave once ordered constitutes a separate violation of this Ordinance.

(C) It shall be the duty and responsibility of law enforcement officers and authorized Department employees to enforce all provisions of permits issued by the Department. It shall be unlawful for any person to do any act forbidden or fail to perform any act required by any permit issued by the Department. Copies of regulations pertaining to reserved park/facility areas may shall be furnished with each permit issued.

SECTION 31. PENALTIES

Failure to comply with the provisions set forth in this Ordinance shall constitute a violation of a County Ordinance and shall be punished upon conviction, pursuant to Section 125.69(1), Florida Statutes, by a fine not to exceed \$500.00 dollars per violation per day for as long as the violation continues or imprisonment not exceeding sixty (60) days, or both fine and imprisonment.

Violations of this Ordinance that are continuous with respect to time may be abated by injunctive or other equitable relief. The imposition of a penalty does not prevent equitable relief.

SECTION 32. SAVINGS CLAUSE

This Ordinance shall not affect or impair the processing and implementation of any permit issued or any act authorized pursuant to the provisions of Ordinance No. 96-44. All permits and authorizations initiated under said Ordinance shall continue in full force and effect until completed. Upon expiration of an existing permit or authorization, the permittee or authorized person must apply for a new permit or seek authorization in accordance with the provisions as set forth herein.

SECTION 33. REPEAL OF LAWS IN CONFLICT

Ordinance No. 96-44 is hereby repealed in its entirety. All local laws and ordinances in conflict with any provisions of this Ordinance are hereby repealed to the extent of such conflict.

SECTION 34. SEVERABILITY

If any provision, article, section, paragraph, sentence, clause, phrase, or word of this Ordinance is for any reason held by the Court to be unconstitutional, inoperative or void, such holding shall not affect the remainder of this Ordinance.

SECTION 35. INCLUSION IN THE CODE OF LAWS AND ORDINANCES

The provisions of this Ordinance shall become and made a part of the Code of Laws and Ordinances of Palm Beach County, Florida. The Articles and Sections of this Ordinance may be renumbered or relettered to accomplish such, and the word

A Ordinance may be changed to A Section, Article, or any other appropriate word.

SECTION 36. EFFECTIVE DATE

The provisions of this Ordinance shall become effective upon filing with the Secretary of State.

APPROVED AND ADOPTED by the Board of County Commissioners of Palm Beach County, Florida, this ____ day of _____, 2004.

ATTEST: PALM BEACH COUNTY, FLORIDA, BY ITS
SHARON R. BOCK, BOARD OF COUNTY COMMISSIONERS
CLERK & COMPTROLLER, PBC

By: _____ By: _____
Deputy Clerk Karen T. Marcus, Chair

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY

By: _____
County Attorney

EFFECTIVE DATE: Filed with the Department of State on the _____ day of _____,
2004.

D. Literature Cited

- Butterfield, B. P., W. E. Meshaka, Jr., and C. Guyer. 1997. Nonindigenous amphibians and reptiles. Pages 123-138 in D. Simberloff, D. C. Schmitz, and T. C. Brown, editors. *Strangers in paradise. Impact and management of nonindigenous species in Florida*. Island Press, Covelo, California.
- Davis, Joseph. 1991. Camp Jupiter, Palm Beach County. January, *AHC Technical Report #26*.
- Carr, R.S., W.S. Steele, J. Pepe, and R. Ferrer. 1992. An Archaeological Survey and Management Plan of the Town of Palm Beach. October, 1992. *AHC Technical Report #61*.
- Carr, Robert S., Willard Steele, James Pepe and Linda Jester. 1994. An Archaeological Assessment and Survey of Riverbend Park, Palm Beach County, Florida. *AHC Technical Report #106*.
- Carr, Robert S., Linda Jester and James Pepe. 1995. Phase II Archaeological Excavations of the Riverbend #12 Site, 8PB7984, Palm Beach County, Florida. *AHC Technical Report #112*.
- Carr, Robert S. and James Pepe. 1995. Archaeological and Historical Elements for the Management of Riverbend Park, Palm Beach County, Florida. *AHC Technical Report #133*.
- Carr, Robert S., M.S. 2005. An Archaeological Assessment of the Pennock Point Parcel, Lots 2 - 6, Palm Beach County, Florida. *AHC Technical Report #601*.
- Colonial Records of Spanish Florida: Letters and Reports of Governors and Secular Persons*, Volume I, 1570-1577, translated and edited by Jeannette Thurber Connor (The Florida State Historical Society, 1925).
- Conant, R., and J. T. Collins. 1991. A field guide to amphibians and reptiles of eastern and central North America. Third edition. Houghton Mifflin, Boston, Massachusetts, USA. 450pp.
- Fernald, R.T. 1989. Coastal xeric scrub communities of the Treasure Coast Region, Florida: a summary of their distribution and ecology, with guidelines for their preservation and management. Technical report no. 6, Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.
- Hawkes, C.V. 2003. Nitrogen Cycling Mediated by Biological Soil Crusts and Arbuscular Mycorrhizal Fungi. *Ecology*. 84: 1553-1562.
- Hawkes, C.V. 2000. Biological soil crusts and their interactions with vascular plants in a xeric Florida shrubland. Ph.D. Dissertation, Univ. Pennsylvania. [Archbold library call number: 581.5/975.9/H2000]
- Humphrey, Stephen R. editor, *Rare and Endangered Biota of Florida*. Vol. I: Mammals. University Press of Florida, Gainesville, USA.
- Kale, Herbert W., II, and David S. Maehr. 1990. *Florida's Birds: A Handbook and Reference*. Sarasota: Pineapple Press.
- Kennedy, W.J., S.Lewis, N. Cassel, L. Jester, J. Pepe and A.J. Sassi. 1991. The SR706/Indiantown Road Realignment, Palm Beach County, Florida, Archaeological Reconnaissance Survey and Gildan Right-of-Way & Bridge/Ca. Florida Atlantic University Department of Anthropology, Boca Raton.

Kennedy, W.J., R. Wheeler, L. Spears-Jester, J. Pepe, N. Sinks and C. Wernecke. 1993. Archaeological Survey and Excavations at the Jupiter Inlet I Site (8PB34), DuBois Park, Palm Beach County, Florida. Florida Atlantic University Department of Anthropology, Boca Raton.

Kennedy, W.J., L. Jester, J. Pepe, N. Sinks, C. Wernecke and D. Flaherty, 1994. Phase I and Phase II Archaeological Survey of the Loxahatchee River. Proposed for Environmental Management and Engineering, Palm Beach County.

Kremer, P.R. and W. Spackman. 1981. The paleoecological evidence for environmental change in "neopaleobotanical" sediments of South Florida. In R.C. Romans (ed.) *Geobotany II*. Plenum Publishing Co. pp. 35-52.

Milanich, Jerald T. 1994. *Archaeology of Precolumbian Florida*. University of Florida, Gainesville.

Meshaka, W. E., Jr. 1995. Reproductive cycle and colonization ability of the Mediterranean gecko (*Hemidactylus turcicus*) in south-central Florida. *Florida Scientist* 58:10-15.

Meshaka, W. E., Jr. 2000. Colonization dynamics of two exotic geckos (*Hemidactylus garnotii* and *H. mabouia*) in Everglades National Park. *Journal of Herpetology* 34:163-168.

Moler, P. E, editor. 1992. *Rare and endangered biota of Florida, Vol. III: Amphibians and Reptiles*. University Press of Florida, Gainesville, USA.

Murdoch, Richard. 1952 *The Florida Historical Quarterly*, pp. 16-32. Available on-line at: <http://palm.fcla.edu/fhq/index.shtml>

Newman, C. and Weisman, B. R. 1992. A preliminary cultural resource inventory of Coupon Bight State Buffer Reserve Monroe County, FL.

Romans, Bernard. 1962. *A Concise Natural History of East and West Florida*. Written in 1775. University Presses of Florida, Gainesville.

Speake, D. W. 1981. The gopher tortoise burrow community. Pages 44-47 in *The future of gopher tortoise habitats* (Lohofener, R., L. Lohmeier and G. Johnston, eds.). Proceedings 2nd Annual Meeting Gopher Tortoise Council. Florida State Museum, Gainesville.

Sturtevant, W. C. 1953. Chakaika and the 'Spanish Indians': Documentary Sources Compared with Seminole Tradition. *Tequesta* 13:35-73. True, DO

True, David O. 1944B. *Memoir of Do. d' Escalente Fontaneda Respecting Florida, written in Spain, about the year 1575*, translated by Buckingham Smith. University of Miami and Historical Association of Southern Florida, Miami.

Wheeler, R.J. 1992. The Riviera Complex: An East Okeechobee Archaeological Area Settlement. *The Florida Anthropologist* 45(1):5-17.

Wheeler, Ryan J., Wm. Jerald Kennedy, and James P. Pepe, "The Archaeology of Coastal Palm, Beach County," *The Florida Anthropologist* 55(3-4): 119-156 2002. Available on-line at: <http://www.uflib.edu/UFDC/UFDC.ASPX?S+FLANT&B=UF00027829>

Wheeler, Ryan J., Wm. Jerald Kennedy, and James P. Pepe, "The Archaeology of Jupiter Inlet I (8PB34)," *The Florida Anthropologist* 55(3-4): 157-196 2002. Available on-line at: <http://www.uflib.edu/UFDC/UFDC.ASPX?S+FLANT&B=UF00027829>

Williams, J.L. 1837. *The Territory of Florida*. Gainesville: University Press of Florida.

Wunderlin, R. P., B. F. Hansen, and D. W. Hall. 1988. The vascular flora of central Florida; taxonomic and nomenclatural changes, additional taxa. *Sida* **13**:83-91.

E. Natural Resource Monitoring Protocols

The following monitoring protocols are adopted from Palm Beach County Department of Environmental Resources Management. The Jupiter Inlet ONA is managed as part of the County's Natural Area program and this will allow for consistent monitoring of management actions across all sites. In addition, BLM may adapt these techniques or add additional techniques, as needed, to assess the results of management actions on the natural resources at the ONA. These monitoring techniques may also be updated, as needed, to stay consistent with approved protocols. For example, U.S. Fish and Wildlife Service is developing monitoring techniques for perforate lichen and these techniques will be incorporated into the ONA monitoring program.

Photo Monitoring Protocol

OBJECTIVE

The objective of photo monitoring is to obtain a qualitative, long-term visual record of changes in vegetative structure and/or condition over time, including the effects of planned management activities. The visual record can be made semi-quantitative with the use of a range pole.

REQUIRED EQUIPMENT

- Photopoint Station Data Sheet(s)
- Aerial photograph of site
- GPS unit
- Measuring tape
- Monument stakes (rebar and PVC)
- Compass
- Camera
- Tripod (must have compass degree increments of at least 45 degrees on camera mount for horizontal movement left and right)
- Range pole
- Level (if needed due to uneven terrain at photopoint location)

METHODOLOGY

Selecting the Location(s) for the Photopoint(s)

Permanent photopoints shall be established in areas where planned management activities are anticipated to occur and in areas where natural vegetation succession (of management interest) is expected to occur.

