

Appendix B Cedar Keys

National Wildlife Refuge ENVIRONMENTAL ASSESSMENT

U.S. Department of the Interior
Fish and Wildlife Service
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Purpose and Need for Action

The U.S. Fish and Wildlife Service proposes to implement a Comprehensive Conservation Plan to guide the management of Cedar Keys National Wildlife Refuge, Levy County, Florida, over the next 10 to 15 years.

The purpose of this Environmental Assessment is to analyze and evaluate the environmental effects of implementing a proposed alternative management framework for the refuge. Formal consultation for this Environmental Assessment did not occur. However, the planning effort and the refuge staff's ongoing dialogue with various federal and state jurisdictions, interest groups, and private citizens has provided important elements in the synthesis of the proposed goals, objectives, and strategies found in the Draft Comprehensive Conservation Plan. Implementation of the plan will necessitate further coordination and cooperation with these entities.

The proposed action is to implement Alternative B, Enhance Protection with Public Awareness and Education, as described in the proposed Management Direction of the draft plan.

Issues and Concerns

Several key issues and concerns surfaced during two public meetings, two stakeholder workshops, and from written comments. The planning team reviewed the issues and concerns raised by the people who participated in the scoping process. The team considered these issues, and concerns, when developing the range of alternatives Wildlife Habitat Management

Key Issues and Concerns Summary Statements

Wildlife Habitat Management

WH1 Not enough is known about the wildlife or habitat of the refuge.

WH2 Staff is needed to monitor and manage habitat for endangered species, migratory birds, and resident wildlife.

People were concerned that the refuge had not collected adequate data on the wildlife present and that no staff were assigned to Cedar Keys National Wildlife Refuge for developing a comprehensive biological program.

WH3 Staff should initiate research partnerships with U.S. Geological

Survey and Suwannee River Water Management District to assist and expand water quantity impact studies on refuge habitat. Commercial fisheries and aquaculture are the main industries of Cedar Key. Many individuals were concerned about maintaining good water quality. Some individuals felt that partnerships increased the opportunity to protect the water quality and coastal habitats of Suwannee Sound and Cedar Key for wildlife and fisheries, including commercial aquaculture.

- WH4** Staff is needed to monitor and manage impacts of human use on wildlife and habitat.

While the public valued the opportunities to participate in wildlife-dependent recreation on the refuges, there was an overwhelming concern that public use be monitored and managed. One suggestion centered around clustering public use areas on Atsena Otie Key in order to limit degradation of resources on the other islands. The other islands would remain natural, without the development of public use facilities.

- WH5** Management activities should preserve and restore refuge ecosystems.

Cedar Keys National Wildlife Refuge has been protected from development since 1929 and four of the islands are designated as Wilderness Areas. Refuge habitats are pristine and for the most part, unaltered. With the exception of exotic plant removal, the public wants the management of the islands to remain passive preservation.

Public Use

- PU1** The public urged the refuge to continue to provide only limited public uses on Cedar Keys National Wildlife Refuge to protect sensitive wildlife habitat.

Most people recognized the need to restrict public use activities on the islands in order to retain their intrinsic beauty and wildlife value. Currently, all refuge island interiors, except Atsena Otie Key, are closed to public use for the protection of island flora and fauna. Atsena Otie Key, the closest island to the town of Cedar Key, is open to the public with developed public use facilities. The beaches of all the islands, except Seahorse Key, are open year round for activities such as wildlife observation, photography, and fishing. Seahorse Key, and a 300-foot buffer around the island, is closed to all public entry annually from March 1 through June 30, to protect the nesting colonial wading birds. Some people wanted more restrictions, while a few wanted less.

- PU2** Staff is needed to expand environmental education and interpretation programs and increase involvement with public schools.

It was expressed that the refuge's present environmental education and interpretation programs were not meeting the demands of area youth. People were concerned about the lack of programs and professional staff to conduct these programs.

- PU3** Environmental education and outreach should include adult groups as well as youth groups.

People also mentioned that the focus of the environmental education programs should be school-aged children; however, people believed refuge staff needed to reach adults and provide wildlife conservation and ecological preservation messages to them as well.

PU4 The public thought staff and funding should be increased for Cedar Keys National Wildlife Refuge.

Currently, Cedar Keys Refuge is unstaffed and unfunded. Management activities occur when staff and funding are available from Lower Suwannee National Wildlife Refuge. People stated that an assistant manager and a biological technician are needed to address Cedar Keys Refuge resource needs on a daily basis.

PU5 Staff should recruit student interns and more volunteers to assist with projects and research. There is a desire for the refuge to utilize volunteers to help with public outreach and to recruit students to assist with needed research projects.

Partnerships to Manage and Protect the Refuge

P1 The refuge should maintain and enhance partnerships with state, county, and community agencies; universities and educational institutions; user groups; natural resource based organizations; and other entities.

