

### III. ALTERNATIVES

#### Formulation of Alternatives

The planning team identified a range of reasonable alternatives for achieving the vision. The four alternatives evaluated were:

Alternative 1, Maintain Current Management; Alternative 2, Ecosystem Emphasis; Alternative 3, Biological Emphasis; and Alternative 4, Public Use Emphasis. The alternatives reflect the issues and concerns identified by the planning team, public scoping meeting comments, and written comments.

Alternative 2, Ecosystem Emphasis, is the Service's preferred alternative for managing Hobe Sound National Wildlife Refuge. This alternative strives for a balanced approach to the key issues, while maintaining the needs of wildlife first (as outlined by Congress in the National Wildlife Refuge System Improvement Act of 1997).

Regardless of which alternative is ultimately implemented, the Service will strive to accomplish the objectives set for the 15-year period, assuming that necessary funding and staffing are obtained.

#### Description of Alternatives

Listed below is a description of the management actions that would occur under each alternative. A comparison of the alternatives by management goals can be found in Figure 29.

##### *Alternative 1. Maintain Current Management (No-Action Alternative)*

The current management of Hobe Sound National Wildlife Refuge, despite the best of intentions, is insufficient to meet the long-range vision of the refuge as formulated by the planning team. Although efforts have been initiated to restore sand pine scrub habitat, the refuge has insufficient resources to actively pursue restoration projects and conduct monitoring to evaluate the success of the projects. Due to the refuge's limited resources, a fire management plan would not be initiated and there would be no efforts made to re-create scrub or barrier island natural fire regimes or to explore alternative disturbance mechanisms.

Dune and mangrove swamp restoration and other restoration/enhancement projects would only occur as time and funding permit. On the barrier island, dune restoration would not be a priority; however, beach re-nourishment would continue along with incidental replanting of sea oats and other native dune plants.

No effort would be made to restore or enhance mosquito impoundments, dredge/spoil sites, seagrass beds, or mangroves. Not only would habitat restoration efforts be limited, but removal of invasive exotic plants would be subject to the vagaries of funding and availability of manpower. For example, little effort would be made to remove Australian pines adjacent to the Indian River

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Lagoon and there would be no effort to restore the subsequently disturbed areas. Increasing loss of wildlife habitat, due to advancing exotic plants, would result not only in a decimation of state and federal listed species, but also in a decrease in species diversity.

Monitoring efforts would occur only for specific, highly visible trust species. Monitoring of sea turtle nests would continue, as would predator control activities. Migratory bird and gopher tortoise surveys would continue only through volunteer assistance. Limited vegetative community inventorying, monitoring, and mapping would occur.

The Hobe Sound Nature Center, Inc., would continue to provide the same level of environmental education opportunities. Recreational opportunities would continue to include access to the Atlantic Ocean beach, to the Indian River Lagoon at the headquarters area, and along the 1/4-mile interpretive trail through the scrub habitat. Improvements to visitor services would be limited and visitors would not have the most up-to-date brochures, educational information, and exhibits possible.

**Goal 1. Wildlife Habitat and Population Management.** Restore and conserve diverse habitats, species populations, and biological integrity.

*Objectives:*

*Habitat Management*

- Efforts to mimic the natural fire regime of scrub habitat on the Atlantic Coastal Ridge or barrier island would continue as time and funding permit. To protect surrounding communities, wildfires would be suppressed.
- Beach renourishment would continue in partnership with the residents of Jupiter Island, along with incidental replanting of native dune plants.
- Dune restoration on the barrier island would occur on a sporadic basis and as time and funding permit.
- Restoration or enhancement of mosquito impoundments, dredge/spoil sites, seagrass beds, and mangroves would be attempted as time and funding permit.
- Efforts would continue to remove Old World climbing fern as one of the priorities.
- Efforts would continue, as time and funding permit, to remove Australian pines on the Atlantic Ocean beach and property adjacent to the Indian River Lagoon. No effort would be made to restore disturbed areas.
- Efforts would be made to partner with the Treasure Coast Exotic Plant Task Force and other exotic plant working groups to control nuisance plants.

*Population Management*

- Efforts to control sea turtle nest predators would continue as time and funding permit. The refuge would continue to support sea turtle salvage efforts.

*Monitoring and Surveys*

- A selected list of highly visible trust species (e.g., sea turtles, Lakela's mint, scrub jay, least tern, and gopher tortoise) would be monitored. Monitoring would be conducted by qualified individuals, but not refuge staff.
- Sea turtle nest monitoring would continue as a permit condition for beach renourishment efforts.
- Migratory bird and gopher tortoise surveys would continue with volunteer assistance.
- Limited inventorying, monitoring, and mapping of vegetative communities would occur.

**Goal 2. Resource Protection.** Conserve natural and cultural resources through partnerships, protection, and land acquisition.

*Objectives:*

*Partnerships*

- Efforts to establish partnerships to enhance the protection and management of the refuge would continue.
- The refuge would cooperate with the Hobe Sound Nature Center, Inc., on beach clean-up and environmental education programs.

*Cultural Resource Protection*

- Cultural resources would be protected in accordance with federal and state historic preservation legislation and regulations.

*Law Enforcement*

- Listed species, natural resources, and refuge boundaries would be protected by existing law enforcement personnel. The refuge (including the beach) would continue to be closed to night-time human activities.

*Land Acquisition*

- Land acquisition would be maintained at current rate, within current acquisition boundaries. The Service would seek to acquire in-holdings from willing sellers.

**Goal 3. Wildlife-Dependent Recreation and Environmental Education.** Develop appropriate and compatible wildlife-dependent recreation, environmental education, and interpretive programs that lead to enjoyable experiences and a greater understanding of fish, wildlife, and habitat conservation by the public.