Examples of planned management activities include:

- Prescribed burns
- Exotic vegetation removal/herbicide
- Mechanical cutting of vegetation (for example, with a Hydro-axe or a Brontosaurus, roller chopping, mowing, logging, etc.)
- Construction of public use facilities and/or management roads
- Wetland/upland restoration
- Volunteer events
- Tree plantings
- Construction of water control structures on the site
- Adjacent property owner activities (construction)

Examples of areas of natural vegetation succession of management interest include:

- Known listed species populations being outcompeted

- Early (for example, post-wildfire) or late (for example, fire-suppressed) successional vegetation communities
- New invasions of exotic species
- Insect pest (for example, Mexican bromeliad weevils) or plant disease outbreaks

The above-mentioned factors shall be considered in the micro-siting of the photopoints.

Each management/burn unit shall contain at least one photopoint within a vegetation community that is expected to carry fire during a wildfire or prescribed burn. In addition, each vegetation community on the site shall contain at least one representative photopoint that will allow photographic recording of at least one of the above-mentioned planned management activities and/or vegetation conditions.

NOTE: Photopoints do not need to be established in both disturbed and undisturbed communities of the same type (for example, disturbed wet flatwoods and wet flatwoods). This may not be applicable on extremely large sites. For some communities (such as open water, beaches, etc.), the site manager shall use his or her best judgment in determining if a photopoint is needed and shall include a brief explanation of his or her decision on the Photopoint Station

Data Sheet.

Additional photopoints may be deemed necessary, or a determination may be made that fewer photopoints are needed, in order to appropriately represent the vegetation conditions on site. The exact number of photopoints to be established shall be determined by the site manager for the natural area.

Establishing the Photopoint(s)

The photopoint location shall be permanently marked by placing rebar in the ground and covering it with a PVC tube. The rebar shall be placed at least 2 feet into the ground (or until completely stable) and the PVC covering shall stand at least 4 feet above the ground (or until it is readily visible). The PVC can be left off if the photopoint is in an area with a significant chance of being vandalized or removed or if the photopoint can be easily encountered in the field in the future by ERM staff. Another rebar shall be placed in the ground at a reference point 15 feet from the photopoint in the direction of the central photo at one of the four cardinal directions (north, east, south, or west). This rebar shall be no more than 3 feet above the ground. Covering it with PVC will be optional. The range pole shall be placed at the reference point and can be placed directly over the rebar.

Both of these points shall then be GPS'd with appropriate technology (preferably a GPS unit w/ sub-meter accuracy) and their locations clearly described on the photopoint monitoring record form.

Describing additional reference points (for example, trees, structures, or other unique features) may also make the photopoint easier to relocate in the future (for example, photopoint is 28 meters at 114 degrees from 20" d.b.h. sand pine).

Taking the Photo(s)

If a photopoint was established prior to the development of this protocol, a test monitoring event shall be conducted at the photopoint by taking photos according to the guidance provided in this section of the protocol. The site manager shall compare those photos with photos previously taken at the photopoint and evaluate the significance of any difference between the photos. If the site manager determines that significant information will be lost by adopting this protocol, photos shall continue to be taken according to the previously-written protocol. If significant information would not be lost, this protocol shall be followed for photomonitoring at the photopoint.

All photos shall be taken using the widest angle “zoom” possible (on all cameras). This will give sufficient overlap between the photos in order to arrange a composite panorama if needed. In addition, photos shall be taken using the image quality that maximizes image resolution while maintaining practical storage capacity.

Three sequential photos shall be taken at approximately 45-degree intervals to obtain a panoramic image of the target vegetation (the degree graduation marks on the tripod shall be used to make this alignment). The tripod shall be set up so that the camera mount is at 4.5 feet above the ground, directly over top of the rebar and at a 90-degree angle to the ground (a level shall be used if the photopoint is on uneven terrain). The “0” on the dial with the degree graduations (located below the camera mount on top of the tripod) shall face the center point of the photo panorama. The center point of the middle photo shall be aligned with one of four cardinal directions. The compass shall be placed on top of the camera to assist with this alignment. The person taking the photos shall hold the bottom tripod handle and take the three photos in sequence, either from right to left or left to right, at “45” degrees (middle dot between “0” and “90”), “0”, and at “45” on the other side from the first photo. The range pole at the reference point shall be included in the middle photograph. All data related to the photos, the reference point, and the range pole shall be recorded on the Photopoint Station Data Sheet at the time the photos are taken.

DATA STORAGE

The data obtained during the monitoring event shall be processed and stored in the NRS Environmental Enterprise Database (EEDB), as required by ERM PPM # EV-O-619 (Collection, Entry, and Storage of Natural Areas Field Data). The staff member who collected the data shall create an electronic data folder for each natural area for storage of the photomonitoring photos taken at that site, if one does not already exist. A subfolder shall be created within the folder for the photo(s) taken in a particular year. The subfolder shall be labeled with the name of the site and the year (for example, High Ridge 2003). The three photos taken for the panoramic view shall be combined into a panoramic photo, which shall be saved as a single file (JPEG) in the subfolder. The photopoint number shall be included in the name of the file (for example, hrpp1).

The file containing the panoramic photo shall then be copied into the EEDB. The data from the Photomonitoring Station Data Sheet for that station and for the monitoring event also shall be entered into the EEDB, and the data sheets for all photopoints shall be reviewed and filed as required by PPM #EV-O-619. Copies of all files will be submitted to the BLM annually.

Vegetation Monitoring Protocol

OBJECTIVES

The primary objectives of the vegetation monitoring program are:

- To determine the species of plants present in the ONA.
- To determine the presence of listed plant species in the ONA.
- To detect large-scale population trends of monitored listed plant species.
- To detect changes in vegetative structure and/or composition of natural communities as related to certain management activities of interest (e.g., exotic species removal, hydrologic restoration, or prescribed burning).

BASELINE DATA COLLECTION

All species observed shall be recorded in the field and the scientific and common names of these species then entered into the NRS EEDB in accordance with Policies and Procedures Memorandum (PPM) #EV-

O-619 (Collection, Entry and Storage of Natural Areas Field Data) and any guidance document related to taxonomy or nomenclature. Species shall be added to the plant species list for the natural area in the NRS EEDB as they are observed by staff and reputable sources.

OPPORTUNISTIC OBSERVATIONS

Staff shall record all listed plant species encountered opportunistically on a natural area during a regular site visit, as well as any plant species not previously recorded for the site. Any specific information obtained during each sighting (e.g., blooming or fruiting), also shall be recorded in the NRS EEDB.

LISTED PLANT SPECIES MONITORING

Listed plant species are any plants that are considered to be endangered, threatened, or of special concern in Florida by any state or federal agency (for example, the Florida Department of Agriculture and Consumer Services [FDACS] or the United States Fish and Wildlife Service [USFWS]), and/or are considered to be rare in Florida by the Florida Natural Areas Inventory (FNAI). The protocol for monitoring listed plant species follows a simplified adaptation of the three-level approach proposed by Menges and Gordon (1996), as refined by Philippi et al. (2001).

Initial Listed Species Assessment

For un-surveyed sections of the ONA, the first listed species monitoring effort conducted at a given site will be the most labor-intensive and time-consuming. The goals of the initial survey shall be to obtain estimates of entire site population densities and distributions, or species presence if the site has not been surveyed before, and to establish permanent monitoring stations based on these estimates. The initial survey shall consist of random transects through appropriate habitat until the majority of the habitat types are sufficiently covered within each management unit. Guidance on how to establish the permanent monitoring stations is provided in this protocol.

It is important to map or describe all geographic areas covered during the initial survey, so that there is no duplication of survey effort and time by subsequent observers. All elements indicated on the sample data sheets shall be included in the surveys, and all data collected during listed species surveys shall be entered into the NRS EEDB in accordance with the guidance provided in ERM PPM #EV-O-619.

Frequency of Monitoring

The frequency of monitoring depends on the species to be monitored, the needs of the land management staff, the requirements of the management plan for the site, and any requirements imposed by permitting agencies (if applicable). The monitoring frequency categories to be used and the codes for these frequencies are:

A = Annual (every year) BE = Biennial (every two years) BA = Biannual (twice a year) Q = Quinquennial (every five years) T = Triennial (every three years) V = Variable (as determined by site manager)

Most listed plant species shall be monitored biennially. Additional surveys may be conducted if it is determined that such surveys are necessary to document changing site conditions or the effects of significant events or land management activities, such as prescribed burns.

Methodology and Levels of Monitoring

Monitoring shall be performed by staff at three levels:

Level 1: Recording the presence of a species and/or a population of a species (opportunistic observation) Level 1 data will provide good baseline information, including whole population and community-wide qualitative indicators, as well as species status and management needs. Weaknesses of Level 1 monitoring include lack of repeatability, observer bias, semi-quantitative data (no analytical value), and the ability to detect only dramatic changes.

Level 2: Estimating the size of a population

Level 2 monitoring provides more information and greater ability and confidence in assessing change, but does not account for variability in responses among individuals over time. The results can be used to determine if populations are being lost and if more intensive monitoring is needed.

Level 3: Demographic monitoring of individuals

Level 3 monitoring is the most time-consuming and detailed monitoring level. This level involves the creation of species-specific monitoring protocols and should be used for species perceived to be at the highest risk of loss. The results of Level 3 monitoring can provide a more rapid indication of change and a greater indication of the effectiveness of a management technique.

All listed plant species shall be monitored at Level 1 or Level 2. Level 3 monitoring shall be performed when more intense monitoring is needed due to regulatory requirements or management information needs, or because a species is highly endangered or suspected to be declining.

The frequency, level, and type of monitoring activity to be conducted for a particular plant species, and the preferred survey season and/or timing for monitoring are provided in the Listed Plant Species Monitoring Table (Attachment 1). The list shall be reviewed periodically to assess the minimum monitoring level for each species. In addition to regularly-scheduled listed species surveys, special surveys with specific objectives may be conducted for certain periods of time, such as to comply with permit conditions for a specific project on a specific natural area or to determine the impact of a destructive natural event such as a hurricane, wildfire, pest, disease or invasive species on one or more natural areas.

The following paragraphs provide specific guidance for each level of monitoring:

- Level 1: Recording the presence of a species and/or a population of a species (opportunistic observation)

A record should be made of all listed plant species encountered on a natural area during a regular site visit. A permanent monitoring station shall be created for each plant species and/or population and the information for that station shall be recorded in the NRS EEDB Station Maintenance module. The location of the monitoring station shall be recorded using a global positioning system (GPS) device. The frequency of monitoring for each plant species shall be determined by the site manager and his/her supervisor. Each species shall be monitored at least once every five years.