P2 Additional land acquisition and/or cooperative management agreements are needed to improve the Service's ability to protect existing and potential refuge resources.

Most of the people were concerned about the growth of Cedar Key and the associated development. People felt the refuge should seek to acquire additional lands or develop management agreements with land owners to protect the land from development. They also believed that partnerships with other agencies and community organizations were an ideal way to direct and manage future growth.

Alternatives Discussed but Eliminated from Further Analysis

In addition to the two alternatives seriously considered, two additional alternatives were discussed:

Alternative C Custodial Management
Alternative D Maximize Public Use

These alternatives were eliminated from further consideration early in the planning process. Alternative C was not seriously considered because it would essentially end all refuge management. Custodial management would end any biological, habitat, and public use management occurring on the refuge. No new staff would be hired and existing partnerships would be dissolved. This alternative was eliminated because it was unreasonable and would result in severe degradation of refuge resources due to the lack of staffing and funding. In Alternative D, all staffing and funding would support public use. While this alternative would benefit wildlife-dependent recreational opportunities as required by the National Wildlife Refuge System Improvement Act of 1997, wildlife and habitat management would not occur. The alternative was eliminated because of its direct opposition to the Act's mandate of "wildlife first," and to the purpose, mission, and vision of the refuge.

Alternatives Including Proposed Action

The following analyzes the two management alternatives for Cedar Keys National Wildlife Refuge, including how each alternative would affect the accomplishment of described refuge goals. Approved refuge goals would not change; only the objectives, strategies, and expected outcomes would be different for each alternative. The No Action and Proposed Action alternatives can be compared by reviewing objectives and strategies related to each issue.

Alternative A: Maintain Current Management (No Action)

In this alternative, the comprehensive conservation plan would advocate that the refuge continue to be managed under its current management direction. The direction the refuge has taken for biology, management, environmental education, public use, and outreach would remain the same. Current biological monitoring would continue, but would not be modified or expanded. Research projects would not be initiated. Environmental education would be dependent upon the University of Florida and local schools without adequate support from refuge staff. Opportunities for increased interpretation, recreation, and outreach would not be promoted. Presently, staff from Lower Suwannee National Wildlife Refuge try to protect the resources and provide public use, however, efforts are minimal for all programs due to lack of funds and manpower. This alternative would continue present management conditions since Cedar Keys Refuge receives no funding and has no staff.

Goal 1

Wildlife and Habitat

Manage and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna, with an emphasis on protecting the colonial wading bird rookery, threatened and endangered species, and species of special concern in the State of Florida.

Objectives:

- 1.1 Continue to monitor colonial bird nesting. Staff and volunteers would continue to conduct morning flight line counts to estimate bird usage. No attempt would be made to monitor nesting success or to investigate more recent state-of-the-art survey techniques.
- 1.2 Continue efforts to reestablish colonial nesting on Snake Key.
- 1.3 Continue to monitor bald eagle nests.
- 1.4 Continue to monitor osprey nesting, but do not repair, relocate, or add platforms.
- 1.5 Continue efforts to control Brazilian pepper infestation.
- 1.6 Continue to conduct the annual Audubon Christmas bird count.

Goal 2

Resource Protection

Protect the natural, cultural, and wilderness resources of the refuge to ensure their integrity and to fulfill the mission of the National Wildlife Refuge System.

Objectives:

- 2.1 Protect the colonial bird rookery from human disturbance through occasional law enforcement patrol.
- 2.2 Protect the bald eagle nests through occasional law enforcement patrol.
- 2.3 Protect refuge cultural resources through occasional law enforcement patrol.

Goal 3

Public Use

Provide opportunities for environmental education and interpretation and wildlife-dependent recreation when compatible with the purpose, mission, and vision of the refuge, provided these activities would not negatively affect critical or sensitive habitats.

Objectives:

- 3.1 Maintain partnership with the Suwannee River Water Management District to provide interpretation and recreation on Atsena Otie Key.

- 3.2 Maintain partnership with University of Florida to provide limited environmental education opportunities.
- 3.3 Continue partnership with Levy County Board of Commissioners and the Suwannee River Water Management District to provide interpretive materials on the county-owned dock in Cedar Key.

Goal 4

Partnerships

Promote collaboration and partnerships with private citizens and other agencies to increase research and environmental education opportunities and to protect the coastal ecosystem.

Objectives: This alternative does not meet this goal.

Alternative B. Enhance Protection with Public Awareness and Education (Proposed Action)

This management alternative was selected based on compatibility with the refuge's mission, vision, and ecosystem function, and by the needs expressed by the public during the scoping process. A complete description of this alternative may be found in the Draft Comprehensive Conservation Plan. For comparison to Alternative A, the goals and objectives are listed below. This alternative adds operational funding and 2 full-time staff, as well as 2 shared positions with Lower Suwannee National Wildlife Refuge.