*Objectives:*

*Wildlife-Dependent Recreation*

- Public access to the Atlantic Ocean beach (for surf-fishing, shelling, sun-bathing, swimming, observing wildlife, boating, taking photographs, painting, hiking, and surfing) would be provided. No improvements would be made to the infrastructure at the beach.
- Public access would be maintained on the mainland from the headquarters area to the Indian River Lagoon for fishing, observing wildlife, taking photographs, painting, and hiking. The 1/4-mile interpretive trail through scrub habitat would be maintained.
- Improvements to visitor services would be limited; visitors would not have the most up-to-date facilities, brochures, or exhibits.
- Fees would continue to be collected on a part-time basis at the refuge beach as personnel availability would allow.

*Environmental Education*

- The Hobe Sound Nature Center, Inc., would continue to provide the same kind and level of environmental education opportunities. The refuge would support the efforts of the Hobe Sound Nature Center, Inc., including the museum, sea turtle program, summer environmental camps, adult lecture series, and off-site environmental education programs with school groups.
- The refuge would promote environmental booths at eco-fairs, and would continue to educate the public on the effects of non-native, exotic, and invasive species.

**Goal 4. Administration.** Implement an appropriate management regime for the refuge and improve infrastructure; add support staff to meet the needs of an expanding visiting public and to facilitate responsible biological, maintenance, and law enforcement programs.

*Objectives:*

*Staffing and Funding*

- Current staff (i.e., 3 permanent and 3 seasonal) and funding levels would be maintained.
- Minimal staff training would be provided and only replacement equipment would be purchased.

- The refuge would continue to seek partnerships to assist in reaching the above-listed goals.
- A re-active versus pro-active management program would continue.

#### *Facilities*

- The current building would remain in use for refuge headquarters and Nature Center. Funding would continue to be sought for a new office building and visitor facility.

#### *Alternative 2. Ecosystem Emphasis (Preferred Alternative)*

In place of single species management, ecosystem and landscape level habitat management would be emphasized. In all cases, possible impacts to trust species would be examined before taking any management action. With the emphasis of an ecosystem approach, individual species and their habitats would benefit.

Native habitats of the barrier island and Atlantic Coastal Ridge would be managed in accordance with historical patterns of succession. The sand pine scrub would be treated with a mechanical process followed by prescribed fire to reproduce the effects of wild-fire without the associated risks to property and life. This technique would only be used to provide the most appropriate conditions for endemic species and overall health of the community, as prompted by an active biological monitoring program.

The Atlantic coastal dune system would be managed to protect its shoreline from erosion and provide optimal beach conditions for nesting sea turtles and shorebirds. The vegetative community would be managed for a diversity of native plants and wildlife. Monotypic stands of exotic plants, as well as invasive natives, would be monitored and treated or burned according to the approved dune management plan.

Mangrove swamps, lining the banks of the Indian River Lagoon, would be protected from erosion and exotic infestation. Through the use of partnerships, historical mangrove wetlands would be restored. A strong effort would be made to develop a number of partnerships with other federal, state, and county agencies and with non-government organizations and universities.

Ecosystem management assists in developing diverse wildlife populations. A systematic removal of exotic plants and the restoration of native plant communities would result in genetically diverse native wildlife populations. Protection and enhancement of state and federal listed threatened, endangered, and trust species would be a high priority. All native populations of non-invasive plants and wildlife would be fostered to ensure future health of the species.

The refuge would develop new facilities such as trails, kiosks, and interpretive areas. Opportunities to enjoy the beauty and serenity of this refuge would be expanded and maintained to protect the

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*Ghostcrab  
USFWS Photo*

safety and health of the visiting public. Increased staffing and funding would permit an efficient and predictable schedule of work that would add to a harmonious workforce of talented and dedicated employees.

Public educational programs of the Nature Center would be expanded and promoted on a regional level. An enlarged or new headquarters building would be needed to address the goals and objectives of this alternative.

Land acquisition, from willing sellers, would continue within the approved refuge acquisition boundary.

**Goal 1. Wildlife Habitat and Population Management.**

Restore and conserve diverse habitats, species populations, and biological integrity.

*Objectives:*

*Habitat Management*

- Restore, by mimicking the natural fire regime, 125 acres of mainland sand pine scrub on the Atlantic Coastal Ridge to early successional stages within the first 5 years of the comprehensive conservation plan. Disturbance mechanisms, including logging and prescribed fire, would be used to reduce fuel loads and open scrub habitat.
- Restore 100 acres of the native Atlantic coastal dune system by 2009. Beach renourishment would continue in partnership with Jupiter Island, along with monitoring of beach renourishment effects on animals and near-shore habitat. Dune restoration (3.5 miles) with native dune plants would be emphasized.
- Restore and conserve 300 acres of mangrove and hammock systems by 2016.
- Sensitive areas, such as hammocks and isolated wetlands, would be identified, restored, and managed for species diversity. These efforts would increase native biological integrity.
- Provide favorable feeding, nesting, and roosting habitat for species of management concern on 75 percent of the refuge in the context of multi-species and ecosystem management.
- Conduct a comprehensive inventory of exotic plants, identify priorities of exotic plant control, and develop an exotic plant eradication program.
- Control invasive exotic plant species on the Atlantic coastal dune system to maintain diversity and native biological integrity.
- Exotic plant control would be elevated to a higher priority. Funding would be sought to remove all Old World climbing fern, 50 percent of Australian pine, and 50 percent of all other exotic species.
- Old World climbing fern found in sensitive areas such as hammocks would be targeted first. Restoration of affected areas with site specific and appropriate native plants would be attempted, where necessary and feasible.

- Fire may be used as a management tool to control exotic plant infestation on both the mainland and barrier island tracts.

#### *Population Management*

- Reduce sea turtle predation to at least 10 percent for nesting turtles to achieve a 75 percent hatchling survival rate. Participate in the sea turtle stranding and salvage network, which provides information on turtle survival.

