U.S. Fish & Wildlife Service

Lower Suwannee & Cedar Keys National Wildlife Refuges

Draft Comprehensive Conservation Plans

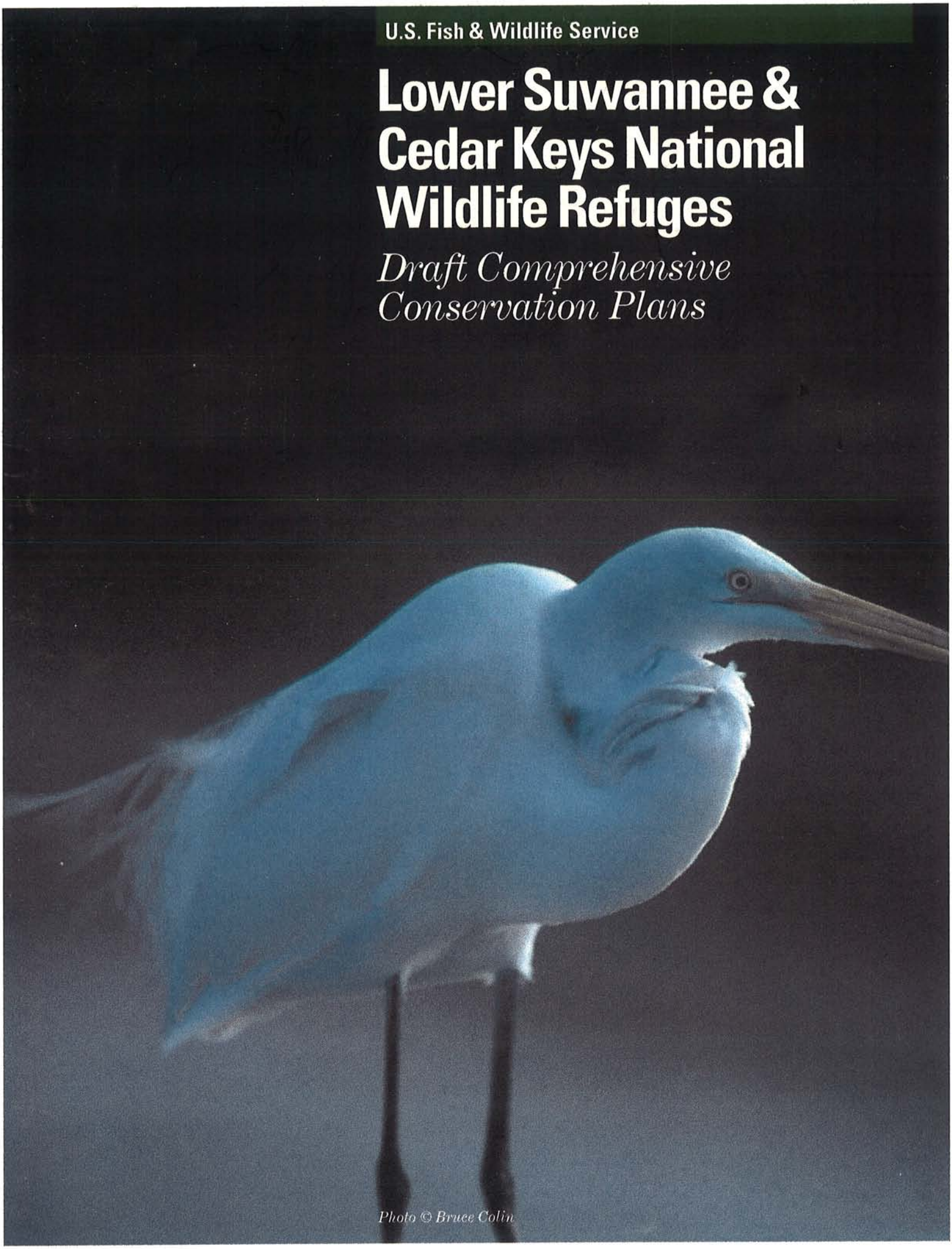

Photo © Bruce Colin

LOWER SUWANNEE NATIONAL WILDLIFE REFUGE

DRAFT Comprehensive Conservation Plan

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LOWER SUWANNEE NATIONAL WILDLIFE REFUGE

DRAFT Comprehensive Conservation Plan

INTRODUCTION

Purpose of and Need for the Plan

Under the provisions of the National Wildlife Refuge System Improvement Act of 1997, the U. S. Fish and Wildlife Service is required to develop comprehensive conservation plans for all lands and waters of the National Wildlife Refuge System. These plans will guide management decisions and set forth strategies for achieving the purposes of each refuge unit. The National Environmental Policy Act ensures that the Service will assess the environmental impacts of any actions taken as a result of implementing these plans.