Goal 1

Wildlife and Habitat

Manage and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna, with an emphasis on protecting the colonial wading bird rookery, threatened and endangered species, and species of special concern in the State of Florida.

Objectives:

- 1.1 Monitor colonial bird nesting, including population estimates, nesting pairs, and nesting success.
- 1.2 Expand efforts to establish colonial nesting on Snake Key.
- 1.3 Monitor bald eagle nests.
- 1.4 Monitor osprey nesting, GPS all nests and platforms, and evaluate need to repair, relocate, or add new platforms.
- 1.5 Continue efforts to eliminate Brazilian pepper and survey islands for other exotic species.
- 1.6 Develop list of flora and fauna present on the refuge.
- 1.7 Through research and surveys, determine the importance of Cedar Keys National Wildlife Refuge to migratory birds.
- 1.8 Conduct a Biological Review.

Goal 2

Resource Protection

Protect the natural, cultural, and wilderness resources of the refuge to ensure their integrity and to fulfill the mission of the National Wildlife Refuge System.

Objectives:

- 1.1 Protect colonial bird rookery from human disturbance through posting and regular patrol.
- 1.2 Protect bald eagle nests from human disturbance through posting and regular patrol.

- 1.3 Revise and update the refuge's Law Enforcement Plan.
- 1.4 Identify and seek funding for additional lands that would improve resource protection; conduct a Wilderness Review.
- 1.5 Protect refuge cultural resources through posting, education, and regular patrol.

Goal 3

Public Use

Provide opportunities for environmental education and interpretation, and wildlife-dependent recreation when compatible with the purpose, mission, and vision of the refuge provided these activities would not negatively affect critical or sensitive habitats.

Objectives:

- 1.1 Maintain and expand partnership with the Suwannee River Water Management District, local government, and interested organizations to promote and provide interpretation and recreation on Atsena Otie Key.
- 1.2 Expand partnership with University of Florida to promote environmental education and outreach to thousands of people annually.
- 1.3 Expand partnership with the Levy County School District for educational opportunities on the refuge.
- 1.4 Provide wildlife observation, interpretation, and photography opportunities while protecting important coastal habitat. Establish a Friends Group and increase volunteerism.

Goal 4

Partnership

Promote collaboration and partnerships with private citizens and other agencies to increase research and environmental education opportunities and to protect the coastal ecosystem.

Objectives:

- 1.1 Identify and secure funding for research projects that will aid in the protection and management of trust resources.
- 1.2 Increase awareness of the refuge through cooperation with the University of Florida.
- 1.3 Develop and submit a grant proposal to the National Fish and Wildlife Foundation and matching cooperator.
- 1.4 Actively seek improved cooperation with recognized Native American tribes in Florida to protect Native American sites on the refuge.

Below is a summarized list of issues and concerns. The abbreviations used in the list are also used in Table 6 which describes how each alternative addresses the needs and issues voiced by the public concerning future refuge management.

Summarized List of Issues and Concerns

Wildlife Habitat Management

- WH1** Not enough is known about the wildlife or habitat of the refuge.
- WH2** Staff is needed to monitor and manage habitat for endangered species, migratory birds, and resident life.
- WH3** Staff should initiate research partnerships with U.S. Geological Survey and Suwannee River Water Management District to assist and expand water quantity impact studies on refuge habitat.

WH4 Staff is needed to monitor and manage impacts of human use on wildlife and habitat.

WH5 Management activities should preserve and restore refuge ecosystems.

Public Use

PU1 The public urged the refuge to continue to provide only limited public uses on Cedar Keys National Wildlife Refuge to protect sensitive wildlife habitat.

PU2 Staff is needed to expand environmental education and interpretation programs and increase involvement with public schools.

PU3 Environmental education and outreach should include adult groups as well as youth groups.

PU4 The public thought staff and facilities should be increased, particularly for Cedar Keys National Wildlife Refuge.

PU5 Staff should recruit student interns and more volunteers to assist with projects and research.

Partnerships to Manage and Protect the Refuge

P1 The refuge should maintain and enhance partnerships with state, county, and community agencies; universities and educational institutions; user groups; natural resource based organizations; and other entities.

P2 Additional land acquisition and/or cooperative management agreements are needed to improve the Service's ability to protect existing and potential refuge resources.