- Level 2: Estimating the size of a population

Survey/Ocular Estimate

If the known population of a listed species on the entire natural area is less than 200 individuals, all individuals shall be counted. If the entire known population of a listed species on a natural area is 200 or more individuals, the population should be grouped into two or more distinct populations, if feasible, for monitoring purposes. The species shall be monitored according to following guidance:

Each special status plant population on the natural area shall be surveyed. If a population contains less than 50 individuals, all of the individuals within that population shall be counted. If a population contains 50 or more individuals, an ocular estimate shall be made using the following ranges:

50-100 101-200 201-500 501-1,000
1,001-3,000 3,001-10,000 >10,000

Permanent Monitoring Stations and Mapping

A permanent monitoring station shall be created for each listed plant species or population and the information for that station shall be recorded in the NRS EEDB Station Maintenance module. This station shall be used for subsequent monitoring activities for the specific listed plant species. If after three monitoring events no plants have been observed at a station, then that station should be closed. The location of the monitoring station shall be mapped using one of the following GIS mapping methods for inclusion in the County's Enterprise GIS:

Map Epicenter: One GPS point (± 1 meter accuracy is preferred, but ± 3 meters may be sufficient) shall be recorded at or near the epicenter (geographic center) of the highest plant density (this area shall be defined as a 25-foot-radius circle unless otherwise stated). An epicenter shall be established at each known population center or at least at one point within each representative management unit or other logical geographic unit. For example, recording in north, central, and south management units may be appropriate if a species is present in all three units and several units contain similar vegetation community types. Examples of species appropriate for this level of mapping include *Tillandsia* spp. and *Lechea cernua*. Each GPS point shall be flagged or otherwise marked in the field for relocatability, and the number of individuals shall be counted within the defined radius or estimated according to the ocular estimate ranges listed previously.

Map Individuals: The location of each individual plant shall be recorded. This technique requires the use of sub-meter accuracy GPS equipment and is labor-intensive. It is suitable only for widely distributed ephemeral species (for example, terrestrial orchids) or species with relatively small populations.

Map Perimeter: The outer boundary of the total area occupied by each population shall be recorded. This will create a polygon shapefile that can be used to track the total area occupied by the species over time. This technique is best used for species in which individual organisms cannot be easily distinguished (for example, *Cladonia perforata* or clump-growing herbaceous species such as *Panicum abscissum*).

- Level 3: Demographic monitoring of individuals

Level 3 is the most intensive and detailed of the monitoring levels and is most appropriate for species perceived to be at a high risk of being lost from the natural area. It involves establishment of sampling procedures to identify individuals and recording of demographic parameters such as seed production, gender, number of rosettes, and height of inflorescence. Data obtained from monitoring of individuals can be used to determine management alternatives and to increase the ability of staff to accurately and precisely detect a change in a population.

Monitoring of Four-Petal Pawpaw (*Asimina tetramera*)

Asimina tetramera shall be monitored at Level 3. A numbered tag shall be placed on or adjacent to each individual plant. The following characteristics shall be recorded for each plant: male or female, alive or dead, and flowering or fruiting. A unique monitoring station in EEDB shall be created for each plant. The location of each individual plant shall be recorded with a GPS unit and the information entered into the NRS EEDB.

Data obtained during a survey conducted for one or more listed species shall be recorded on a Listed Plant Survey Data Sheet.

Following a monitoring event, all data shall be entered into the NRS EEDB in accordance with the guidance provided in ERM PPM #EV-O619. BLM will be provided with a copy of all data.

POINT INTERCEPT TRANSECT VEGETATION MONITORING

In addition to regularly-scheduled listed species survey, vegetation surveys with specific objectives may be conducted for certain periods of time, such as to comply with permit conditions for a specific project on a specific natural area or to determine the impact of a destructive natural event such as a hurricane, wildfire, pest, disease or invasive species. Monitoring may also be conducted to detect any changes in vegetative structure/composition of the natural communities that may be associated with certain management activities of interest. If an existing vegetation monitoring protocol currently is being followed for a specific project, that protocol shall remain effective until monitoring requirements have been fulfilled. If vegetation monitoring is required by the conditions of a permit, grant or any other agreement, a point intercept transect monitoring method shall be used, subject to approval by the overseeing agency or organization. Permanent point intercept transects shall be established to monitor changes in vegetation, following the general methods described in Elzinga et al. (2001).

Frequency of Monitoring

Transects shall be surveyed twice a year, once near the end of the dry season (March 15 – May 30) and once near the end of the wet season (August 1 – October 31). If an analysis of the transect data indicates that negative natural community changes are occurring, additional transects may be established in the affected management unit to determine if the changes are localized or widespread.

Methodology

Each transect shall be 100 to 250 feet long, and shall be aligned to pass through at least two different natural communities, or two different subtypes within a single community. The location of each transect shall be mapped and a corresponding EEDB Station number shall be created (the GIS layer shall be submitted to the ERM Database Administrator for inclusion in the County's Enterprise GIS database). The end points of each transect shall be permanently marked with rebar and PVC covers. The starting and ending points of each transect, the bearing, and the distance from an easily recognizable landmark shall be recorded. Data shall be recorded at either 3-foot or 5-foot intervals along each transect and shall include the dominant species in each stratum (canopy, shrub and herbaceous), the presence of any listed species, and any other plants of management interest (e.g., nonnative invasive species) that cross, touch or intersect the line. For purposes of this protocol, the dominant species in each stratum shall be considered to be the tallest species in that stratum. Strata are defined as:

Herbaceous Stratum: Any nonwoody plant, excluding seedlings of woody species that are presently nonwoody (e.g., *Sabal palmetto*, *Hypericum* spp.), but including vines (e.g., *Vitus* spp., *Toxicodendron radicans*). A plant shall be counted only if it crosses, touches or intersects the line.

Shrub Stratum: Any woody plant above the ground and less than, or equal to, 2.5 meters (8.2 feet) tall, excluding vines (which shall be recorded only in the herbaceous plot canopy cover). All *Hypericum* species shall be counted, and all seedlings of potentially woody species that cross, touch or intersect the line.

Canopy Stratum: Any woody plant greater than 2.5 meters tall, excluding vines. A tree shall be counted only if any portion, including the canopy, crosses, touches, or intersects the line. Seedlings of canopy species shall be counted within the shrub layer. The same interval (3-foot or 5-foot) and transect length shall be used for the subsequent point intercept transect monitoring on each natural area.

Data obtained during a survey shall be recorded on a Point Intercept Transect Survey Data Sheet (Attachment 3).

Following a monitoring event, all data shall be entered into the NRS EEDB in accordance with the guidance provided in ERM PPM #EV-O-619. A copy will be provided to BLM.

Wildlife Monitoring Protocol

OBJECTIVES

The primary objectives of the wildlife monitoring program are:

- To determine the species of animals present on each County-managed natural area.
- To determine the presence of listed animal species on each County-managed natural area.
- To monitor the presence of migratory bird and non-migratory wildlife species (amphibians, reptiles, birds, mammals, and insects) on County-managed natural areas.

The secondary objectives of the monitoring program are:

- To determine the number of gopher tortoises and scrub jays on each of the County-managed natural areas on which these species are present.
- To detect large-scale population trends of monitored species on each County-managed natural area over time.

LEVELS OF MONITORING

The three different levels of monitoring that may be performed by NRS staff are:

- Level 1: Recording the presence of a species and/or a population of a species.
- Level 2: Estimating the size of the population.
- Level 3: Censusing individuals.

Level 1 monitoring will provide good baseline information, including whole population and community-wide qualitative indicators, which staff can use to determine species status and presence and management needs on a particular natural area. Weaknesses of Level 1 monitoring include lack of repeatability, observer bias, semiquantitative data (no analytical value), and the ability to detect only dramatic changes. Level 2 monitoring provides more information and greater ability and confidence in assessing change, but does not account for variability in responses among individuals or over time. The results can be used to determine if populations are declining or have been lost on a natural area, and if more intensive monitoring or a change in management is needed. Level 3 monitoring is the most time-consuming and detailed. It should be used for species considered to be at the highest risk, because the results can provide a more rapid indication of change.

Level 1 monitoring shall be used for baseline data collection. Opportunistic observation and species inventories shall be considered to be Level 1 monitoring. Both nonmigratory wildlife surveys and migratory bird surveys shall be considered to be Level 2 monitoring, because an estimate of the abundance of each species observed is recorded. Level 3 monitoring may be used by NRS for certain listed animal species, but is not used for migratory or nonmigratory wildlife surveys.

BASELINE DATA COLLECTION

NRS staff shall conduct one or more Level 1 surveys on each natural area to develop a list of the animal species present on the site for use in the preparation of the initial management plan for the site. All species observed shall be recorded in the field and the names of these species then entered into the NRS Environmental Enterprise Database (EEDB) in accordance with Policies and Procedures Memorandum (PPM) #EV-O-619 (Collection, Entry and Storage of Natural Areas Field Data). Species shall be added to the animal species list for the natural area in the NRS EEDB as they are observed by staff. After the management plan for the site has been approved and migratory and nonmigratory wildlife surveys are scheduled to be conducted, a baseline list shall be generated from the NRS EEDB for use in those surveys.

OPPORTUNISTIC OBSERVATIONS

Staff shall record all listed animal species encountered on a natural area during all regular site visits, as well as any animal species not previously recorded for the site. Any specific information obtained during each sighting (e.g., number of individuals, adult/juvenile, male/female, breeding, feeding, etc.) also shall be recorded in the NRS EEDB.

MIGRATORY BIRD SURVEYS

Time period: Last two weeks of September through first two weeks of November (fall) and April through May (spring). Frequency: Biannual Technique: Point count or permanent line transect The purpose of the migratory bird survey is to make an estimate of the relative abundance of bird populations during the migratory season. Migratory bird surveys shall be conducted biannually. The site manager for a specific natural area shall ensure that migratory bird surveys are conducted on that site during the same time period on all subsequent years following the first survey. Counts will occur in the morning, beginning as soon as it is light enough to see a distance of at least 200 meters (approximately 660 feet) and ending no later than four hours after official sunrise. The observer should try to arrive at the first plot while it is still dark, so that the count can begin as soon as it is light enough to see. The singing rate for most species is usually highest before or near official sunrise and then declines slowly for the next four hours.

Counts should not be conducted during high winds or heavy rains because these conditions inhibit bird activity and impair the observer's ability to see and hear birds. Counts should not be conducted if wind strength is a sustained 4 or greater on the Beaufort Scale as described on the Migratory/Nonmigratory Data Sheet (Attachment 1), or if there is light or hard rain (rain code >3). If these conditions are encountered, the observer should wait until the weather improves or cancel the survey and try again on another day.

Surveys will consist of either point counts or line transects. At least one permanent transect or point shall be established within each representative habitat type or management unit within each natural area. Point counts shall be used in small natural areas with closed canopies or at sites with fine-scaled habitat variability over short distances. Line transects shall be used at larger sites or in more open habitats where the vegetative community remains relatively homogeneous over hundreds of meters or more

(Bibby et al. 1993). The procedures for the establishment of points and line transects are described in the following sections.

Point Count

Each point count station shall be located in a relatively homogeneous vegetative community away from management roads (although management roads can be used if habitat is not readily accessible). Points shall be located in areas in which visibility is maximal in all directions (360°) while still being representative of the target vegetation type. All bird species, and the number of individuals of each species seen and heard at each point during a ten-minute period, shall be recorded (recording start and stop times). Shorter five-minute periods may be used for larger sites if time is limited. The recording period should be consistent on a per-site basis (e.g., if a five-minute count is conducted during the first year, a five-minute count should be conducted in subsequent years. Distance estimates shall not be recorded unless counts are being conducted for estimates of density. Counts shall be conducted by a skilled observer. Counting shall begin immediately upon arriving at a point unless a motor vehicle will be used, in which case the count shall begin after a several-minute settling period. Adjacent points shall be located no closer than approximately 200 meters (approximately 660 feet) apart unless they are located in extremely dense vegetation. Each point count location shall be entered into the NRS EEDB as a station. The GIS files for the stations shall be uploaded to the GIS Enterprise Server by the NRS Database Administrator.