#### *Monitoring and Surveys*

- Monitor, map, and inventory all federal trust and state listed species' populations and habitats by 2008, to provide a basis for refuge management actions, measuring accomplishments and implementing adaptive management.
- State-of-the-art monitoring, mapping, and inventory techniques would be used.
- Trust species, sensitive habitats, and selected plant communities would be inventoried and monitored according to Service-accepted protocols.
- Biological studies would be implemented to support recovery efforts of listed species. GIS software would be acquired and maintained with up-to-date data.

**Goal 2. Resource Protection.** Conserve natural and cultural resources through partnerships, protection, and land acquisition.

#### *Objectives:*

##### *Partnerships*

- Establish cooperative agreements and memorandums of understanding, and pursue joint funding opportunities with agencies and non-government organizations to protect the ecosystem and to promote public awareness and use.
- Work with partners to improve aquatic habitats bordering the refuge that are essential to manatee, fish, and other species.
- Work with adjacent communities to protect and enhance neighboring lands for native wildlife and plants.
- Enhance and develop additional partnerships with other agencies to protect natural resources, both on and adjacent to the refuge.
- The refuge would support Partners-In-Flight actions and the North American Shorebird Conservation Plan for migratory birds, and work with other professional organizations that assist with resource management decisions.

##### *Cultural Resource Protection*

- Enhance mechanisms for cultural resource protection by 2006.
- Develop and implement law enforcement procedures to protect

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the refuge's cultural resources and diminish site destruction due to looting and vandalism.

- Inventory and assess historic properties on lands under refuge jurisdiction by 2006.
- Facilitate partnerships with pertinent federal and state agencies, State Historic Preservation Office, professional archaeologists, Native American tribes, and the general public in order to manage cultural resources.
- Enter into a Memorandum of Understanding with pertinent federal and state agencies to enforce protection acts.
- Develop and implement procedures for obtaining input from Native American tribes regarding management, public use, and interpretive activities.

*Law Enforcement*

- Develop partnerships with law enforcement agencies to expand the range of law enforcement programs and enhance protection of resources.

*Land Acquisition*

- Establish a buffer area surrounding the refuge to provide corridors from refuge lands to other natural areas by acquiring (on a willing-seller basis) the remaining 126 acres of inholdings and collaborating with partners (government/private entities) to identify lands needing protection outside the 1,160-acre refuge acquisition area. Land acquisition, to be carried out by such partners, would facilitate achieving habitat objectives.

**Goal 3. Wildlife-Dependent Recreation and Environmental Education.** Develop appropriate and compatible wildlife-dependent recreation, environmental education, and interpretive programs that lead to enjoyable experiences and a greater understanding of fish, wildlife, and habitat conservation by the public.

*Objectives:*

*Wildlife-Dependent Recreation*

- Increase public accessibility to new areas of the refuge by 20 percent and enhance other opportunities by 50 percent for fishing, wildlife observation, and wildlife photography, as long as these opportunities do not conflict with wildlife needs.
- Increase number of fee collection staff and improve fee collection methods.

*Environmental Education*

- Expand partnership with the Hobe Sound Nature Center, Inc., and explore the development of new environmental education

opportunities, both on and off the refuge, targeted toward students beyond the elementary school level and adults.

- By 2005, assist the Nature Center to expand experiences to more than 100,000 visitors per year and guarantee a healthy work environment for staff and volunteers. To accommodate the planned annual visitation and also to attract a greater spectrum of the community, the Nature Center would set lengthier and more convenient hours of operation, provide staff on the weekends, and accommodate multiple school and meeting groups.

- Expand opportunities for environmental interpretation throughout the refuge.

- By 2005, 50 volunteers would be added to assist with resource protection, environmental education, and interpretive programs.

**Goal 4. Administration.** Implement an appropriate management regime for the refuge and improve infrastructure; add support staff to meet the needs of an expanding visiting public and to facilitate responsible biological, maintenance, and law enforcement programs.

*Objectives:*

*Staffing and Funding*

- Six key positions would be added to the staff to achieve the goals, objectives, and strategies of this plan. Optimal space, equipment, and work surroundings would be secured to enhance staff productivity.
- Procure and maintain safe equipment to facilitate maintenance of grounds, buildings, and facilities, and provide appropriate equipment to conduct proposed biological inventories and monitoring.

*Facilities*

- Replace the existing administrative headquarters building, Nature Center, and maintenance shop with a facility that is safe, efficient, and state-of-the-art.

*Alternative 3. Biological Emphasis*

Under this alternative, over 1,000 acres of the refuge would receive intensive management to maximize wildlife benefits. Full-scale habitat restoration programs would be planned for the mainland scrub tract, including prescribed fire or a disturbance mechanism. Native scrub vegetation would be planted to provide optimal habitat for the refuge's many listed species.

Barrier island restoration would include upland and coastal strand, mosquito impoundments, spoil sites, mangroves, and seagrass beds. Sensitive areas such as hammocks and isolated wetlands would be restored. All exotic and invasive plants would be identified, and a plan for their control or eradication would be written

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and implemented. Complete habitat restoration would closely follow exotic plant removal.

Every effort would be made to inventory, map, and monitor indicator species of macro- and micro-invertebrates, vertebrates, terrestrial and aquatic insects, flowering and coniferous plants, algae, moss, fungus, and lichens (including native and exotic) to understand the biotic communities on the refuge. A state-of-the-art geographic information system would be developed and maintained. With this information, it would be possible to evaluate the effects of management techniques on biotic communities.

Ground, ocean, and intracoastal water quality issues would be evaluated and monitored. Biological studies would be implemented to contribute to the de-listing process.

Public education efforts about the Atlantic Coastal Ridge and barrier island ecosystem would continue. Public access would be restricted from many areas, including Peck Lake, so that the effects on wildlife would be negligible. Beach and mainland facilities would remain the same or be cut back as needed to protect the resources.