Skimmers
USFWS Photo by Ken Litzenberger

The following Draft Comprehensive Conservation Plans and appended Environmental Assessments have been prepared for the Lower Suwannee and Cedar Keys National Wildlife Refuges, located in Levy and Dixie Counties, Florida. Their purposes are to identify the roles the refuges will play to support the mission of the National Wildlife Refuge System and the North Florida Ecosystem. The draft plans outline issues, concerns, and opportunities expressed to the Service during a series of public scoping meetings, workshops, and on comment sheets. They also provide a description of desired future conditions and propose long-range guidance to accomplish the purposes, missions, and visions of the refuges. This guidance is presented for each refuge in a listing of goals, objectives, and strategies resulting from an analysis of possible management alternatives. Environmental Assessments of management alternatives may be found in Appendix A for Lower Suwannee National Wildlife Refuge and Appendix B for Cedar Keys National Wildlife Refuge.

The final plans will serve as operational guides for management of these refuges over the next 10 to 15 years.

Iris
USFWS Photo by Robert LeMarie

The plans will:

- provide a clear statement of the desired future conditions when refuge purposes and goals are accomplished;
- provide refuge neighbors and visitors with a clear understanding of the reasons for management actions on the refuge;
- ensure management of the refuge reflects policies and goals of the National Wildlife Refuge System;
- ensure refuge management is consistent with federal, state, and county plans;
- provide long-term continuity in refuge management; and
- provide a basis for operation, maintenance, and capital improvement budget requests.

Overview of the Department of the Interior

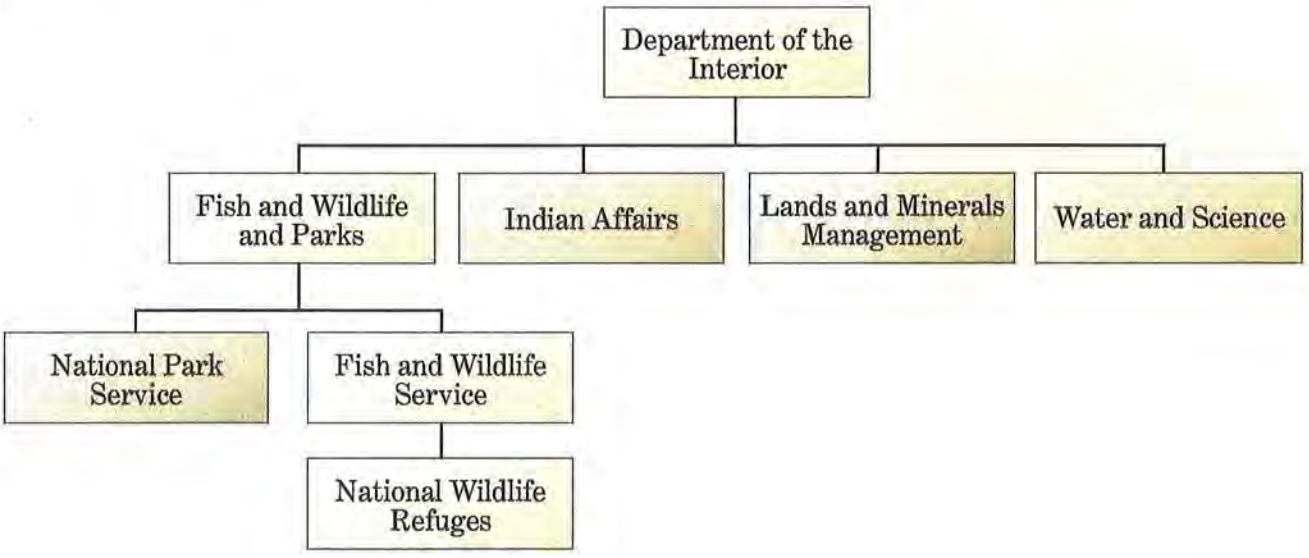
The Department of the Interior is the principal landowner of most of our nationally owned public lands and cultural resources. Management responsibilities include fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, managing the National Wildlife Refuge System, and providing for the enjoyment of life through outdoor recreation.