Line Transect

Each transect should be located entirely within one vegetative community. Therefore, the length of each transect may differ depending upon the habitat in which it is located. As a general rule, a transect shall be at least 100 meters long (approximately 330 feet), but a greater length (up to 1 kilometer, or approximately 3,280 feet) is preferable when the habitat allows for the establishment of a longer transect. The transect length shall be measured and the endpoints recorded with a Global Positioning System (GPS) receiver and permanently marked in the field with rebar, spray-paint, landmarks, or other permanent fixtures that will be easily recognizable in future surveys. Each transect shall be entered into EEDB as a station. The GIS files for the stations shall be uploaded to the GIS Enterprise Server by the NRS Database Administrator. Adjacent transects shall be no closer than 150-200 meters (approximately 500-650 feet) in a closed-canopy habitat and 250-500 meters (approximately 820-1,640 feet) in an open habitat.

Transects shall be walked at a natural, steady pace by a skilled observer. The observer shall count all birds seen and heard on each side of the transect for an unlimited distance and record the start and end times of each survey period.

Migratory/Nonmigratory Data Sheet

All data collected during a migratory bird survey and any relevant information shall be recorded on a Migratory/Nonmigratory Data Sheet (Attachment 1). A separate data sheet shall be used for each station. The information to be provided at the top of the sheet shall be completed during or as soon as possible after the survey.

The following information shall be recorded on the data sheet for each bird heard or seen (at any distance) during the observation period:

Species: The scientific name and/or the common name. (The scientific name will be required in order to enter the data into the NRS EEDB.)

Total Number Observed: The total number of birds observed and/or heard during the observation period (excluding flyovers).

Avian Activity: The number of birds observed that were feeding, roosting, nesting, or flying over the site.

Wildlife Observation: The method used for observation (only for nonmigratory surveys).

Opportunistic Sightings: Any notable species observed opportunistically outside of established transect routes during a survey period, recorded for the station closest to the observation location.

NONMIGRATORY WILDLIFE SURVEYS

Time period: June through August **Frequency:** Annual **Technique:** Point count or permanent line transect

The purposes of the annual nonmigratory wildlife survey are to estimate the abundance of bird populations during the nonmigratory season, and to record the presence of nonavian wildlife. After the first survey is completed on a natural area, the site manager for that natural area shall ensure that nonmigratory wildlife surveys are conducted on that site during the same time period in all subsequent years.

At a minimum, the same point stations and line transect stations used for the migratory wildlife survey shall be used for the nonmigratory survey. Additional points or line transects may be established specifically for nonavian wildlife surveys. Counts will occur in the morning, beginning as soon as it is light enough to see a distance of at least 200 meters (approximately 660 feet) and ending no later than four hours after official sunrise. The observer should try to arrive at the first plot while it is still dark, so that the count can begin as soon as it is light enough to see. The singing rate for most species is usually highest before or near official sunrise, and then declines slowly for the next four hours.

Counts should not be conducted during high winds or heavy rains, because these conditions inhibit bird activity and impair the observer's ability to see and hear birds. Counts should not be conducted if wind strength is a sustained 4 or greater on the Beaufort Scale, as described on the Migratory/Nonmigratory Data Sheet (Attachment 1), or if there is light or hard rain (rain code >3). If these conditions are encountered, the observer should wait until the weather improves or cancel the survey and try again on another day.

The procedures for recording bird species for a nonmigratory survey shall be the same as those for a migratory survey. It is recommended that a second observer be present for the recording of the presence of additional wildlife species. One observer should focus on the bird species while the other observer records the presence of any other species of wildlife. Surveyors of reptiles and amphibians can turn over, or look under, any "cover objects" (e.g., logs, rocks, trash, or other debris) intercepted by the transect line (Elzinga et al. 2001). Cover objects may be placed along transect routes if few or no animals are observed along the entire transect length.

All data collected and any relevant information shall be recorded on a Migratory/Nonmigratory Survey Data Sheet. A separate data sheet shall be used for each station. The information to be provided at the top of the sheet shall be completed during or as soon as possible after the survey.

Fish surveys and other aquatic macrofauna surveys are considered optional, unless required by the conditions of a permit, grant or other agreement. They may be conducted during a separate sampling

event, using the methodology and data sheets provided in the Aquatic Macrofauna Monitoring Protocol for Palm Beach County Natural Areas.

LISTED ANIMAL SPECIES MONITORING

Listed animal species are any animals that are considered to be endangered, threatened, or of special concern in Florida by any state or federal agency (for example, the Florida Fish and Wildlife Conservation Commission [FWC] and the United States Fish and Wildlife Service [USFWS]). In addition to regularly-scheduled listed species surveys, special surveys with specific objectives may be conducted for certain periods of time, such as to comply with permit conditions for a specific project on a specific natural area or to determine the impact of a destructive natural event such as a hurricane, wildfire, pest, disease or invasive species on one or more natural areas.

The only regularly-scheduled listed wildlife species monitoring is for gopher tortoise (*Gopherus polyphemus*) and Florida scrub jay (*Aphelocoma coerulescens*). The scrub jay and gopher tortoise are keystone species that are indicators for the overall health of a community. When there is a need to monitor a listed animal species for which a species-specific protocol does not exist, a species-specific or animal class-specific (e.g., fish, reptiles, etc.) protocol shall be developed. Several species-specific protocols are used.

In addition to a species-specific monitoring event, any opportunistic observation of an individual of a listed animal species or a population of a listed animal species encountered on a natural area during a regular site visit and any additional information about each sighting deemed appropriate (for example, number of individuals, adult/juvenile, male/female, etc.) shall be recorded in the NRS EEDB. Additional documentation, such as recording the location of the species or population with a GPS device or taking a photograph of the individual animal or population, also should be done if the necessary equipment is available at the time that the observation is made.

Gopher Tortoise Protocol

The gopher tortoise is listed as a threatened species by FWC. Surveys shall be performed biennially from March through October and shall follow the procedures described in Appendix 7 of the FWC Gopher Tortoise Management Plan (FWC 2007), which is provided as Attachment 3. The survey shall be conducted according to the guidance in the section entitled “Intensive Surveys to Confirm Rough Density Estimates.”

The survey requires the establishment of random strip transects 10 meters wide x 250 meters long (= 0.62 acres in area), throughout the natural area. These transects must account for at least 15% of the area or habitat patch surveyed. These transects shall be entered into the NRS EEDB as a station and the GIS files uploaded to the GIS Enterprise Server by the NRS Database Administrator. The results of the survey shall be entered into the NRS EEDB and a copy provided to BLM.

Florida Scrub Jay Protocol

The Florida scrub jay is listed as a threatened species by both USFWS and FWC. A survey shall be conducted each year in March, and again in July when the young of the year can be identified by their plumage, following the procedures described in Subsection 1.2 of Fitzpatrick et al. 1991.

The survey requires the establishment of transects or routes with points at which an observer plays a tape recording of a scrub jay call. Each transect or route and point shall be entered into the NRS EEDB as a

station. The GIS files shall be uploaded to the GIS Enterprise Server by the NRS Database Administrator.

Survey results shall be entered on Jay Watch Data Sheets. There are two data sheets associated with the survey: a survey sheet for recording the point stations, bird counts and banding information and a vegetation monitoring data sheet for quickly categorizing the vegetation cover classes at the survey points. The results of the bird counts and banding information shall be entered into the NRS EEDB. The vegetation monitoring information does not have to be entered into the NRS EEDB. However, the completed sheets should be filed in the appropriate monitoring folder in the NRS site file for the natural area on which the monitoring was conducted, so that this information can be entered into the NRS EEDB at a future date, if desired. BLM will be provided with a copy of all data.

REFERENCES CITED

Bibby, C.J., N. Burgess, and D. Hill. 1993. Bird Census Techniques. British Trust for Ornithology. Academic Press, NY.

Elzinga, C.L, D.W. Salzer, J.W. Willoughby, and J.P. Gibbs. 2001. Monitoring Plant and Animal Populations. Blackwell Science, Malden, Mass.

Fitzpatrick, J.D., F.E. Woolfenden, and M.T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub jay (*Aphelocoma coerulescens coerulescens*). Nongame Wildlife Program Technical Report No. 8, Florida Game and Fresh Water Fish Commission, Tallahassee. Available online

http://research.myfwc.com/publications/publication_info.asp?id=46526

Florida Fish and Wildlife Conservation Commission. 2003. Florida's breeding bird atlas: a collaborative study of Florida's birdlife. Tallahassee. Available online

<http://www.myfwc.com/bba/>

Florida Fish and Wildlife Conservation Commission. 2007. Protocol for assessing gopher tortoise densities on FWC lands identified as potential restocking sites. Appendix 7 in Florida Fish and Wildlife Conservation Commission, Gopher Tortoise Management Plan, Tallahassee. Available online

http://www.myfwc.com/docs/WildlifeHabitats/Gt_Mgmt_Plan.pdf

Menges, E.S. and D.R. Gordon. 1996. Three levels of monitoring intensity for rare plant species. Natural Areas Journal 16:227-237.

Rodgers, J.A. Jr., H. Kale, and H.T. Smith (eds.). 1996. Rare and Endangered Biota of Florida. Volume V: Birds. University Press of Florida, Gainesville.

Philippi, T., B. Collins, S. Guisti, and P.M. Dixon. 2001. A multistage approach to population monitoring for rare plant populations. Natural Areas Journal 21:111-116.

Stevenson, H., and B. Anderson. 1994. The Birdlife of Florida. University Press of Florida, Gainesville.

Van Horn, M. and K. Van Horn. 1993. Save Our Rivers Environmental Monitoring Protocols. South Florida Water Management District, West Palm Beach.

F. Summary of Public and Regulatory Agency Comments

1. Summary of Public Comments

BLM received a total of 66 comment cards, emails and letters during the public comment period on the draft management plan. The majority of the comments dealt, at least in part, with the issue of boater access or shoreline stabilization along the Indian River Lagoon. The subject was controversial with strong sentiments on both sides. Those comments have been collected and are being considered in the development of a preferred alternative for that project.

In addition, a number of people provided extensive editorial comments on the draft plan including James Snyder, Richard and Lorraine Roberts, and Dave Gillings, Melissa Tolbert and Harvey Rudolph with Palm Beach County Department of Environmental Resources Management.

The following characterize common themes, points or issues.