**Goal 1. Wildlife Habitat and Population Management.**

Restore and conserve diverse habitats, species populations, and biological integrity.

*Objectives:*

*Habitat Management*

- Provide favorable conditions for all species in the context of multi-species management.
- Conduct intensive restoration of sand pine scrub on the Atlantic Coastal Ridge by using disturbance mechanisms and prescribed fire. Native scrub plants would be planted as needed to provide optimal habitat for listed species.
- Control exotic species and other threats to the Atlantic Coastal Ridge system to maintain native biological integrity and diversity.
- Develop control plan, identify sources of funding, and award contracts to remove 90 percent of Old World climbing fern, Australian pine, and other exotic species.
- Manage the barrier island system to maintain its native biological integrity and diversity.
- Restore all upland and strand dunes, mosquito impoundments, spoil sites, degraded mangroves, and seagrass beds on the barrier island to improve habitat for migratory and nesting birds, manatees, and other nursery animals.
- Sensitive areas such as hammocks and isolated wetlands would be identified, restored, and managed for species diversity.
- Continue beach renourishment in partnership with Jupiter Island and evaluate the effects of renourishment on plants and animals within the near-shore habitat.

- Expand efforts to find alternative methods for stabilizing the beach.
- Restore 3 miles of dune habitat with native plants.

#### *Population Management*

- Provide optimum conditions for sea turtles and their nesting activities such as predator control and appropriate beach renourishment.

#### *Monitoring and Surveys*

- Inventory, monitor, and map 90 percent of macro- and micro-invertebrates, terrestrial and aquatic insects, flowering and coniferous plants, algae, moss, fungus, lichens (including native and exotic), and all vertebrates. Inventory and map plant communities.
- A geographic information system that adheres to the Federal Geographic Data Committee (FGDC) guidelines for describing the content, quality, and condition of data (see [www.fgdc.gov](http://www.fgdc.gov)), would be developed and maintained. State-of-the-art monitoring, mapping, and inventorying techniques would provide the basis for refuge management actions.

**Goal 2. Resource Protection.** Conserve natural and cultural resources through partnerships, protection, and land acquisition.

#### *Objectives:*

##### *Partnerships*

- Establish cooperative agreements and memorandums of understanding and pursue joint funding opportunities with other agencies and non-government organizations to protect the ecosystem and promote public awareness and use.
- Work with partners to improve aquatic habitats bordering the refuge which are essential to manatees, fish, and other species.
- Work with adjacent communities to protect and enhance neighboring lands for native wildlife and plants.
- Enhance and develop additional partnerships with other agencies to protect natural resources, both on and adjacent to the refuge.
- The refuge would support Partners-In-Flight actions and the North American Shorebird Conservation Plan, as well as professional organizations that assist with resource management decisions.

##### *Cultural Resource Protection*

- Protect refuge cultural resources in accordance with federal and state historic preservation laws.

##### *Law Enforcement*

- Protect listed species, natural resources, and refuge boundaries through existing law enforcement personnel. The refuge (including the beach) would continue to be closed to night-time human activities.

*Land Acquisition*

- Establish a buffer area surrounding the refuge to provide corridors from refuge lands to other natural areas by acquiring (on a willing-seller basis) the remaining 126 acres of inholdings and collaborating with partners (government/private entities) to identify lands needing protection outside the 1,160-acre refuge acquisition area. Land acquisition, to be carried out by such partners, would facilitate achieving habitat objectives for trust species.

**Goal 3. Wildlife-Dependent Recreation and Environmental Education.** Develop appropriate and compatible wildlife-dependent recreation, environmental education, and interpretive programs that lead to enjoyable experiences and a greater understanding of fish, wildlife, and habitat conservation by the public.

*Objectives:*

*Wildlife-Dependent Recreation*

- Human impacts would be monitored and public access would be restricted, such that they would virtually have no impact on wildlife. Access would not be allowed from Peck Lake to the Atlantic Ocean beach.
- Mainland facilities would remain the same as Alternative 1, Maintain Current Management. Recreational opportunities would be reduced, as needed, to protect resources.

*Environmental Education*

- Efforts to educate the public about the Atlantic Coastal Ridge and barrier island ecosystem would continue.
- Environmental education opportunities provided would have minimal impact upon the environment.

**Goal 4. Administration.** Implement an appropriate management regime for the refuge and improve infrastructure; add support staff to meet the needs of an expanding visiting public and to facilitate responsible biological, maintenance, and law enforcement programs.

*Objectives:*

*Staffing and Funding*

- Maintain current staff (i.e., three permanent and three seasonal positions) and funding levels.
- Promote staff productivity by actively using employee incentive program.

*Facilities*

- Construct a new headquarters building which would promote research activities to accomplish goals and objectives of this alternative.
- Establish an annual inventory, by program, to identify needed equipment, parts, and supplies.
- Establish and maintain a base level of parts and supplies for the refuge.

*Alternative 4. Public Use Emphasis*

In this alternative, the refuge would allocate a greater share of the budget to public use as opposed to resource management. With this focus, efforts to inventory, monitor, and manage the biological and archaeological resources would be limited. Without sufficient staff, these efforts would be carried out by volunteers who would be trained in plant and animal identification and ecosystem ecology.

Similar to other alternatives, wildlife-dependent recreation uses, such as environmental education and interpretation, fishing, wildlife observation, and wildlife photography would remain priority public uses. At the same time, these public uses would be managed so that there would be minimal impact to wildlife. Increased access would be provided throughout the refuge.

The environmental education and interpretive programs both on and off the refuge would be expanded. Ecotourism, adult lecture series, and an expanded in-service teacher training program would be supported. Ecotourism would be permitted at the Peck Lake area with appropriate boat landing sites.

Existing interpretive trails would be lengthened. New trails, observation towers, and photo blinds would be created both on the mainland and beach tracts. Fire breaks from U.S. Highway 1 to the Indian River Lagoon would be converted into trails for canoeing, kayaking, and fishing access.