Mission of the Fish and Wildlife Service

The Fish and Wildlife Service is the principal organization through which the Department of the Interior carries out its responsibilities of working with others to conserve, protect, and enhance the nation's fish and wildlife and their habitats for the continuing benefit of people.

The Service manages the National Wildlife Refuge System (Fig. 1), the world's largest collection of lands set aside specifically for the protection of fish and wildlife populations and habitats. More than 520 national wildlife refuges covering more than 93 million acres provide important habitat for native plants and many species of insects, amphibians, reptiles, fish, birds, and mammals. These refuges also play a vital role in preserving threatened and endangered species, as well as offering a wide variety of recreational opportunities. Many refuges have visitor centers, wildlife

Figure 1. Organizational Chart of the Fish and Wildlife Service within the U.S. Department of the Interior



Swallow-tailed Kite
USFWS Ken Myers

trails, and environmental education programs. Nationwide, more than 30 million visitors annually hunt, fish, observe and photograph wildlife, or participate in interpretive activities on national wildlife refuges. The Service also manages all national fish hatcheries.

Mission of the National Wildlife Refuge System

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of the Refuges

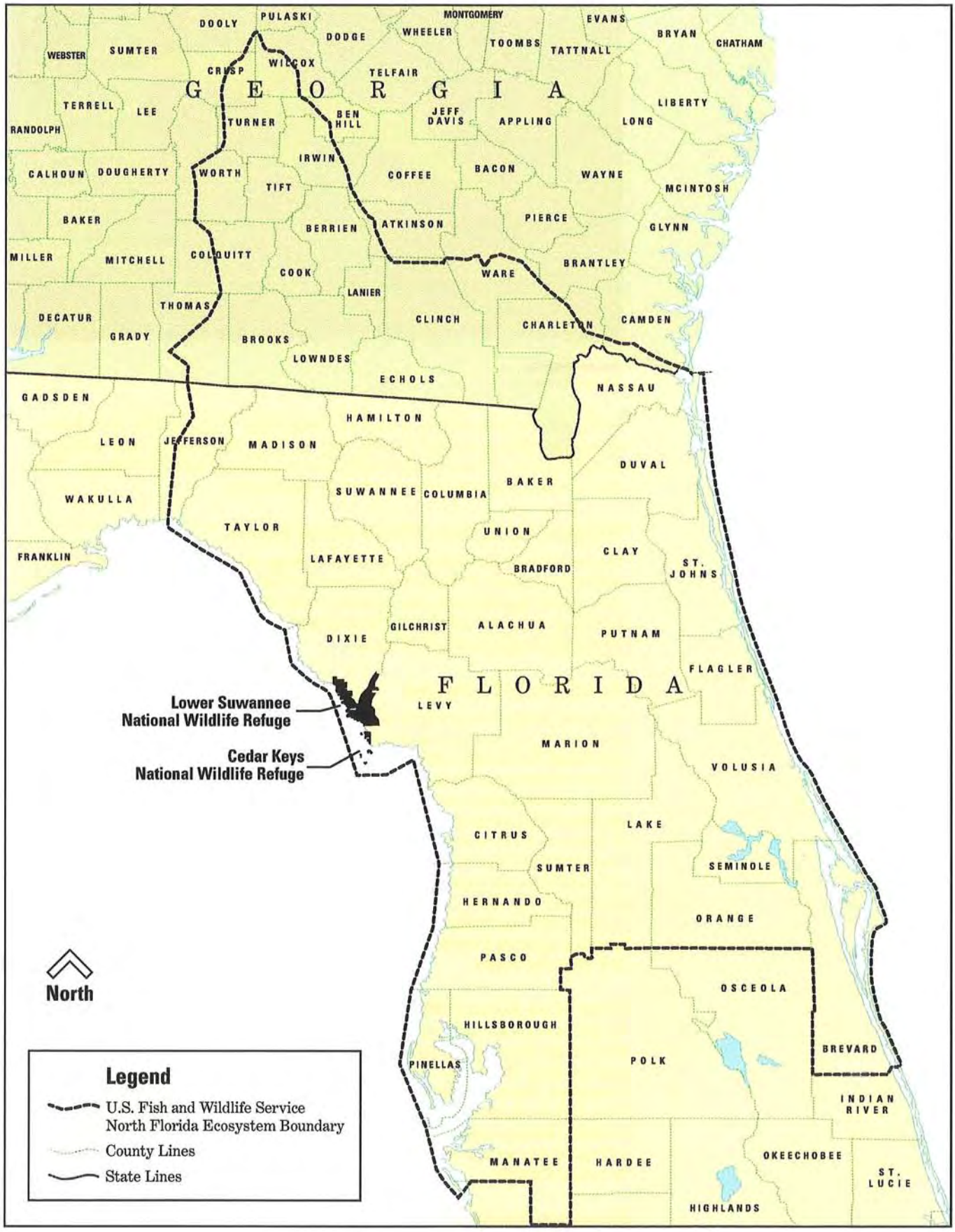
Located along the southern edge of the Big Bend Region of Florida's west coast, Lower Suwannee and Cedar Keys National Wildlife Refuges represent two jewels of the National Wildlife Refuge System (Fig. 2). Lower Suwannee National Wildlife Refuge was established on April 10, 1979, for the purpose of protecting, maintaining, and enhancing a rare and beautiful ecosystem. The refuge, which is predominantly wetlands, is bisected by 20 miles of Stephen Foster's famous Suwannee River and includes 20 miles of coastal marsh habitat along the Gulf Coast. The salt marshes and tidal flats at the river's mouth are a paradise for shorebirds and fish. The refuge also encompasses an unusual diversity of floodplain hardwoods; cypress-lined sloughs; cabbage palm and cedar islands; cypress domes; hydric, mesic, and xeric hardwood hammocks; and low pine flatwoods.