- Several comments were in favor of retaining boat access in general. Some of these suggested methods of reducing erosion problems such as restricting access to climb the hillside.
- Many comments stressed shoreline stabilization, and many of these suggested restricting access, including boat access.
- Some comments recommended that recreation be oriented to “passive” use, including suggestions for education programs interpretation of natural heritage.
- There were several comments noting that the proposed parking area south of Beach Road Bridge should be eliminated, as the area was too congested and it poses a safety issue.
- Several comments advocated keeping the ONA exclusively or primarily as a natural area and opposed recreation purposes.
- Some comments noted that a walkway under Beach Road Bridge would attract inappropriate uses.
- Some comments recommended bringing interpretive planning into the project as early as possible to design facilities to protect natural habitat and allow for education.
- Some comments recommended use of “green” materials, especially permeable material for sidewalks and parking areas.
- Some expressed concern about safety, specifically to keep hikers away from roadways.
- Some expressed concern about fast currents in the Indian River Lagoon and the danger that poses to snorkelers and swimmers.
- Some comments were in general agreement with ONA designation or with the draft plan or one of the alternatives in the draft plan.

- Some comments supported historic preservation goals including restoration of historic structures on the site. A couple of comments, however, specifically recommended that the bridge tender's building not be restored.
- Several people did not want to see exotic vegetation removed.
- Some people did not support prescribed burns.
- Several people wanted an emphasis on environmental education and interpretive facilities, and guided tours.
- Comments were received recommending that the area behind the Station J building should be closed to swimming and fishing for the protection of artifacts and a retaining wall was suggested to control erosion in that area.
- There was suggestion to restore the Lighthouse Keeper's Workshop and provide restrooms.

BLM Responses to Substantive Comments

The following substantive comments were excerpted from written letters, emails or comment cards received on the draft plan. These comments are listed by a randomly assigned correspondence number. The BLM's response to each comment is in italic.

17-1 Check Florida Master Site File (FMSFile@dos.state.fl.us or 850 245 6440) for all cultural resource studies done on this property—for example, Ms #605 is the 1981 "Literature Review and Cultural Resources Survey of the U.S. Coast Guard Light Station, Jupiter Inlet, Palm Beach County" by Carol Weed, as well as Ms #13813, the 2003 "Jupiter Tract Survey and Site Testing of 8PB35" by Greg Mikell, Caleb Curren and others. It appears there are several other surveys in the site file that are not referenced or included in the References section (a partial list seems to include Ms #s 593, 2031, 5325, 7849, 7878, and 8118). For management purposes it would be good to include these.

The older references have been cited in some of the reports that we have cited in the reference section for the Cultural Resource section of the plan. We have included a statement in the beginning paragraph of the history of the plan directing readers if they so wish to peruse more research on their own, "For more comprehensive information on the cultural history of the Jupiter Inlet area see literature cited section for related documents by Ryan Wheeler, Jerald Kennedy and James P. Pepe and James Snyder, Jeannette Thurber Conner and Richard K. Murdoch. For older report references of Jupiter and Palm Beach County look at the reference sections in some of the literature".

17-2 In the section on the Prehistoric Periods, pp. 43-46 it would be good to reference the following:

Wheeler, Ryan J., Wm. Jerald Kennedy, and James P. Pepe, "The Archaeology of Coastal Palm Beach County," *The Florida Anthropologist* 55(3-4):119-156, 2002. Available on-line at: <http://www.uflib.ufl.edu/UFDC/UFDC.aspx?s=flant&b=UF00027829>

Wheeler, Ryan J., James P. Pepe, and Wm. Jerald Kennedy, "The Archaeology of Jupiter Inlet 1 (8PB34)," *The Florida Anthropologist* 55(3-4):157-196, 2002. Available on-line at: <http://www.uflib.ufl.edu/UFDC/UFDC.aspx?s=flant&b=UF00027829>

These are a little more up-to-date, accurate and accessible than the Kennedy et al. 1993 report about Jupiter Inlet 1 and Dubois Park that is cited in the study.

17-3 Page 46, paragraph that discusses the Historic Period, specifically the possibility of an English settlement in the area. There are at least two oblique literary references to English settlements in the area. Jeannette Thurber Conner, in her 1925 book *Colonial Records of Spanish Florida*, notes that documents relating to the 1815 Eusebio Gomez Grant in the area refer to an old English settlement in the area. Also, the 1793 report of Second Spanish Period Governor Juan Nepomuceno de Quesada mentions that English Loyalist Charles Lewis was settled somewhere in southeastern Florida, perhaps "established on the Rio Gega"—see Richard K. Murdoch's 1952 article in *The Florida Historical Quarterly*, pp. 16-32. Available on-line at: <http://palmm.fcla.edu/fhq/index.shtml>. Attached are photos of the Irish shot charger and Brown Bess ramrod pipe that were recently found by Jupiter Wreck Inc. that likely date to the British Period, now in our collection here.

We have included a statement in the beginning paragraph of the history of the plan directing readers to the references cited section if they so wish to peruse more research on their own, "For more comprehensive information on the cultural history of the Jupiter Inlet area see literature sited section for related documents by Ryan Wheeler, Jerald Kennedy and James P. Pepe and James Snyder, Jeannette Thurber Conner and Richard K. Murdoch. For older report references of Jupiter and Palm Beach County look at the reference sections in some of the literature."

17-4 Page 59—Management Issues-Protecting Cultural Resources. The recommendation for a full cultural resources survey is very welcomed, considering the number and quality of resources present and level of impacts necessitated in managing such a property. This type of survey would help in planning small and large projects that may impact cultural resources. It might be worth mentioning here that unmarked human burials have been encountered on the property, so there is an added level of sensitivity regarding ground disturbing activities. Also, it would be good to discuss the possibility that some unmarked human burials on the property would fall under the auspices of NAGPRA, there may be some that are not American Indian burials, which would require other consultation if encountered.

While burials are important issue at Jupiter, at this time we will not be making a distinction between Native American burials and unmarked historic burials because of Native American concerns. To be able to make proper distinctions between the two it would be necessary to perform invasive scientific testing that will go against the wishes of the Native American Tribes. At this time if we encounter burials, work will stop, the locations will be plotted with GPS and left alone. These plots will be filed with the Florida State Historic Preservation Office and U.S. Coast Guard for avoidance during any future ground disturbances.

28-2 **North Side Hard Trail and other trails where "shell rock" is listed as an alternative:** use concrete or recycled concrete on the trails, NOT shell rock. Shell rock is alkaline and will change the Ph of the scrub sand that is acidic. The construction of trails should have minimal impacts on the scrub soils, and the disturbance should be limited to the width of the trail and no more. Note that invasive species colonize new disturbances.

Concrete has been selected as the preferred material for the ADA trails in natural areas of the ONA. The trail construction is currently anticipated to be limited to a 2 foot "work zone" on either side of the

trail footprint. Additional control of invasive plant species, particularly natal grass, is anticipated and will be incorporated into weed maintenance activities.

28-3 Management Roads. Fire breaks and fence line roads are needed for management purposes. Do not eliminate these. You may want to use some for trails as they are already established.

Only two sections of management roads are being eliminated. The northern section would be incorporated into the soft trail system and only the width of the trail would be maintained. Without regular root raking areas outside of the trail bed are expected to be return to scrub vegetation. The management road along the southern boundary of the communication site is being replaced by an existing road inside the communication site that will be open to administrative use only. Public access would be funneled onto the ADA trail from the new parking area.

28-5 HABITAT RESTORATION / ENHANCEMENT ACTIONS

There are several mentions of mechanical manipulation on JILONA. Attached is recent paper by Weekley et al from Archbold Biological Station. Although it is lengthy, recommendations for restoring and maintaining high-quality Florida scrub are on pages 126 & 127. The basic recommendations are: 1) burning is superior or equivalent to mechanical, 2) burning and to be vigilant in monitoring for invasive species colonization with mechanical treatments, 3) mechanical treatment should be prerequisite not surrogate for burning, 4) logging should not be used as a restoration tool, 5) heavy equipment uses should be avoided as restoration tool, and 6) routine monitoring should be used to evaluate future management actions.

Additionally Florida Wildlife Conservation Commission (FWCC) and Florida Natural Areas Inventory (FNAI) produced “Scrub Management Guidelines” available on the FWC Sharepoint Web site: <http://share2.myfwc.com/scrubjay/default.aspx>. You may already have a copy of this excellent paper. Although the scrub-jays are no longer present on JILONA, the guidelines are applicable to the listed species on the site.

The final plan identifies prescribed fire as the preferred management tool in all blocks, with mechanical manipulation as an alternative only when burning is not prudent because of health and safety issues, or resource concerns.

The invasive species program has identified a need for vigilant follow-up after disturbances. Incorporating early and more frequent invasive plant sweeps is planned, particularly in newly disturbed or burned areas, when hand pulling is more effective and before invasive plants have an opportunity to produce seed. This approach will also assist in reducing the amount of herbicide needed to suppress invasive plants.

As stated above, prescribed fire will be the preferred management tool for scrub management. Where fuel loads require, mechanical preparation prior to prescribed burns will be used to reduce the potential for crown fires, reduce flame heights, and reduce residual smoke and spotting. Mechanical manipulation alone will be used in those situations where risks to public health and safety are not prudent.

Logging would not be used as a restoration tool by itself, however, removal of sand pine in areas being managed for earlier successional scrub, as defined in the “Scrub Management Guidelines”, may be necessary. In all cases, the removal could include both hand felling and mechanical manipulation.

A description of the monitoring program that will be used to monitor the effectiveness of this plan has been included in the Appendix. Additional monitoring may be developed, as needed, to adapt to changing conditions and the monitoring will be modified as needed to stay consistent with current approved protocols.

28-6 South Side Prescribed Burn Program: Listed is a 30-year rotation. It may be more appropriate to give a range of years as 8 – 15 years, as the fire return intervals for scrub management have been revised to more frequent timing. As recommended in the FWC/FNAI “Guidelines” the burn rotation should be specific to the site, based on vegetation parameters of shrub height, canopy coverage, and open ground. The South East Florida Scrub Ecosystem Working Group (SEFSEWG) is considering producing easy to use protocols for monitoring scrub habitat to augment the “Guidelines”.

The south side prescribed fire interval is being extended to provide the best opportunity to maintain the existing populations of perforate lichen and other mature scrub endemics. As best management practices for burning in areas supporting perforate lichen are developed and verified this interval could be modified.

28-7 Invasive Control. Continue the good work you are doing on the North portion. Remove all the invasive plants on the southern portion and especially in Lot 17. Note that treating Brazilian Pepper with herbicide makes the woody parts very hard and is extremely difficult to remove after it has been treated. Remove all the invasive species at the same time to prevent recolonization and follow-up with herbicide. Some invasive species are spread by birds and leaving some of them for three years increases the possibility of reinvasion.

The exotic plants in Lot 17 would be removed over at least three years; in part to initiate work as soon as possible and to postpone any work along the Indian River Lagoon until after the shoreline has been fully stabilized. There is some additional work expected with the staggered removal but it will allow for a quicker response and is more likely to fit within anticipated budgets. It also reduces the visual impacts and provides some wildlife structure in the duration.

28-8 Florida Scrub-jay. See “Scrub Management Guidelines” above and continue management. FWCC is researching scrub-jay relocation efforts and may provide a paper on this topic in the next year.

The plan is supportive of future efforts to recover this species and although the ONA is likely to be too small to warrant reintroduction efforts, BLM would fully support reintroduction in the ONA, if feasible.