Public use facilities would be expanded at the beach parking lot and improved on the Mainland Tract. To increase visitation, a radio message program would be established. Placement of directional signage on all roads leading to the refuge would increase visitation. A large visitor center, complete with state-of-the-art interactive interpretive displays and two classrooms, would be needed to accomplish this alternative's goals and objectives.

**Goal 1. Wildlife Habitat and Population Management.**

Restore and conserve diverse habitats, species populations, and biological integrity.

*Objectives:*

*Habitat Management*

- Mimic the natural fire regime on Atlantic Coastal Ridge or barrier island plant communities as time and funding permit. To protect surrounding communities, wildfires would be suppressed.
- Beach renourishment would continue in partnership with the residents of Jupiter Island, along with incidental replanting of native dune plants.
- On the barrier island, dune restoration would occur on a sporadic basis and as time and funding permit.
- Restoration or enhancement of mosquito impoundments, dredge/spoil sites, seagrass beds, and mangroves would be attempted as time and funding permit.
- Volunteers would remove exotic plants and help to restore habitats by planting native species on 3.5 miles of dunes.
- Volunteers would assist in the restoration of affected areas by planting native species produced at a volunteer-run nursery.

*Population Management*

- Efforts to control turtle nest predators would continue as time and funding permit. The refuge would continue to support sea turtle stranding and salvage efforts.

*Monitoring and Surveys*

- Refuge staff would rely on volunteers to inventory and monitor wildlife species and vegetation.
- Environmental educators and refuge staff would train volunteers on species identification (plant and wildlife) and on understanding ecosystem ecology.

**Goal 2. Resource Protection.** Conserve natural and cultural resources through partnerships, protection, and land acquisition.

*Objectives:*

*Partnerships*

- Develop partnerships to support compatible wildlife-dependent recreational and educational programs.
- Partner with agencies to produce signage that addresses appropriate ethical behavior in relation to aquatic resources.
- Enhance trash removal efforts through teams of volunteers.

*Cultural Resource Protection*

- Enhance mechanisms for cultural resource protection by 2006.
- Develop and implement law enforcement procedures to protect the refuge's cultural resources and diminish site destruction due to looting and vandalism.
- Inventory and assess historic properties on lands under refuge jurisdiction by 2006.
- Facilitate partnerships to manage cultural resources with pertinent federal and state agencies, the State Historic Preservation Office, professional archaeologists, Native American tribes, and the general public.
- Enter into a Memorandum of Understanding with pertinent federal and state agencies to enforce protection acts.
- Develop and implement procedures for obtaining input from Native American tribes regarding management, public use, and interpretive activities.
- Initiate a trained volunteer patrol force to assist in reporting violations, including archaeological looting.
- Have volunteers trained and supervised by qualified archaeologists to inventory and monitor archaeological sites.
- Develop procedures for tribal consultation regarding cultural resources.

*Law Enforcement*

- Protect listed species, natural resources, and refuge boundaries through existing law enforcement personnel. The refuge (including the beach) would continue to be closed to night-time human activities.

*Land Acquisition*

- Maintain land acquisition at the current rate, within current acquisition boundaries. Seek to acquire in-holdings.

**Goal 3. Wildlife-Dependent Recreation and Environmental Education.** Develop appropriate and compatible wildlife-dependent recreation, environmental education, and interpretive programs that lead to enjoyable experiences and a greater understanding of fish, wildlife, and habitat conservation by the public.

*Objectives:*

*Wildlife-Dependent Recreation*

- Create facilities that minimize disturbance, while offering opportunities to view wildlife.
- Promote trails/paths such as boardwalks and raised cross-overs to minimize impacts on species of management concern.

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- Increase the length of the existing hiking trail by 2 miles and create 3 miles of new trails on the mainland.
- Build a 30- to 50-foot observation tower on the Mainland Tract.
- Establish a 5-mile trail on the barrier island, from the beach parking lot to Peck Lake, including a boardwalk over sensitive habitat and a 30- to 50-foot observation tower.
- Establish and enhance interpretive signage along all existing and new trails and along the beach.
- Convert mainland firebreaks to walking trails and Indian River Lagoon access points.
- Provide covered shelters for picnicking and trash cans along the beach.
- Construct a bath house at the beach with running water, showers, drinking water, and restrooms.
- Install a public phone at the beach entry area and a dock on Peck Lake.
- Construct kayak launching facilities.

*Environmental Education*

- Increase public education efforts on leave-no-trace ethics.
- Create environmental education manual on each refuge habitat type for use by teachers/naturalists.
- Provide teacher in-service training.
- Increase public education on trust species and recovery plans.
- Create programs on exotic plant and animal impacts to the ecosystem and what homeowners should and should not do regarding exotics.
- Develop a refuge-specific environmental education curriculum. Initiate satellite downlink for distance learning. Promote conservation ethics to build support for the refuge system.
- Develop docent training for volunteers who will conduct public walks and become roving interpreters.
- Initiate walks on the refuge beach to observe nesting sea turtles.
- Expand adult lecture series and promote ecotourism in the area.
- Develop a cultural resources interpretive and educational program.
- Create multi-lingual signage and interpretive brochures.
- Replace existing interpretive signs.
- Establish a low-watt radio message in both English and Spanish.
- Initiate annual refuge photo and art contests.
- Develop an interactive Internet website.
- Promote and participate in Service-sanctioned events such as Earth Day to promote environmental awareness.
- Construct a large visitor center, complete with an auditorium, state-of-the-art interactive interpretive displays, two classrooms, and a wet lab.
- Place directional signs on all roads.

**Goal 4. Administration.** Implement an appropriate management regime for the refuge and improve infrastructure; add support staff to meet the needs of an expanding visiting public and to facilitate responsible biological, maintenance, and law enforcement programs.