Cedar Keys National Wildlife Refuge was established on July 16, 1929, to protect a breeding ground for colonial nesting migratory birds. Today, the refuge is comprised of 13 islands ranging in size from 1 to 120 acres and totaling 762 acres. Four of the islands, Snake, Seahorse, North and Deadman Keys, are designated Wilderness Areas. Additionally, Atsena Otie Key is state-owned and managed as part of Cedar Keys National Wildlife Refuge through a Memorandum of Understanding. Cedar Keys refuge ranks as one of the largest nesting areas for colonial wading birds in north Florida.

Ecosystem Management and Priorities

For the Service, the North Florida Ecosystem includes portions of south

Figure 2. North Florida Ecosystem Map, Fish and Wildlife Service



Georgia and most of north and central Florida (Fig 2). The area includes southern temperate and subtropical climates, numerous physiographic districts, and many unique and widely varied habitat types. The northern boundary of this ecosystem includes the watersheds of the St. Mary's and Suwannee Rivers, including the Okefenokee Swamp. The northeast boundary begins at Camden County, Georgia, and proceeds down the east coast of Florida to the line separating Brevard and Indian River Counties. The ecosystem boundary then turns west and includes Orange, Lake, and Sumter Counties as its southern border. The western boundary includes all Florida counties from Sarasota north through Taylor and Jefferson Counties. In Georgia, the ecosystem is inclusive of all counties east and south of Thomas, Colquitt, Worth, Turner, Ben Hill, Coffee, Ware, Charlton, and Camden Counties.

Habitats found within this ecosystem include barrier islands; xeric scrub; pine flatwoods; freshwater marshes, lakes, streams and springs; mixed hardwood/pine forests; cypress swamps and domes; dry prairies; maritime forests; hardwood hammocks; estuarine marshes; pine rocklands; sandhill woodlands; coastal strands; sawgrass prairies; sloughs; and tree islands. The North Florida Ecosystem team currently has three priorities which include restoring scrub habitat, conserving coastal habitat, and protecting the water quality of the Suwannee River Basin.