29-2 Still another related point is the low bluffs at the very south end, currently much assaulted ecologically by boats, and hence eroding unnaturally. . . I'd like to see boat disturbance of this area completely eliminated. Banks provide a rare habitat in south Florida. We have Belted Kingfishers all winter long on this stretch of the Intracoastal and the Loxahatchee, but there is no undisturbed place for this species to nest so it disappears from our area in summer, although breeding in highly scattered locations elsewhere in south Florida.

The bluffs at Jupiter Inlet are a scarce feature along the Indian River Lagoon. The current sheer bluffs are likely a manifestation of human influences. Based on historic photos and aerial photos from the 1880's and the slopes although probably close to the same height were more gradually sloped to a narrower, more braided waterway. Opening the Intracoastal Waterway substantially widened the waterway and subsequent use has exposed sheer sand bluffs that are very vulnerable to the erosive action of waves and wind, as well as being actively eroded by public use.

Since this species nests in excavated burrows in bluff situations, it is unlikely that suitable natural habitat will be available after the bluffs are stabilized. However, there is some literature on the use of artificial nest boxes for other species of kingfisher that could be pursued.

29-4 The only other thing that caught my eye was the proposed ferry dock near the museum building. Ferry from where?

This option would have allowed for the construction of a dock for use as part of a water taxi system being proposed in Jupiter. Concerns for the project, particularly nighttime security for the Station J building resulted in the proposal not being included in the final plan.

31-1 Regarding the proposed deck behind the Station J building, would there be public access or is the intent to allow only those individuals who are part of the lighthouse tours or museum activities? Who would be responsible for the maintenance of the proposed deck/dock?

There is no admission fee currently being charged for that area, so it is assumed that the deck would be open to the public. However, this property is administered by the Town of Jupiter and public access would be at their discretion.

31-2 Has it been determined that the proposed location for the dock is safe due to the currents on the inlet at that location?

The vicinity of the bridge, fast currents and current level of public use were all additional concerns regarding this project, which was not included in the final plan.

31-3 Are the hard trails ADA accessible?

Yes, all of the trails designated as "hard" will be designed to be universally accessible, as per the Americans with Disabilities Act.

31-5 Who would be responsible for the maintenance of the proposed chain link fence along the soccer fields?

That is expected to be negotiated between BLM and the Town of Jupiter.

32-1 Page 7 table –south side ADA trail – add after “Kato Bridge” (**SR 707**) - Kato’s bridge is such a local term and maps list the road as SR 707.

A global change has been made to refer to the road as State Road 707.

32-2 Page 58, line 33 – insert sentence – “In addition, this site has been utilized by local commercial snapper fisherman as a source of the “perfect” sand for mixing with chum to make sand balls.”

The change has been made as suggested.

32-3 Comment on wetland projects illustrated on pages 11 & 12. For both northern and southern mangrove projects, I recommend Alternative 2 for reasons previously discussed. One inlet for a project is easier to maintain than two, the one nearest the inlet will have the hydrologic advantage to stay open, building an inlet too close to the bridge might have the possibility to interfere with stability of the bridge embankment.

Given the concerns about the feasibility of maintaining wetlands with two inlets, the option to extend the existing wetland was removed from the final plan. The option of constructing a second wetland south of State Road 707 will be addressed in the shoreline stabilization study.

34-1 Was the water taxi dock behind the Barracks Building eliminated?

Yes, see response to comment 29-4.

34-2 Will the Town's existing restrooms near the soccer fields be used on a regular basis, and if so who will open and close them?

This is expected to be negotiated between BLM and the Town of Jupiter.

34-3 Is BLM or PBC going to be patrolling the site on a regular basis?

BLM will pursue a Law Enforcement MOU/agreement with local law enforcement entities, including Palm Beach County Sheriff Department, Town of Jupiter Police Department, Village of Tequesta Police Department, and other appropriate entities for the enforcement of the Special Rules. In addition, BLM expects to have an onsite manager for the ONA in the near future. This person is not expected to have law enforcement capabilities but would be able to provide an additional agency presence.

34-4 Did the new water line and fire hydrant get approved?

Both of these items would be constructed at the discretion of the Town of Jupiter to provide additional protection for the Station J building and other historic structures. BLM may be able to provide support for this project.

35-1 It is not clear if the current or proposed fencing in both alternatives is located in areas where it can prevent gopher tortoises from crossing into busy highways.

The split-rail perimeter fencing planned would not exclude tortoises from State Road 707. However, the chain link fence in conjunction with the native hedge would discourage tortoises from entering Jupiter Lighthouse Park and the ball fields.

35-2 Based on our experience at other natural areas, we believe you should make it clear if horses are allowed or not on the ONA.

The change has been made as suggested.

35-3 It appears like historically all standing snags were removed. We recommend leaving snags that are not a safety concern up as is proposed in Alternative 1 on page 79. Snags will also provide habitat for woodpeckers as well as nesting sites for ospreys and roosting sites for wading birds.

The change has been made as suggested. Strategic snags will be left in place where they do not posed threat to public use.

35-4 I believe the bird species listed on page 33 were meant to be Species of Greatest Conservation Need. FWC does not have a category called Species of Conservation of Concern.

The change has been made as suggested.

35-5 The osprey is only listed as a Species of Special Concern in Monroe County (i.e. the Florida Keys). It is not an SSC in Palm Beach County.

The change has been made as suggested.

37-1 On the sixth line, page 21, it says the lighthouse was completed in 1859. Please make it 1860.

The change has been made as suggested.

38-1 While we believe that public access will provide outreach and education, it also has the potential to increase visitor impacts to natural features and native species. All trails should be routed away from occurrences of rare and listed species. The trail identified in the east side of Lot 15 appears to be routed within 20 to 30 feet of two of the only four remnant *Asimina tetramera* plants. This will draw attention to the plants and could lead to picking of fruits when they are in season, as they are large and interesting in appearance. The trail system should be routed away from these plants to reduce the chance of this happening. *Cladonia perforate* have also been transplanted near this area, and these transplants have the same protection under the ESA as individuals that occur naturally elsewhere in other sections of the site. Routing trails away from occurrences should be added to the management recommendations for these species.

The public access trails will be designed to funnel the increasing number of visitors through sensitive areas while providing appropriate interpretive facilities to encourage appreciation for the ONA resources and understanding of special rules. The trail will be routed around all special status plants and in particular four-petal pawpaw and perforate lichen. Ongoing coordination with the U.S. Fish and Wildlife Service will continue through the design and construction phase of the ADA trail north of State Road 707 to ensure that the trail does not adversely affect either species. There may be some potential for visitors to take pawpaw fruit, however the fruit ripens in the middle of the summer when public visitation is expected to be low. Adoption and enforcement of the Palm Beach County natural area ordinance as special rules for Jupiter Inlet Lighthouse ONA, and ultimately staffing the site with a full time manager will provide additional protection for resources and ensure visitor compliance.

38-2 Although there have been no confirmed sightings of eastern indigo snakes on site, it is nevertheless possible that they could occur there, given that they are a commensal burrow species, a wide-ranging habitat generalist, are cryptic, and are not readily surveyed. In acknowledgement of this possibility, the Service recommends ensuring that any erosion control geo-textiles used are safe for snakes and do not present opportunities for entanglement. We recommend that BLM protect all burrows, stumps, and debris piles that may serve as snake refugia by raking around them before prescribed burns.

The change has been made as suggested.

38-3 Monitoring the status of populations and their response to management actions will be essential in directing future management decisions. The BLM should include monitoring programs for rare, threatened, and endangered species in the management plan.

The ONA will use the monitoring protocol developed for use in Palm Beach County's Natural Areas, which includes population and habitat monitoring for special status species. These have been included in the Appendix. This does not preclude additional monitoring as needed to assess management actions, including monitoring of special projects such as the four-petal pawpaw augmentation and perforate lichen transplants.

38-4 Many recommend using vegetative structure to determine the burn interval for scrub jays rather than time in years because individual sites may have different growth rates. As a result, scrub would be burned when the vegetative height reaches the point where there needs to be a reduction, rather than at a predetermined date. Vegetation height within a territory is one of the most important factors influencing demographic success of scrub-jays. The optimal average height of the shrub layer for scrub-jays is 4 to 5.5 feet. This average shrub height also provides appropriate habitat for the majority of other scrub adapted species. Scrub-jay numbers, as well as numbers of scrub-endemic plants, quickly decline in areas where the shrub layer averages taller than 5.5 feet. Optimal scrub-jay habitat contains 10% to 50% open ground with either bare sand or grass <6 inches tall.

The final plan has a more adaptive burn program which identifies the use of prescribed fire as the preferred management tool for scrub habitats within the ONA. Fire interval and preparation techniques would be adapted to maintain approximately 50% of the scrub habitats in oak scrub as described by the Florida Fish and Wildlife Conservation Commission and Florida Natural Areas Inventory (June 30, 2009). It is anticipated that sand pine would be reduced in these areas. The remaining areas would be managed with longer fire rotations to support perforate lichen, epiphytes, and other species requiring more mature scrub communities, including sand pine. It is the goal of this plan to adapt implementation, as needed, to reflect the most current research. Where the use of fire is not prudent mechanical manipulations may be used to maintain scrub characteristics. Specific burn plans will be developed prior to each burn establishing the burn prescription based on fuel conditions and resource objectives.

38-5 Extreme caution should be practiced when using herbicides to treat invasives in the vicinity of rare and listed plants.

All herbicide applicators will be fully briefed on the location and identification of special status plants. No herbicide applications will be made on days when there is potential for drift to affect non-target species. In addition, the move to more frequent sweeps for invasive species is expected to increase the effectiveness of hand pulling. In areas with perforate lichen, limiting the number of people to one or two people capable of identifying the species and understanding the need to avoid trampling would help to minimize loss.

38-6 Cladonia perforata and prescribed fire

Recommend fire as the preferred management technique for scrub where feasible. However, there probably is no vegetation treatment, fire or mechanical, that will avoid the destruction of some of the lichen fragments of Cladonia perforata in Lot 19. In 2009, the Service issued a Biological Opinion for a pilot project involving the translocation of Cladonia perforata from occupied to unoccupied habitat at JILONA. This effort was implemented on a small scale to test methodology and feasibility of relocating lichens to avoid directly mortality that would occur with the application of prescribed fire or mechanical treatments. While this technique may hold value to management of the species and its habitat at JILONA, the success of this effort cannot be fully evaluated because the fragments were moved less than a year ago.

Because the prescribed burn program has the potential to adversely affect perforate lichen, BLM will consult to fulfill all Endangered Species Act Section 7 requirements. The U.S. Fish and Wildlife Service is currently preparing a programmatic biological opinion addressing prescribed burning in areas supporting perforate lichen. Once that document has been completed BLM will adopt those best management practices and apply for an incidental take permit through a separate Section 7 consultation.