*Objectives:*

*Staffing and Funding*

- Provide for a full biological staff to achieve refuge goals and tasks.
- Provide the most current training in ecosystem management for the staff.
- Promote staff productivity by actively using employee incentive program.
- Provide optimal equipment and work space for staff to effectively accomplish goals.
  - Establish an annual inventory, by program, to identify needed equipment, parts and supplies.
  - Add trash cans along the beach.
  - Actively acquire lands to consolidate the refuge.

*Facilities*

- Construct a new headquarters building where research activities would be promoted.
- Establish and maintain a base level of scheduled inspections and service checks for facilities and equipment.

**Figure 29. Comparison of alternatives by management goals.**

<b>WILDLIFE HABITAT AND POPULATION MANAGEMENT</b>				
<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Habitat Management</b> Sand Pine Scrub Habitat Restoration	Efforts to mimic the natural fire regime of scrub habitat on the Atlantic Coastal Ridge or barrier island would continue as time and funding permit. To protect surrounding communities, wildfires would be suppressed.	Restore 125 acres of mainland sand pine scrub on the Atlantic Coastal Ridge to early successional stages within first 5 years. Disturbance mechanisms, including logging and prescribed fire, would be used to reduce fuel loads and open scrub habitat.	Intensive restoration of sand pine scrub on the Atlantic Coastal Ridge would be conducted using disturbance mechanisms and prescribed fire. Native scrub plants would be planted as needed to provide optimal habitat for listed species.	Management of coastal or scrub habitat would be the same as Alternative 1, Maintain Current Management.
<b>Habitat Management</b> Beach Renourishment and Dune Restoration	Beach renourishment would continue in partnership with the residents of Jupiter Island along with incidental replanting of native dune plants.  Dune restoration on the barrier island would occur on a sporadic basis, and as time and funding permit.	Restore 100 acres of the native Atlantic Coastal Dune System by 2009.  Beach renourishment in partnership with Jupiter Island would continue. The effects of beach renourishment on animals and near-shore habitat would be monitored.  Dune restoration (3.5 miles) with native dune plants would be emphasized.	The barrier island system would be managed to maintain native biological integrity and diversity.  Beach renourishment would continue in partnership with Jupiter Island.  Effects of beach renourishment on animals and near-shore habitat would be evaluated.  Efforts would be expanded in search of alternative methods for stabilizing the beach.	Management of barrier island and beach renourishment would be the same as Alternative 1, Maintain Current Management.  Volunteers would complete most of the native restoration on 3.5 miles of dunes.

WILDLIFE HABITAT AND POPULATION MANAGEMENT				
Issues	Alternative 1 Maintain Current Management	Alternative 2 Ecosystem Emphasis	Alternative 3 Biological Emphasis	Alternative 4 Public Use Emphasis
<p><b>Habitat Management</b></p> <p>Restoration of mangroves, spoil islands, mosquito impoundments and other wetland habitats.</p>	<p>Restoration or enhancement of mosquito impoundments, dredge/spoil sites, sea-grass beds, and mangroves would be attempted as time and funding permit.</p> <p>Habitat and vegetative communities would follow their current course of being overrun by invasive exotic plants.</p>	<p>Major restoration projects would focus on mangroves, spoil islands, and mosquito impoundments.</p> <p>Three-hundred acres of mangrove and hammock systems would be restored and conserved by 2016.</p> <p>Favorable conditions would be provided for trust species on 75 percent of the refuge in the context of multi-species and ecosystem management.</p> <p>Sensitive areas, such as hammocks and isolated wetlands, would be identified, restored, and managed for species diversity. These efforts would increase native biological integrity.</p>	<p>All upland and strand dunes, all mosquito impoundments, all spoil sites, all degraded mangroves, and seagrass beds on the barrier island would be restored to improve habitat for migratory and nesting birds, manatees, and other nursery animals.</p> <p>Sensitive areas, such as hammocks and isolated wetlands, would be identified, restored, and managed for species diversity.</p>	<p>Same as Alternative 1, Maintain Current Management.</p>
<p><b>Habitat Management</b></p> <p>Exotic Plant Control</p>	<p>Little planning, prioritizing or removal of the 36 encroaching, exotic, and nuisance plants would occur; nor would removal efforts increase.</p>	<p>A comprehensive inventory of exotic plants would be conducted, priorities for exotic plant control would be determined, and an exotic plant eradication program would be implemented.</p>	<p>Intensive exotic plant control would become top priority.</p>	<p>A small-scale exotic plant removal effort would be sustained through the assistance of volunteers.</p>

**WILDLIFE HABITAT AND POPULATION MANAGEMENT**

<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<p><b>Habitat Management</b> Exotic Plant Control</p>	<p>Efforts would continue to remove Old World climbing fern as one of the priorities.</p> <p>Efforts would continue, as time and funding permit, to remove Australian pine on the Atlantic Ocean beach and property adjacent to the Indian River Lagoon. No effort would be made to restore disturbed areas.</p> <p>A very limited effort (one temporary employee) would continue to control exotic plants on the refuge.</p>	<p>Invasive exotic plant species on the Atlantic coastal dune system would be controlled to maintain diversity and native biological integrity.</p> <p>Exotic plant control would be elevated to a higher priority. Funding would be sought to remove all Old World climbing fern, 50 percent of Australian pine, and 50 percent of all other exotic species.</p> <p>Old World climbing fern found in sensitive areas such as hammocks would be targeted first. Where necessary and feasible, restoration of affected areas with site-specific and appropriate native plants would be attempted.</p> <p>Prescribed fire would be considered as a management tool to control exotic plant infestation on both the Mainland and Jupiter Island tracts.</p>	<p>A control plan would be developed, sources of funding would be identified, and contracts would be awarded to remove 90 percent of Old World climbing fern, Australian pine, and other exotic species.</p> <p>Prescribed fire would be used as a management tool to control exotic plant infestation on both the mainland and barrier island tracts.</p>	<p>Volunteers would assist in the restoration of affected areas with native plants produced by a volunteer-run nursery.</p>