Legal Policy, Administrative Guidelines, and Other Considerations

Administration of national wildlife refuges is governed by various international treaties, federal laws, Presidential Executive Orders and regulations affecting land and water, as well as by the conservation and management of fish and wildlife resources. Policies for management options for the refuge are further refined by administrative guidelines established by the Secretary of the Interior and policy guidelines established by the Director of the Fish and Wildlife Service.

Select legal summaries of treaties and laws relevant to administration of the National Wildlife Refuge System and management of these refuges are provided in Appendix C.

Planning Issues and Opportunities

Overview of the Public Involvement Process

The Comprehensive Conservation Plans and Appended Environmental Assessments for Lower Suwannee and Cedar Keys National Wildlife Refuges are being prepared in compliance with the provisions of the

CCP Planning Team
USFWS A. Askins

National Wildlife Refuge System Improvement Act of 1997. Plan preparation is in compliance with the National Environmental Policy Act of 1969, which requires the Service to actively seek public involvement in the preparation of environmental assessments and environmental impact statements. It also requires the Service to seriously consider all reasonable alternatives, including a No Action Alternative and a Proposed Alternative. These alternatives are described in detail in the Environmental Assessments (Appendices A and B).

Identification of important issues provides a sound basis for initiating the development of management alternatives, objectives, and strategies. To ensure that the future management of these refuges reflects the issues, concerns, and opportunities expressed by the public, a variety of scoping mechanisms was used. A complete description of the public participation process is included in Appendix D.

Public Participation Highlights

- A comment packet was used to gather general information on current and potential refuge operations.
- Letters were mailed to affected and interested members of the public to inform them of the planning process and to invite their participation.
- Refuge personnel presented informative programs to community organizations and stakeholder groups.
- A series of stakeholder workshops and public scoping meetings were held to develop components of the draft plan.

Scope of Issues, Concerns, and Opportunities

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 approximately 100 people who participated in the scoping process. This list was based on the team's knowledge of the area, information gathered during the scoping meetings, and written comments submitted by the public.

LOWER SUWANNEE NATIONAL WILDLIFE REFUGE

DRAFT Comprehensive Conservation Plan

Lower Suwannee
National Wildlife Refuge

Background Information

Location

Located along the southern edge of the Big Bend Region of Florida's west coast, the Lower Suwannee National Wildlife Refuge is found in the westernmost part of Levy County and the southern tip of Dixie County (Fig. 3). The refuge is approximately 50 miles southwest of Gainesville, Florida.

Aerial View of Suwannee
USFWS Ken Litzenberger

History

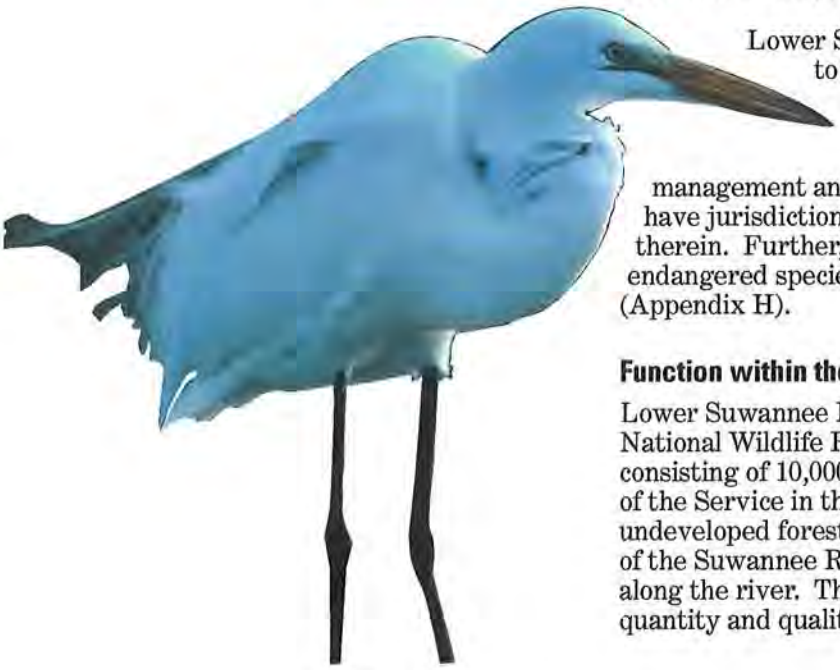
Lower Suwannee National Wildlife Refuge was established on April 10, 1979, under the authority of the Fish and Wildlife Act to protect the lower Suwannee River ecosystem. The initial acquisition in 1979 was 5,300 acres of land at Shired Island. Additional parcels of land were acquired over a 15-year period, until the refuge reached its present size of 52,935 acres. The refuge, which is predominantly wetlands, is bisected by 20 miles of Stephen Foster's famous Suwannee River and includes more than 20 miles of coastal marsh along the Gulf Coast. The refuge also encompasses an unusual diversity of floodplain hardwoods; cypress-lined sloughs; cabbage palm and cedar islands; cypress domes; hydric, mesic, and xeric hardwood hammocks; and low pine flatwoods. Each of these diverse vegetative communities contributes to making Lower Suwannee National Wildlife Refuge one of the largest undeveloped river delta-estuarine systems in the United States.