Table 6. Issues and Alternatives Matrix for Cedar Keys National Wildlife Refuge

ISSUES	ALTERNATIVE A	ALTERNATIVE B
	No Action	Enhance Protection
<p>Wildlife and Habitat Issues</p> <ul style="list-style-type: none"> ■WH1 ■WH2 ■WH5 	<p>Continue existing monitoring programs for nesting birds</p> <p>Continue efforts to eliminate Brazilian Pepper</p>	<p>Develop more accurate monitoring techniques</p> <p>Develop flora and fauna list Expand exotic species control</p> <p>Collect data with Global Positioning System and develop Geographic Information System database</p> <p>Survey and monitor shore bird, neotropical songbird, reptile, and amphibian use</p>
<p>Public Use and Outreach Issues</p> <ul style="list-style-type: none"> ■WH4 ■PU10 ■PU20 ■PU30 ■PU50 <p>Staffing and Funding</p> <ul style="list-style-type: none"> ■PU40 	<p>Maintain present level of use on Atsena Otie Key</p> <p>Limited on-refuge and off-refuge outreach activities</p> <p>No staffing or funding</p>	<p>Improve public use facilities on Atsena Otie Key</p> <p>Active on-refuge and off-refuge outreach activities</p> <p>Increase staffing and funding</p> <p>\$555,000 (first year operations and staffing) \$255,000 (recurring need, operations and staffing) \$290,000 (special projects monies)</p>
<p>Partnerships Issues</p> <ul style="list-style-type: none"> ■WH3 ■P100 ■P200 	<p>Limited environmental education through the University of Florida</p> <p>Present level of research</p>	<p>Increase partnerships for environmental education with the University of Florida, the Suwannee River Water Management District, and Florida Fish and Wildlife Conservation Commission</p> <p>Develop research proposals and seek grants</p>
<p>Protection Issues</p> <ul style="list-style-type: none"> ■WH5 ■P200 	<p>Present level of patrol and no additional land acquisition</p>	<p>Greatly improve protection through staffing and land acquisition</p>

General

Cedar Keys National Wildlife Refuge is located in Levy County, Florida, approximately 60 miles southwest of Gainesville. The nearest town is the island town of Cedar Key. The refuge is comprised of 13 islands ranging in size from 1 to 120 acres. Four of these islands, Seahorse, Snake, North, and Deadman's Keys are designated Wilderness Areas. These four islands, plus Atsena Otie Key, are located in the Gulf of Mexico south of the town of Cedar Key. The remaining refuge islands are interior islands that surround the island town, and are themselves surrounded by salt marsh and shallow mudflats. The islands are accessible only by boat.

Economic and Social Conditions

The first big influx to the area came in the period of the Second Seminole War, 1835-42, when Atsena Otie (Depot Key) was used by the Army of the United States as a base for supplies and as a general hospital. Seahorse Key was used as a detention camp and a port of embarkation for captured Indians (Cubberley 1931). The end of the Second Seminole War, reached through negotiations with Indian Chieftain Tiger Tail on Atsena Otie Key, was proclaimed in August 1842. The departure of the military soon followed.

The first white settlement in the Cedar Key area began in 1842 when Judge Augustus Steele entered Atsena Otie Key under the Armed Occupation Act. He took the 168-acre Atsena Otie Key for the purpose of establishing a summer colony made up of planters and merchants drawn from the more civilized areas of western Florida. Until the coming of the railroad, the only access to Cedar Key was by boat.

The Cedar Key harbor and timber reserves were the first industries in Cedar Key. On April 7, 1860, The St. Augustine Examiner, St. Augustine, Florida, wrote of Cedar Key, "There are two excellent mills here doing a thriving business, selling as much lumber as they can saw...the Suwannee River is inexhaustible in its resources." But 30 years later that "inexhaustible resource" was nearly depleted, and the timber industry was on the decline by 1890. Seafood and commercial fishing came to prominence and continues to present day. Green sea turtles were one of the first commercial sea products. Oysters became a commercial fishery and there were two oyster canning factories in town until 1910. In the early years, oystering was only extraction and exploitation, but today re-seeding programs maintain oysters as an important part of the commercial shellfish trade. Near-shore commercial net fishing, with mullet as the primary species, was important from the turn of the century until 1995, when certain types of nets were banned by the Florida Legislature. Since then, oysters, crabs, and fin fish make up part of the commercial fish trade, but clams grown on aqua farms have become the most significant portion of this trade.

Today, nature-based tourism (including sportfishing) and commercial fisheries are tied for the number one industry in Cedar Key without any additional economic industry in second place. The refuge contributes to both industries, which rely on a healthy environment.

Geology and Water Quality

The Cedar Key islands are terraced coastal lowlands, due to sedimentation associated with the higher sea levels that existed during the Miocene and early Pleistocene periods. They consist of sand sheets overlying limestone bedrock. About 20,000 years ago the sea level was perhaps 100m lower. Since then, there has been a geologically rapid rise in sea level, as much as 15m in the last 8,000 years. The islands are largely ledges and pinnacles of limestone drowned by the rising sea level. Roger B. Durham analyzed sands from Atsena Otie and Seahorse Keys. In his report, he concluded, "...the sands of the Cedar Keys mounds are eolian sands derived from a poorly sorted, nearby, low energy beach." (1985).