<b>WILDLIFE HABITAT AND POPULATION MANAGEMENT</b>				
<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Population Management</b>	Efforts to control sea turtle nest predators would continue as time and funding permit. The refuge would continue to support sea turtle stranding and salvage efforts.	Because the beach tract provides some of the most productive sea turtle habitat in the United States, sea turtle predation would be reduced to at least 10 percent to achieve a 75 percent hatchling survival rate. The refuge would participate in the sea turtle stranding and salvage network, which provides information on turtle survival.	Optimum conditions would be provided for sea turtles and their nesting activities.	Same as Alternative 1, Maintain Current Management..
<b>Monitoring and Surveys</b>	A selected list of highly visible species of management concern (e.g., sea turtles, Lakela's mint, scrub jay, least tern, and gopher tortoise) would be monitored. Monitoring would be conducted by qualified individuals, but not refuge staff.  Sea turtle nest monitoring would continue as a permit condition for beach renourishment efforts.	To provide a basis for refuge management actions, to measure accomplishments, and to implement adaptive management, all federal trust and state listed species populations and habitats would be monitored, mapped, and inventoried by 2008.  State-of-the-art monitoring, mapping, and inventory techniques would be used.	Ninety percent of macro- and micro-invertebrates, terrestrial and aquatic insects, flowering and coniferous plants, algae, moss, fungus, and lichens (including native and exotic), and all vertebrates would be inventoried, monitored, and mapped.  Plant communities would be inventoried and mapped. A state-of-the-art geographic information system would be developed and maintained with up-to-date data.	Efforts to inventory, monitor, and manage the refuge resources would be minimal.  Surveying and monitoring would be conducted by volunteers who would be trained to identify plants and animals.

**WILDLIFE HABITAT AND POPULATION MANAGEMENT**

Issues	Alternative 1 Maintain Current Management	Alternative 2 Ecosystem Emphasis	Alternative 3 Biological Emphasis	Alternative 4 Public Use Emphasis
<b>Monitoring and Surveys</b>	<p>Migratory bird and gopher tortoise surveys would continue with volunteer assistance.</p> <p>Limited inventorying, monitoring, and mapping of vegetative communities would occur.</p>	<p>Trust species, sensitive habitats, and selected plant communities would be inventoried and monitored according to Service-accepted protocols.</p> <p>Biological studies would be implemented to support recovery efforts of listed species. GIS software would be acquired and maintained with up-to-date data.</p>		
<b>RESOURCE PROTECTION</b>				
<b>Partnerships</b>	<p>Efforts to establish partnerships to enhance the protection and management of the refuge would continue.</p> <p>Partner with the Treasure Coast Exotic Plant Task Force and other exotic plant working groups.</p> <p>Cooperate with Hobe Sound Nature Center, Inc., on beach cleanup and environmental education programs.</p>	<p>Significant time would be spent seeking partnerships and enhancing communications to foster a greater appreciation of the ecosystem. Partnerships would assist in protecting the ecosystem and in promoting public awareness and use.</p> <p>Cooperative agreements and memorandums of understanding would be established. The refuge would pursue joint funding opportunities with other federal, state and county agencies, universities, and non-governmental organizations.</p>	<p>Support Partners-in-Flight action and the North American Shorebird Conservation Plan as well as professional organizations that assist with resource management decisions.</p>	<p>Partnerships would be developed to support wildlife-dependent recreational and educational programs.</p> <p>Partner with agencies to produce signage that addresses appropriate ethical behavior in relation to aquatic resources.</p>

<b>RESOURCE PROTECTION</b>				
<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Partnerships</b>		<p>Work with partners to improve aquatic habitats bordering the refuge that are essential to manatees, fish, and other species.</p> <p>Work with adjacent communities to protect and enhance neighboring lands for native wildlife and plants.</p> <p>Enhance existing and develop new partnerships with other agencies to protect natural resources, both on and adjacent to the refuge.</p> <p>Support Partners-in-Flight actions and the North American Shorebird Conservation Plan for migratory birds and work with other professional organizations that assist with resource management decisions.</p>		Trash removal efforts would be enhanced by using teams of volunteers.

<b>RESOURCE PROTECTION</b>				
<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Cultural Resource Protection</b>	<p>The refuge would comply with federal and state historic preservation legislation and regulations.</p>	<p>Law enforcement procedures would be developed and implemented to protect the refuge's cultural resources and diminish site destruction due to looting and vandalism.</p> <p>By 2006, the refuge would inventory and assess historic properties on lands under its jurisdiction.</p> <p>Partnerships would be facilitated to manage cultural resources with pertinent federal and state agencies, State Historic Preservation Office, professional archaeologists, Native American nations, and the general public.</p> <p>Enter into a Memorandum of Understanding with pertinent federal and state agencies to enforce protection acts.</p> <p>Procedures for obtaining input from Native American tribes regarding management, public use, and interpretive activities would be developed and implemented.</p>	<p>This alternative would be the same as Alternative 1, Maintain Current Management.</p>	<p>This alternative would be the same as Alternative 2, Ecosystem Emphasis, except that volunteers would be trained and supervised by qualified archaeologists to inventory and monitor archaeological sites.</p>

**RESOURCE PROTECTION**

<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Law Enforcement</b>	Listed species, natural resources, and refuge boundaries would be protected utilizing existing law enforcement personnel. The refuge (including the beach) would continue to be closed to night-time human activities.	Partnerships with law enforcement agencies would be developed to expand the range of law enforcement programs and to enhance protection of resources.	This alternative would be the same as Alternative 1, Maintain Current Management.	This alternative would be the same as Alternative 1, Maintain Current Management.
<b>Land Acquisition</b>	Land acquisition would be maintained at current rate, within current acquisition boundaries. Seek to acquire in-holdings from willing sellers.	A buffer area would be established surrounding the refuge to provide corridors from refuge lands to other natural areas by acquiring (on a willing-seller basis) the remaining 126 acres of inholdings and collaborating with partners (government/private entities) to identify lands needing protection outside the 1,160-acre refuge acquisition area. Land acquisition, to be carried out by such partners, would facilitate achieving habitat objectives for trust species.	This alternative would be the same as Alternative 2, Ecosystem Emphasis.	This alternative would be the same as Alternative 1, Maintain Current Management.