38-7 The BLM should consult with the Service on burn and translocation plans for Cladonia perforata at JILONA. Due to this species slow rate of regeneration and/or recolonization after fire, and small area

occupied at the site, careful planning will always be needed to ensure the persistence of *Cladonia perforata* at JILONA. *Cladonia perforata* lichens should only be moved when habitat management is needed. If they must be moved, preference should be given to areas where they currently occur, since these habitats are proven to support the species. Translocation should be to sites where vegetation treatments have recently been completed so that the translocated lichen fragments will have 15-30 years to regenerate. Lichens should not be moved in any case to make way for improvements such as trails and roads. Areas that are to be managed on a 30-year interval will probably have the best chance providing the time needed for significant regeneration. Burning at 15 year intervals would likely cause this species to be extirpated from these areas. Fire shadows should be simulated to act as refugia for these lichens. The Service recommends using GIS to carefully track and plan prescribed fire in relation to *Cladonia perforata* to ensure that management of the site does not lead to the extirpation of this species. The adaptive management paradigm should be utilized to modify practices as needed.

See response to comment 38-6.

38-8 *Cladonia perforata* and tennis courts/ball field

The Service feels that restricting access to adjacent scrub (Lot 19) by replacing the existing split rail fence with 6 foot cyclone fence and installing overhead screen over the tennis court to reduce number of stray balls is the best option to protect lichens adjacent to these areas, which we believe are being trampled by people retrieving stray balls or entering the area for other untoward purposes.

BLM expects that the addition of a shrub hedge in front of 4 feet chain link fence will be sufficient to discourage people from entering the site from the ball fields and will have the added benefit of deflecting the irrigation from the scrub habitat. .

38-9 Florida mouse (*Peromyscus floridanus*) conservation

The Service recommends that BLM explore reintroduction of the Florida mouse (*Peromyscus floridanus*) to suitable habitat within the JILONA.)

The change has been made as suggested.

43-1 Executive Summary

Nice narrative, however, is this a summary or Introduction? If it's an executive summary we need to make sure any information here is repeated elsewhere in the body of the Plan.

Could proposed actions in Summary Table be numbered or lettered and then located on corresponding maps? This would make it easier to identify and locate.)

With the number of actions included in the document it would be difficult to display them on a map for inclusion in the document. In the final document no public access facilities are included in Lot 17, which should help to clarify the locations of planned actions.

43-2 New Section

Add Introduction, goals, mission statement. While the purpose of this document is to meet requirements of the JILONA Legislation, we also need to recognize that this will be the main "official document" for the JILONA. As such, it will be read by the Public as well as other governmental entities. We need to make sure that it's purpose and goals are clear to any reader. I would suggest adding an Introduction section. In this we should explain the overall purpose of the Plan and the goal(s). Specifying a specific mission statement or goal(s) will assist in future use and advocacy of the plan.)

These sections are addressed later in the document.

43-3 B. Relationship to Other Plans and Relevant Statutes, 5. Local Zoning (pg. 19)

"Change "5. Local Zoning to" Local Land Use Designation and Zoning"

The change has been made as suggested.

Add: The current Land use for the ONA within the Town of Jupiter is Public/Institutional. While the Town's current zoning for the site is "Rural Residential", the Town intends to change it to "Public/Institutional" to be consistent with the Land Use.

The change has been made as suggested.

Consider adding, "Florida statutes, chapter 163.Part II governs the process for local government land use changes, and requires consistency between Land Use and Zoning." (See below)

Consider adding: "Florida Law, Florida Statutes, Chapter 163, Part II, Known as the "Local Government Comprehensive Planning and Land Development Regulation Act "requires that all local governments adopt a Comprehensive Plan. The act requires that all actions related to property be consistent with the Town's adopted Comprehensive Plan. Required elements of the plan that could include policies related to JILONA include the following elements: Land Use, Coastal, Conservation, Recreation and Open Space." Adding JILONA-related policies to the Town's Plan may be of benefit in regard to grants, and strengthen intergovernmental cooperation.

While BLM will continue to coordinate with local municipalities to ensure that local zoning and comprehensive plans are consistent with management of the ONA.

43-4 C. Existing Land Uses" (pg. 19)

Consider changing heading to "JILONA Partners and Current Uses"

The change has been made as suggested.

Consider NEW SECTION Recommend a section on how site came to be JILONA and member of the Landscape Conservation System, describing unique working group and efforts involved. Also mention awards to date such as the 4 Cs, the JHS student awards, Cooperative Conservation, etc.

Commented noted.

43-5 5. visual resources (pg.51)

Could you quote the reference document or law for the "Visual Resource Management (VRM) Class III Zone"?

The visual resource inventory process is outlined in BLM Handbook H-8410-1. The process of assigning a ranking is based on scenic quality, sensitivity level analysis and delineation of distance zones. Based on these three factors lands are placed into one of four visual resource inventory classes. This ranking system was designed to address larger tracts of land. The Class III objectives for visual resources are to partially retain the existing natural and cultural character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities should be moderate. Management activities may attract attention but should not dominate the view of the casual

observer. Changes should repeat the basic elements found in the predominant natural and/or cultural features of the characteristic landscape.

43-6 H. Socio-Economic Conditions – Jupiter (pg 55)

Incorporation date 1925.

Update population projection -just over 50,000.

Clarify/modify comment regarding growth relating to Scripps.)

The change has been made as suggested.

43-7 C. Management Issues (pg. 58)

Consider adding section on "Link to Inlet Village". Issues would include access, onsite impact, coordination opportunities. This may benefit both areas, in terms of grants and future activities.

Comment noted.

60-3 Need to remodel the small building next to the lighthouse to include much needed restrooms.

The Lighthouse Keeper's Workshop has been funded for stabilization and rehabilitation to provide the public with a living exhibit to demonstrate the working life of the lighthouse keeper. Constraints with the existing septic system preclude use as a public restroom.

61-1 Area at Barracks Bldg. (museum) should be restricted from swimming & fishing. Artifacts found in this area could be destroyed. Put signs & keep boats from landing on the beach along river and inter-coastal.

The "Barracks Building" is located in Lot 20 which is administered by the Town of Jupiter. The Town of Jupiter has adopted Palm Beach County Parks and Recreation Ordinance No. 2004-022 for the area behind the Station J building (see Appendix C). According to that ordinance swimming and boating use is at the discretion of the Director, or in this case the Town of Jupiter.

61-2 Build retaining walls in this area to prevent erosion.

Areas along the Loxahatchee River east of the Station J building are in active erosion. The plan provides for stabilization of the bank and return to the 1995 shoreline.

2. Regulatory Agency Comments



United States Department of the Interior




FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

March 5, 2010

Memorandum

To: Bruce Dawson, Field Manager, Bureau of Land Management
Attention: Faye Winters

From:  Paul Souza, Field Supervisor, South Florida Ecological Services Office

Subject: Jupiter Inlet Lighthouse Outstanding Natural Area Management Plan, Bureau of Land Management Number: 6843 (020) FW; Service Federal Activity Code: 41420-10-CPA-0138; Service Consultation Number: 41420-2010-I-0149



This memorandum acknowledges the U.S. Fish and Wildlife Service's (Service) December 4, 2009, receipt of the Jupiter Inlet Lighthouse Outstanding Natural Area Management Plan (plan), and the Bureau of Land Management's (BLM) request for informal consultation. The plan addresses activities to be implemented over the next 10 to 15 years and includes actions to maintain and improve habitat and populations of the endangered four-petal pawpaw (*Asimina tetramera*) and perforate lichen (*Cladonia perforata*) while providing public access. Specific actions include: prescribed burns, integrated weed management, exact routing/construction of a trail system, constructing an overlook, restoring buildings, and adding kiosks. This letter addresses all actions except prescribed burning. The Service and BLM have discussed the proposed plan and decided to address prescribed burning under a different request. BLM has determined the remaining plan activities "may affect, but are not likely to adversely affect" the four-petal pawpaw, perforate lichen, Florida scrub-jay (*Aphelocoma coerulescens*), Eastern indigo snake (*Drymarchon corais couperi*), brown pelican (*Pelecanus occidentalis*), and gopher tortoise (*Gopherus polyphemus*). The brown pelican is no longer a federally listed species and the gopher tortoise is not federally listed in this part of its range; therefore, the Service cannot concur with any determination made. A site visit was performed on February 2, 2010, to help site the proposed trail. BLM has stated they will require their contractor to work closely with the Service once the final route is determined. All federally listed plants will be avoided within the actual footprint of the trail. Several actions within the plan have been funded by the American Recovery and Reinvestment Act. This memorandum represents the Service's views on the potential effects of the activities associated with the plan on the above species in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*).

PROJECT DESCRIPTION

The Jupiter Lighthouse Outstanding Natural Area (ONA) encompasses 120 acres. This consists of 51 acres of xeric oak scrub and sand pine scrub, 5.3 acres of tropical hardwood hammock,



5.9 acres of mangrove swamp, and 23 acres of disturbed habitat dominated by invasive plant species. The remaining 34.8 acres consists of a Town of Jupiter park and U.S. Coast Guard facilities that will eventually be managed by BLM. The ONA is located partially in the Village of Tequesta and partially in the Town of Jupiter, at the intersection of U.S. Highway 1 and Beach Road (Section 32, Township 40 S, Range 43 E). BLM has divided the entire site into parcels referred to as Lot 15 through Lot 20. The plan refers to specific activities on specific Lots. Below is the table provided in the Biological Assessment that refers to the proposed action and preferred alternative. BLM has worked with the Service over the past year to select the preferred alternative for each proposed action.

PROPOSED ACTION	PREFERRED ALTERNATIVE
North Side Parking	Construct 8 car parking on north side of Beach Road using permeable material
North Side Hard Trail	Construct permeable trail (ADA compliant) from parking area to wetland boardwalk (to include interpretive signing). This trail would be routed to avoid direct and indirect impacts to four-petal pawpaw and perforate lichen in coordination with the U.S. Fish and Wildlife Service.
Boardwalk Overlook	Construct elevated boardwalk along the existing wetland lagoon to two-story wetland overlook
North Side Soft Trail	Construct soft loop trail to link management roads to parking area on north side
Portal Signage	Install ONA portal signs on north and south side of Beach Road at Highway 1 and at Kato Bridge
Recreational and Cultural Interest Area Signs (brown highway sign)	Apply for tourist destination sign for ONA at Indiantown Road north and south I-95 exits and Florida Turnpike
Connect Trail System	Coordinate with County Road Department and pursue public access under Beach Road Bridge.
Bike Racks	Provide bike racks at each public access points.
Management Roads	Utilize existing asphalt road in U.S. Coast Guard communication site to access northern blocks for management roads.
Management Roads	Eliminate "buffer management road" and management road south of U.S. Coast Guard communication site (maintained as firebreak only).
Access Road North of Beach Road	Construct permeable road to replace asphalt road, when needed.
Historic Keeper's Workshop	Restore historic Keeper's Workshop to Secretary of the Interior Standards.
Lighthouse Keeper's House and Weather Station	Recreate historic structures for public interpretation, if it does not adversely affect U.S. Coast Guard mission.
Bridge Tender's Building	Build kiosk near original Bridge Tender's building site for public interpretation, if developed as a trail head
Station J midden protection	Re-cap and sod midden area behind Station J building, install protective surface in high use areas.
Water Taxi Dock	No water taxi dock construction is being considered at this time.
Lighthouse	Construct a deck over Lighthouse Keeper's house location (under council fig) to protect the