The water quality is generally good in this portion of the Gulf of Mexico. There are no industrial wastes being pumped directly into the system. The greatest threats are nitrates and associated bacteria from human septic tanks in the area and intensive agricultural practices up-stream along the Suwannee River, which empties into the Gulf. Aquacultural and shell fisheries are particularly susceptible to these pollutants. The Florida Fish and Wildlife Conservation Commission's Cedar Keys Research Station monitors water quality on a regular basis along the Gulf coast. There is no source of fresh water on the refuge.

Topography

Seahorse Key, the outermost refuge island, was formed as a huge sand dune many thousands of years ago. This dune is now evident as a prominent central ridge which rises abruptly to an elevation of 52 feet (the highest elevation along Florida's west coast). The central ridges of the other keys are less obvious, extending only 5 to 20 feet above sea level. The lower elevation of the islands, comprising almost 40 percent of the total refuge acreage, is subject to frequent tidal flooding and is dominated by salt marsh with patches of mangrove trees.

Soils and Minerals

The soils present include Zolfa sand, pompano, Orseno and Paola fine sand, Myakka mucky sand, and Wulfert muck. The highest sand ridges of the islands are Paola fine sand, the marsh and mangroves swamps are Wulfert muck, and the remaining soils are in between these soil types. No known mineral, oil, or gas deposits exist on or off the refuge.

Climate

The refuge lies within the subtropical zone, but is north of Florida's frost line. Winter temperatures do occasionally dip below freezing. No weather records are kept on the islands. Weather conditions for the area are similar to those reported for Lower Suwannee National Wildlife Refuge, except temperatures are generally a few degrees cooler in the summer and a few degrees warmer in the winter due to off-shore breezes.

Land Uses

Unlike the surrounding counties, the Cedar Key area has become a haven for upper income retirement homes and tourism. The limited amount of uplands in the area that are not already in residential and commercial buildings is subdivided and quickly being converted. The wetlands are predominated by salt marshes and cannot be developed. The residents that are not retired generally make their income either from commercial fishing, including aquiculture, or from tourism.

Refuge Management

To meet its established wildlife objectives and to preserve its unspoiled characteristics, Cedar Keys National Wildlife Refuge can support only limited public use. The interiors of all the islands, except Atsena Otie Key, are closed to the public for visitor safety and for the protection of flora and fauna. Atsena Otie Key has a walking trail through the interior of the island that will be further developed. The beaches of all the islands, except Seahorse Key, are open to the general public. Seahorse Key, including a 300-foot buffer zone around the island, is closed to all public entry annually from March 1 - June 30. Access to the refuge is only by boat and there are no roads on the islands. All the islands are surrounded by shallow sand and mud flats which make them relatively inaccessible. At low tides, few sites along the shores can be reached by conventional boat.

The University of Florida, through an agreement with the Service, will continue to manage the lighthouse and surrounding area as a marine science laboratory. The priority public uses, besides structured environmental education, are birdwatching, fishing, photography, and enjoying the breathtaking vistas. Hunting, camping, campfires, possessing weapons, collecting artifacts, and using metal detectors are prohibited.

Vegetation

A Coastal Uplands Assessment Project report (Florida Department of Natural Resources 1991), describes the vegetative characteristics of the refuge as maritime hammock, xeric hammock, and beach dune. Maritime hammocks support a canopy of live oak, cabbage palm, red cedar, hackberry, redbay, pignut hickory, and laurel cherry trees. The understory is dominated by dense stands of laurel cherry, yaupon, beauty berry, catbrier, grape, coontie, and saw palmetto. The xeric hammock consists of sand live oak canopy and tall shrubs of lyonia with occasional slash pines. The understory is dense stands of saw palmetto, myrtle, prickly pear, and hog plum. Beach dunes are dominated by beach cordgrass, beach dropseed, and sandspur. Other species include beach morning glory, northern beach sunflower, and beach bean.

The intertidal wetlands are saltmarsh, dominated with smooth cordgrass. Black mangroves dominated much of these areas prior to a freeze killing them in 1985. In recent years, the mangroves have started to re-establish and have formed thick stands in the protected coves. Thick stands of Brazilian pepper trees, an invasive exotic, are present mostly in the transition zone between the uplands and the salt marsh/mangroves. An eradication effort is in place.

Wildlife Resources

Threatened and Endangered Species

The waters around Cedar Key with their oyster bars, mudflats and seagrass beds provide important habitat for both the sea turtle and manatee. The Florida manatee uses the coastal waters from spring through fall. Green, loggerhead, and Kemp's ridley sea turtles are commonly found in the offshore coastal waters. No known nesting occurs in the immediate area of the refuge. Bald eagles, which have been downgraded from endangered to threatened, are common on the refuge during the winter months. There are two active nests on the refuge with other eagle nests on lands adjacent to the refuge. Gulf sturgeon are found in the Gulf of Mexico in the fall and winter months. Wood storks are observed periodically throughout the year but no nesting occurs on the refuge.