**WILDLIFE HABITAT AND POPULATION MANAGEMENT**

<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<p><b>Wildlife-Dependent Recreation</b></p>	<p>Recreational opportunities would continue to include access to the Atlantic Ocean beach, Indian River Lagoon, and headquarters area.</p> <p>A 1/4-mile interpretive trail through scrub habitat would be maintained. No improvements would be made to the infrastructure at Atlantic Ocean beach.</p> <p>Fees would continue to be collected on a part-time basis at the refuge beach as personnel availability allows.</p> <p>Improvements to visitor services would be limited; visitors would not have the most up-to-date facilities, brochures, or exhibits.</p>	<p>Accessibility would be increased by 20 percent to new areas of the refuge, and opportunities for fishing, wildlife observation, and wildlife photography would be enhanced by 50 percent, as long as these opportunities would not conflict with wildlife needs.</p> <p>The fee collection staff would be expanded and collection methods would be improved.</p>	<p>Public access would be restricted so that it would virtually have no impact on wildlife. Access would not be allowed from Peck Lake to the Atlantic Ocean beach.</p> <p>Mainland facilities would remain the same as Alternative 1, Maintain Current Management. Recreational opportunities would be reduced, as needed, to protect the resources.</p>	<p>Firebreaks would be converted to trails to provide access for canoes, kayaks, and for fishing, from U.S. Highway 1, to the Indian River Lagoon.</p> <p>Existing interpretive trails would be lengthened. New trails, observation towers, and photo blinds would be created on both the Mainland and Jupiter Island tracts.</p> <p>Directional signs would be placed on all roads.</p>

**WILDLIFE HABITAT AND POPULATION MANAGEMENT**

<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<p><b>Environmental Education</b></p>	<p>Hobe Sound Nature Center, Inc., would continue to provide the same kinds and levels of environmental education opportunities. Service would support the efforts of the center, including the museum, sea turtle program, summer environmental camps, adult lecture series, and off-site environmental education programs with school groups.</p> <p>Refuge would cooperate with the Hobe Sound Nature Center, Inc., to provide beach clean-up and environmental education programs.</p> <p>Environmental booths at eco-fairs would be promoted, and efforts to educate the public about the effects of non-native, exotic, and invasive species would continue.</p>	<p>Expand partnership with Hobe Sound Nature Center, Inc., and explore new environmental education opportunities both on and off the refuge.</p> <p>State-of-the-art headquarters building that supports offices and exhibits for both refuge and Nature Center staff would be built to accommodate 100,000 visitors per year.</p> <p>Environmental interpretation opportunities would be expanded.</p>	<p>Efforts to educate the public about the Atlantic Coastal Ridge and barrier island ecosystem would continue.</p> <p>Refuge would provide environmental education opportunities that would have minimal impact on the environment.</p>	<p>Environmental education and interpretive programs would be expanded both on and off the refuge.</p> <p>Eco-tourism, adult lecture series, and an expanded in-service teacher training program would be supported.</p> <p>A low-watt radio message program in both English and Spanish would be developed.</p> <p>Refuge would construct public use facilities on the Jupiter Island Tract and improve facilities on the Mainland Tract.</p>

**WILDLIFE HABITAT AND POPULATION MANAGEMENT**

<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Environmental Education</b>		By 2005, the refuge would add 50 volunteers to assist with resource protection, environmental education, and interpretive programs.		A large visitor center, complete with an auditorium, state-of-the-art interactive interpretive displays, and two classrooms would be developed.

**ADMINISTRATION**

<b>Staffing and Funding</b>	<p>Current staff (i.e., three permanent and three seasonal positions) and funding levels would be maintained.</p> <p>Minimal staff training would be provided and only replacement equipment would be purchased.</p> <p>Re-active vs. pro-active management program would continue.</p>	<p>Refuge would add six key positions to its staff to achieve the goals, objectives, and strategies of this plan. Optimal space, equipment, and work surroundings would be secured to enhance staff productivity.</p>	<p>This alternative would be the same as Alternative 1, Maintain Current Management, with an emphasis on biological staff and resources.</p>	<p>This alternative would be the same as Alternative 1, Maintain Current Management, with an emphasis on public use staff and resources.</p>
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<b>ADMINISTRATION</b>				
<b>Issues</b>	<b>Alternative 1 Maintain Current Management</b>	<b>Alternative 2 Ecosystem Emphasis</b>	<b>Alternative 3 Biological Emphasis</b>	<b>Alternative 4 Public Use Emphasis</b>
<b>Facilities</b>	Existing administration building and Nature Center would continue to be utilized, however, the refuge would seek funding to replace these facilities.	<p>The existing administration building, Nature Center, and maintenance shop would be replaced with a state-of-the-art facility that is safe and efficient.</p> <p>The refuge would procure and maintain safe equipment to facilitate maintenance of grounds, buildings, and facilities, and to provide appropriate equipment to conduct proposed biological inventories and monitoring.</p>	A new and enlarged headquarters building to provide research opportunities would be needed to address the goals and objectives of this alternative.	Same as Alternative 1, Maintain Current Management.

*Hobe Sound*  
*National Wildlife Refuge*

**Section B.**

**Environmental Assessment**

**CHAPTER III - Alternatives**