PROPOSED ACTION	PREFERRED ALTERNATIVE
Keeper's house cap	site and provide for interpretation.
Jupiter Inlet Lighthouse Mound	Stabilize and cap the lighthouse mound, including the removal of invasive plants and establishment of a native vegetation cover.
North Side Prescribed Burn Program	Utilize a rotating prescribed burn program to optimize scrub height at between 4 and 5.5 feet with 10-30% open sand to support scrub endemics, particularly on the east facing slope of the ONA. The west facing slope will be managed for more mature scrub to allow for the establishment of species requiring longer burn intervals, including lichens, epiphytes, rosemary, and sand pine. Mechanical manipulations, including use of mechanized equipment and hand cutting maybe used as needed to meet habitat objectives, when prescribed burning is not a viable option.
South Side Prescribed Burn Program	Utilize prescribed burn program to reduce fuel loads and improve scrub habitat. Specific measures to protect federally listed perforate lichen will be incorporated into any manipulations of vegetation in Lot 19, including hand trimming or fire exclusion in occupied areas.
Invasive Control	Conduct invasive sweeps of ONA as needed, particularly after disturbances, to remove non-native and invasive annuals and vines. Early intervention, hand pulling, and native plantings will be included in the integrated pest management program. Use of selected hand applied herbicides will also be a management tool.
Invasive Control	Phase the mechanical removal of all woody invasives in Lot 17 over 3 years, with herbicide follow-up and planting of natives, as needed. Utilize prescribed fire as a management tool in scrub areas to meet habitat objectives.
Wetland Construction	No new wetland construction is planned.
Open Sand Areas	Root rake and/or hand clear in scrub habitats to maintain 10-30% open sand in scrub habitats.
Roosting and cavity opportunities	Install osprey platforms, bat roosts, and bird boxes where appropriate.
Feral Animals	Actively trap and remove feral cats and nuisance animals, as needed.
Four-petal pawpaw	Augment existing four petal pawpaw population in suitable habitats.
Perforate lichen	Continue to monitor transplanted perforate lichen and coordinate with U.S. Fish and Wildlife Service to explore transplanting as an option to expand this population within the ONA.
Florida Scrub-jay	Continue to manage habitat to meet Florida scrub-jay requirements. Explore options for future reintroduction, if it supports regional effort. The small size of the site is likely to be limiting.
Florida Mouse	Explore the reintroduction of Florida mouse (<i>Peromyscus floridanus</i>) in suitable scrub habitat within the ONA.
Soccer Field Fencing	Replace existing fence with 4' black chain link and native, drought resistant hedge.
Tennis courts	Restrict access to adjacent scrub and install overhead screen to reduce number of stray balls.

PROPOSED ACTION	PREFERRED ALTERNATIVE
Law Enforcement Agreements	Establish Law Enforcement MOU between ONA partners
Supplementary Special Rules	Adopt Palm Beach County Natural Area Ordinance as Supplementary Rules for Lots 15, 16, 17 and 19, and County Parks and Recreation Ordinance for Lot 18 and 20.

THREATENED AND ENDANGERED SPECIES

The Service has reviewed our Geographic Information Systems (GIS) database for recorded locations of federally listed threatened and endangered species and critical habitats on or adjacent to the project site. The GIS database is a compilation of data received from several sources. The Service has conducted several site inspections to verify species occurrence as well as worked in depth with BLM to address concerns at the forefront of developing the plan.

Florida scrub-jay

The project occurs within the geographic range of the threatened Florida scrub-jay; however, no birds have been seen on-site since 2003. The site is monitored annually as part of the range-wide Jay Watch Program. Although there are no scrub-jays on-site, the ONA continues to provide suitable habitat and there is the potential for birds to be reintroduced to the site. The plan would continue to provide near optimal habitat across 20 acres or more, while maximizing habitat value for other scrub endemic species. Annual monitoring for the presence of scrub-jays will continue on-site using Service approved protocol. Should scrub-jays begin to reoccupy the site, BLM will notify the Service and expand monitoring requirements to meet current standards. BLM has determined that the project “may affect, but is not likely to adversely affect” the Florida scrub-jay. The Service concurs with BLMs’ determination.

Eastern indigo snake

Suitable habitat for the threatened eastern indigo snake may exist on site. BLM has determined the project “may affect, but is not likely to adversely affect” the eastern indigo snake. Because indigo snakes use a variety of habitat types and have large home ranges, it is possible they occur within the project area. BLM has agreed to adhere to the Service’s *Standard Protection Measures for the Eastern Indigo Snake* to minimize potential of harm or harassment to any resident snakes during any of the proposed actions. Therefore, the Service concurs with this determination.

Four-petal pawpaw

The ONA does contain naturally occurring and reintroduced four-petal pawpaw. Each of these plants is individually flagged and GPS coordinates taken for exact location. The ONA has been a successful site for research and augmentation of this species. BLM has worked extensively with the Service to address potential concerns with the proposed management activities and future recovery of this species. Prescribed fire is the primary tool to be used for managing this

species. It is possible fire may affect individual plants differently; therefore, the Service and BLM have agreed that the prescribed burn program will be addressed under a separate consultation at a later date. The integrated weed management program and proposed trail system could potentially impact this species. However, the pawpaw is located in an area where hand pulling is sufficient to remove invasive plants. BLM will continue to work with the Service on the exact route of the proposed trail system and will avoid four-petal pawpaw and other protected plants. The trail system will provide public access where deemed appropriate and provide signage to inform the public of endemic and protected plants. BLM has determined the project "may affect, but is not likely to adversely affect" the four-petal pawpaw. Based on BLM's extensive coordination with the Service and continued efforts at recovery of the four-petal pawpaw, the Service concurs with this determination.

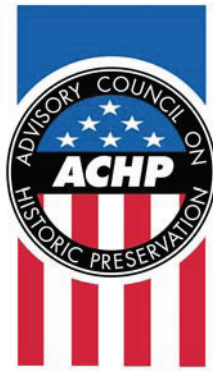
Perforate reindeer lichen

The ONA does contain perforate reindeer lichen. BLM and the Service have identified and marked areas where these lichen naturally occur, as well as three areas where lichen have been transplanted. The trail system will be routed around these areas. The integrated weed management program will consist of hand pulling and bagging material with minimal ground disturbance in known perforate lichen areas. No herbicide or mechanical disturbance will be used near perforate lichen. The number of people conducting the weeding activities will be limited and briefed in identification of the species. Weeding will be conducted during periods of high humidity to help reduce fragmentation from trampling of the lichen. The plan incorporates several conservation measures to limit impacts to this species. The Service and BLM recognize the need for prescribed fire to help manage the species and scrub habitat, but there is the potential for individual lichen to be killed during the burns. Therefore, the prescribed burning program on the ONA will be consulted on under a separate consultation at a later date. The BLM has determined the plan "may affect, but is not likely to adversely affect" the perforate reindeer lichen. The Service concurs with this determination.

This letter fulfills the requirements of section 7 of the Act and no further action is required. If modifications are made to the projects, if additional information involving potential effects to listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary.

Fish and Wildlife Resources

The Service believes the project will have beneficial effects, and will not significantly affect fish and wildlife resources in the area. If you have any questions regarding this memorandum, please contact myself or Kristi Yanchis at 772-562-3909, extension 313.



Preserving America's Heritage

February 4, 2010

Mr. Bruce Dawson
Field Manager
Bureau of Land Management
Jackson Field Office
411 Briarwood Drive, Suite 404
Jackson, MS 39206

***Ref: Proposed Construction Projects at Jupiter Inlet Lighthouse Outstanding Natural Area
Jupiter, Florida***

Dear Mr. Dawson:

On January 25, 2010, the Advisory Council on Historic Preservation (ACHP) received your revised notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property listed or eligible for listing in the National Register of Historic Places. We understand that we were invited to participate under the *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers regarding the Manner in which BLM will meet its Responsibilities under the National Historic Preservation Act*. At this time, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, or other consulting party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Thank you for providing us with the opportunity to review this undertaking. If you have any questions or require further assistance of the ACHP, please contact Nancy J. Brown at 202-606-8582, or by e-mail at nbrown@achp.gov.

Sincerely,

Raymond V. Wallace
Historic Preservation Technician
Office of Federal Agency Programs

"Zambrano, Ricardo" <Ricardo.Zambrano@MyFWC.com>

09/08/2009 01:02 PM

Faye,

Laura Knipp from our Division of Habitat and Species and I both reviewed the draft plan for the Jupiter Inlet ONA. We both felt this was a very thorough and well-laid out plan. We only had a few minor comments on the plan. I am listing them below in no particular order.

* It is not clear if the current or proposed fencing in both alternatives is located in areas where it can prevent gopher tortoises from crossing into busy highways.

* Based on our experience at other natural areas we believe you should make it clear if horses are allowed or not on the ONA.

* It appears like historically all standing snags were removed. We recommend leaving snags that are not a safety concern up as is proposed in Alternative 1 on page 79. Snags will also provide habitat for woodpeckers as well as nesting sites for ospreys and roosting sites for wading birds.

* I believe the bird species listed on page 33 were meant to be Species of Greatest Conservation Need. FWC does not have a category called Species of Conservation of Concern.

* The osprey is only listed as a Species of Special Concern in Monroe County (i.e. the Florida Keys). It is not an SSC in Palm Beach County.

Thank you for the opportunity to review this plan.

Ricardo Zambrano
Regional Biologist
Florida Fish and Wildlife Conservation Commission
8535 Northlake Boulevard
West Palm Beach, FL 33412
Phone: 561-625-5122
Fax: 561-625-5129

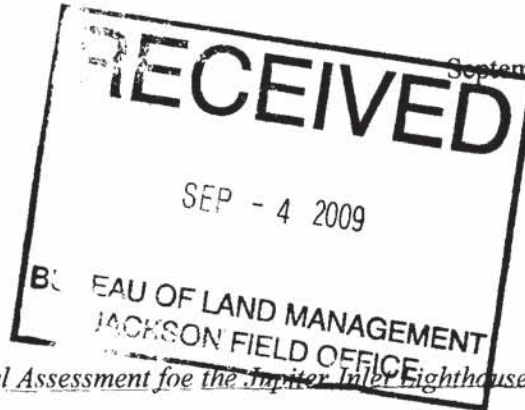
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FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Bruce Dawson
Attn: Jupiter Inlet Lighthouse ONA
Bureau of Land Management
Jackson Field Office
411 Briarwood Drive, Suite 404
Jackson, Mississippi 39206

September 1, 2009



RE: DHR Project File Number: 2009-4894
Draft Management Plan and Environmental Assessment for the Jupiter Inlet Lighthouse Outstanding Natural Area
Palm Beach County

Dear Mr. Dawson:

This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended, *36 CFR Part 800: Protection of Historic Properties* and the *National Environmental Policy Act of 1969*, as amended.

We reviewed the sections of the draft environmental assessment, which deal with Cultural and Historical Resources. Based on the information provided, it is the opinion of this office that cultural and historical resources have been adequately addressed.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail sedwards@dos.state.fl.us, or at 850-245-6333 or 800-847-7278.

Sincerely,

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

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