The Cedar Keys National Wildlife Refuge has the potential to support other rare flora and fauna. The table in Appendix H contains both federally and state listed species known to occur, or that have the potential to occur, on the refuge. Surveys for both occurrences and habitat for listed and rare species on the refuge are incomplete. Surveys and further evaluation of habitat may reveal other species that occur or that have the potential to occur on the refuge.

Birds

Historically, Cedar Keys Refuge was a tremendous nesting area for colonial birds with a peak population of 200,000 birds nesting during the 1960s and 1970s. In recent years, peak populations have been in the 8,000- to 10,000-range, but it is still one of the largest rookeries in north Florida. The nesting species include white ibis, brown pelican, double-crested cormorant, snowy egret, great egret, cattle egret, tri-colored heron, little blue heron, great blue heron, and black-crowned night heron. Osprey are common nesters as well. Magnificent frigatebirds are seasonal visitors. Their annual population usually peaks at several hundred in July. These frigatebirds are usually non-nesters or post-nesters from south Florida that take advantage of the refuge's excellent feeding opportunities.

Many species of shore birds use the beaches, mud flats, oyster bars, and exposed sand bars. Neotropical songbirds use the islands for short, but important stopovers during spring and fall migrations. A bird list for Lower Suwannee and Cedar Keys National Wildlife Refuges includes a total of 254 species with an additional 25 species considered to be accidental occurrences to the refuges. Raccoons are abundant on most islands, but

other mammals, except a few rats, mice, and squirrels, are relatively scarce. Reptiles are present, but there is little information on which species are present and in what number. The exception to this is an unusually dense population of cottonmouth snakes on Seahorse Key.

Fishery Resources

There are no freshwater ponds on the refuge. Only a small number of visitors fish from the island beaches or the pier on Atsena Otie Key. Most fishing is by boaters in the coves and shallow waters around the islands. Although not part of Service ownership, the seagrass beds and oyster bars adjacent to refuge lands are productive commercial, sport fishing, and shell fishing areas due partly to the habitat protection the refuge provides. The most important fishes in anglers' creels are red fish, sea trout, and mullet.

Cultural Resources

There are 19 sites within the refuge on 5 islands that are listed in the National Register of Historic Places. These include aboriginal midden sites, old cedar and sawmill sites, old town structures and a cemetery, a Civil War cemetery and powder magazine, and the lighthouse on Seahorse Key. Additional archaeological sites are located on several of the other refuge islands that have not been nominated for the National Register, but that are protected under the Archaeological Resources Protection Act.

Section 106 of the National Historic Preservation Act of 1966, as amended, and Section 14 of the Archaeological Resources Protection Act, require the Service to evaluate the effects of any of its actions on cultural resources that are listed or eligible for listing in the National Register of Historic Places. If the Service plans or permits any actions that might affect eligible cultural resources, it will carry out appropriate site identifications, evaluations, and protection measures as specified in the regulations and Service directives and manuals.

Environmental Consequences

The following discussion assesses the impacts to the physical, biological, cultural, and socioeconomic environment by the implementation of the two alternatives addressed in the draft comprehensive conservation plan for the refuge. The issues identified in the Affected Environment section of this Environmental Assessment, as well as some of the issues identified in the scoping process for the plan, are considered.

Physical Environment (Soils, Air, Climate, and Water)

Alternative A (No Action) The No Action alternative would not have negative environmental consequences on the soils, air, and water resources, or on the climate. However, under this alternative, no research activities would be conducted to identify external pollution potentials.

Alternative B (Proposed Action) The alternative to Enhance Protection with Public Awareness and Education would not have negative environmental consequences on the physical environment. It would provide better coordination with other environmental agencies such as the Florida Fish and Wildlife Conservation Commission, the Suwannee River Water Management District, and the University of Florida's Marine Research Laboratory for the research, monitoring and protection of soils, air, and water resources.

Biological Environment (Wildlife and Habitat)

There are only a few mammals that live on or use refuge lands. The kinds and numbers of reptiles and amphibians that use the refuge are unknown. The primary wildlife group utilizing the refuge is birds, with the bald eagle being the only federally listed species that nests on the island. However, there are several species of special concern that nest on the refuge. In addition to colonial herons, ibis, and egrets that nest on the refuge, the

islands are important resting and feeding places for migrating songbirds and a large variety of shore birds.

Alternative A (No Action) Would not adversely affect the biological environment of wildlife and habitat on Cedar Keys National Wildlife Refuge. This alternative would continue to provide important habitat for colonial nesting birds, endangered species, shore birds, and neotropical songbirds. However, the current biological monitoring program only provides minimal information on the highest priority species. Staff and funds are insufficient to conduct adequate surveys, vegetation maps, and research programs that address critical management issues. The No Action Alternative would continue the “status quo” and not adequately monitor or evaluate habitat and wildlife present to identify population trends or suggest remedial actions to improve habitat or wildlife populations.

This alternative would not provide staff or funding to monitor the expanding public use and its effects on wildlife and habitat. It would not provide the staff or funding to develop outreach and environmental education programs or improve public use facilities on the refuge. Law enforcement patrol to protect colonial bird nesting would continue but would not be expanded to better protect refuge resources.

Alternative B (Proposed Action) Enhance Protection with Public Awareness, would not adversely affect the biological environment. Important habitat for colonial nesting birds, threatened and endangered species, shore birds, and neotropical songbirds would still be provided and protected. The wildlife goal under this alternative would expand scientifically based monitoring and research. Strategies developed to assist the refuge in meeting its wildlife goal under this alternative include the following: breeding bird surveys and shore bird surveys would be added to the present colonial bird, osprey and eagle surveys to help determine trends and important habitat; nesting success would be better documented; a list of flora and fauna for the islands would be developed and evaluated to determine if any significant, rare, or endangered species are present; exotic species control or elimination programs would be conducted; and research and partnerships with the University of Florida Marine laboratory would be expanded.

Public use of our natural resources in and around Cedar Key is anticipated to increase. This alternative identifies the need for improved outreach and environmental education and the need to limit public use on the refuge. The biggest concern is that public visitation on these small islands would interfere with wildlife use or negatively impact their habitat. Through proper staffing, funding, and planning, this alternative would monitor those public uses and their impacts on the natural environment.

This alternative would provide for expanded law enforcement staff to better protect nesting colonial birds, natural and cultural resources, and the visiting public.

Cultural and Historical Environment

Under both alternatives, historic and archaeological sites would be protected under federal ownership and jurisdiction as defined in the National Historic Preservation Act, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act and implementing regulations authored by the Advisory Council on Historic Preservation, the Department of the Interior, and the National Park Service. However, the degree of protection as well as the opportunities to conduct scientific research and to interpret past cultures vary between each alternative.

Archaeological and related scientific investigations on the refuge have been limited to Walker’s 1880 excavations at Cedar Keys; C.B. Moore’s 1903 investigations of several mounds and shell middens on Keys within and

in the vicinity of the refuge; Groggin's 1951 and 1956 survey of selected islands in the Cedar Keys area; and Borreman's investigations of three shell middens on Seahorse Key. These investigations were preliminary in nature, except Borreman's, and have been summarized by Willey (1949), and Dorian and Stoutmire (1980). Historic works have focused on the Euroamerican settlement and economic development of the Cedar Keys area. The most informative works are those of Burtchaell (1949), Fishbourne (1997), and Shiver (1988).

Alternative A (No Action) Cultural resource management would be limited to those investigations required for compliance with Section 106 of the National Historic Preservation Act and Archaeological Resources Protection Act relating to looting and illicit collecting. Data relating to the refuge's geomorphology, changing vegetation patterns, and past cultural land use patterns would be garnered only through reviews of existing technical literature and not through focused scientific investigations. Other efforts such as erosion control and interpretive and educational opportunities would be virtually non-existent due to the lack of personnel, facilities, and funds. Rather than pro-active partnerships with universities and Native American groups, Alternative A lays the groundwork for abrasive and non-constructive relationships.

Alternative B (Proposed Action) Alternative B seeks to enhance habitat management and public use. Several specific objectives and strategies are proposed to aid the Service in responsible management of the refuge's historic properties. Included are the performance of a refuge-wide comprehensive archaeological survey and site assessment; the development of a comprehensive archaeological plan; the development of an annotated bibliography; and the development of a site predictive or sensitivity model. To accomplish the goals of this alternative, scientific investigations, such as plant and animal inventories, GIS mapping, archaeological investigations, and geomorphic studies are necessary tools. The databases generated from these investigations would enhance the refuge's ability to monitor and protect cultural resources under Service ownership and jurisdiction. The emphasis on environmental education can provide increased public awareness of the region's past cultural histories, the fragility of archaeological sites, and the nature of human-habitat interactions. Ties with the Creek, Seminole and Miccosukee Tribes are encouraged, particularly for input into the management of sites important to these groups as well as providing opportunities to educate others about their history and use of resources present within the refuge. Partnerships with universities and other pertinent entities to conduct scientific archaeological research would be actively pursued and fostered under this alternative.

Socioeconomic Environment

Alternative A (No Action) The two, equally important, economic industries of Cedar Key are fisheries and nature-based tourism. Under the No Action alternative, the refuge would not monitor or research water quality needs for fisheries. Outreach would continue at its current level. There would be no attempt to establish a visitor center or improve interpretive and environmental educational facilities. Education and interpretive programs would be provided on an occasional basis, but there would be no formal outreach or education programs. Public use would expand on its own through the sheer number of visitors to Cedar Key, but there would be little monitoring of the programs for needed improvements or environmental affects. This alternative could adversely affect the physical environment and indirectly have a negative impact on the socioeconomic aspects of the community.

Alternative B (Proposed Action) Under the Proposed Action Alternative, public use, outreach, and environmental education programs would be expanded. A visitor center, environmental education facilities, and improved interpretive facilities are planned under the proposed

alternative. These would better inform and educate the visitors and provide additional nature-based tourism.

Under this alternative, additional lands would be considered for acquisition. It is Service policy to acquire lands only from willing sellers and to pay fair market value with little latitude to go above that value. Landowners would have the final decision on whether to accept or reject a Service offer. Lands acquired through fee title would be removed from the county tax base and have a negative impact in that aspect. However, much of the lands acquired are wetlands or within county identified conservation areas that limit development. Additionally, the Refuge Revenue Sharing Act of June 15, 1935, as amended, provides for annual payments to counties or the lowest unit of government that collects and distributes taxes based on acreage and value of National Wildlife Refuge System lands located within the county. Levy County has collected, on the average over the past ten years, \$29,468 per year from the Service in lieu of taxes for land within Cedar Keys and Lower Suwannee National Wildlife Refuges.

The monies for these payments come from two sources: (1) net receipts from sale of products from National Wildlife Refuge System lands (e.g., oil and gas leases, timber, grazing fees); and (2) annual Congressional appropriations. Annual Congressional appropriations, as authorized by a 1978 amendment, were intended to make up the difference between net receipts from the Refuge Revenue Sharing Fund and the total amount due to local units of government. Payments to the counties are calculated based on the following formulas as set out in the Act which provide the largest return: (1) \$0.75 per acre; (2) 25 percent of the net receipts collected from refuge lands in the county; or (3) 3/4 of 1 percent of appraised value. Using this method, lands are re-appraised every 5 years to reflect current market values.

Effects Common to Alternatives

Health and Safety Effects

The alternatives would not have a significant effect on health and safety of the environment. Under all alternatives, water resources, quality, and quantity are protected. The only potential safety problems are accidents that deal with human error affecting other humans. Operation of equipment and boats by staff, for management purposes, can lead to accidents affecting the health of both staff and the visiting public. Proper training and awareness of climatic and physical surroundings during operations would help to minimize accidents. Refuge brochures and signs would inform visitors of potential hazards associated with being in the outdoors.

Regulatory Effects

As indicated in the Introduction of the Draft Comprehensive Conservation Plan and Appendix C, Legal Mandates, the Service must comply with a number of federal laws, Presidential Executive Orders, and administrative policies and guidelines in the development and implementation of management actions. The alternatives would not lead to a violation of these laws and orders.

Effects on the Surrounding Lands

The refuge is comprised of 13 islands in the Gulf of Mexico. The nearby coastal land is either in State ownership or is already zoned for development. The refuge islands contribute to nature based tourism while preserving natural environments. Wading birds from the colonial bird rookery on Seahorse Key utilize the surrounding coastal habitats for feeding and loafing. The alternatives would not adversely affect surrounding lands.

Uncertainty of and Future Action Effects

Cedar Key is a mecca for nature-based tourism and sport fishing, and it is becoming known as a retirement village. The city leaders, county commissioners, and state officials are aware of the importance of preserving the remaining undeveloped coastal lands for water protection and quality of life. As the town of Cedar Key continues to grow, both in the number of residents and tourists, the protection of refuge lands for shore birds, wading birds, and migrating songbirds would become even more important. The alternatives should not have a negative effect on the human environment. Hopefully the refuge would provide a beneficial service, however, it is not known how human decisions unrelated to the refuge would affect future actions.

Cumulative Impacts

Both alternatives were evaluated as to their cumulative impacts. Cumulative impacts include impacts on the environment which result from incremental effects of the proposed action when added to other past, present, and foreseeable future actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Implementing Alternative B would reduce any potential for cumulative impacts because of improved biological research and monitoring of all refuge programs and issues with consideration of resource conflicts within the broad management framework of the draft comprehensive conservation plan. The greatest internal threat to the resources of Cedar Keys National Wildlife Refuge is long-range use by the public. If public use programs, due to sheer numbers, become detrimental to the purpose for which the refuge was established, those activities would be restructured, restricted, or eliminated.

If Alternative A, the No Action alternative, is implemented, cumulative impacts may not be identified due to the issue-by-issue, problem-by-problem, fragmented approach currently in place.

Mitigation and Residual Impacts of the Proposed Action

No mitigation would be necessary in the adoption and implementation of the proposed action. Where site development activities are proposed, each activity would be given appropriate National Environmental Policy Act consideration prior to development. At that time, any identified mitigation activities would be designed into the specific project to reduce any significant adverse impacts to the environment.

The refuge would closely regulate any proposed activities to reduce potential impacts. Public use activities would be monitored and visitation numbers recorded with consideration given to zoning activities by space or time to reduce potential impacts. If wildlife or habitat were to become negatively impacted, the use would be modified and/or adjusted accordingly to mitigate such impacts.