Purpose

The purpose of Lower Suwannee National Wildlife Refuge is:

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. § 742f(a)(4), and

"...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude...." 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956, 16 U.S.C. § 742f(a)-754, as amended.



Lower Suwannee National Wildlife Refuge was established to protect, maintain, enhance, and where appropriate, restore habitats along the lower reaches of the Suwannee River. The refuge also protects water quality and quantity through sound land resource management and cooperative relationships with state agencies that have jurisdictional authority over the water and aquatic resources therein. Further, the refuge provides habitat for several threatened and endangered species and species of special concern in the State of Florida (Appendix H).

Function within the Ecosystem

Lower Suwannee National Wildlife Refuge, along with Okefenokee National Wildlife Refuge, anchors the Suwannee River Basin - an area consisting of 10,000 square miles across two states. The primary focus of the Service in this ecosystem is to maintain the quality of large, undeveloped forested and wetland habitats in the upper and lower portions of the Suwannee River by linking those areas with a corridor of habitat along the river. The Service is also concerned with maintaining the quantity and quality of river flows and the rich biological heritage of the

native plant species within the river basin. The refuge plays an integral role in meeting these ecosystem goals by protecting nearly 53,000 acres of riverine habitat and more than 20 miles of river corridor along the lower reaches of the Suwannee River.

Agreements

- Memorandum of Understanding with the Suwannee River Water Management District for management of its 420-acre St. Petersburg tract, as part of the Lower Suwannee National Wildlife Refuge.
- Memorandum of Understanding that gives management authority of the 146-acre, Service-owned Canavan tract in Baker County to the District. This property was a Farmers Home Administration property that the Service acquired and is adjacent to other property owned by the Suwannee River Water Management District.
- Lease agreement with the State of Florida, Division of Lands, for the Service to manage 624 acres in T 12 S, R 11 E, Section 16, as part of the Lower Suwannee National Wildlife Refuge.
- Lease agreement with The Nature Conservancy for the Service to manage the 786-acre, Conservancy-owned, Cummer tract, as part of the Lower Suwannee National Wildlife Refuge.
- Lease agreement with the Dixie County Board of Commissioners for the Commissioners to maintain the Shired Island boat ramp.
- Memorandum of Understanding between the Service and Levy County Sheriff's Department allowing either agency to provide emergency assistance to the other upon request.
- Memorandum of Understanding between the Service and Dixie County Sheriff's Department allowing either agency to provide emergency assistance to the other upon request.
- Memorandum of Understanding between the Service and the State of Florida, Department of Agricultural and Consumer Services, Division of Forestry, to provide wildfire suppression.

Proposed Management Direction

Mission

The mission of the Lower Suwannee National Wildlife Refuge is to protect, maintain, and enhance a significant natural ecosystem which encompasses flood plain hardwoods, coastal and freshwater marshes, and upland forests; provide optimum habitat conditions and protection for native wildlife with special emphasis on threatened and endangered species and migratory birds; provide wildlife-oriented recreational/educational opportunities to the public; and preserve significant archaeological sites.

USFWS

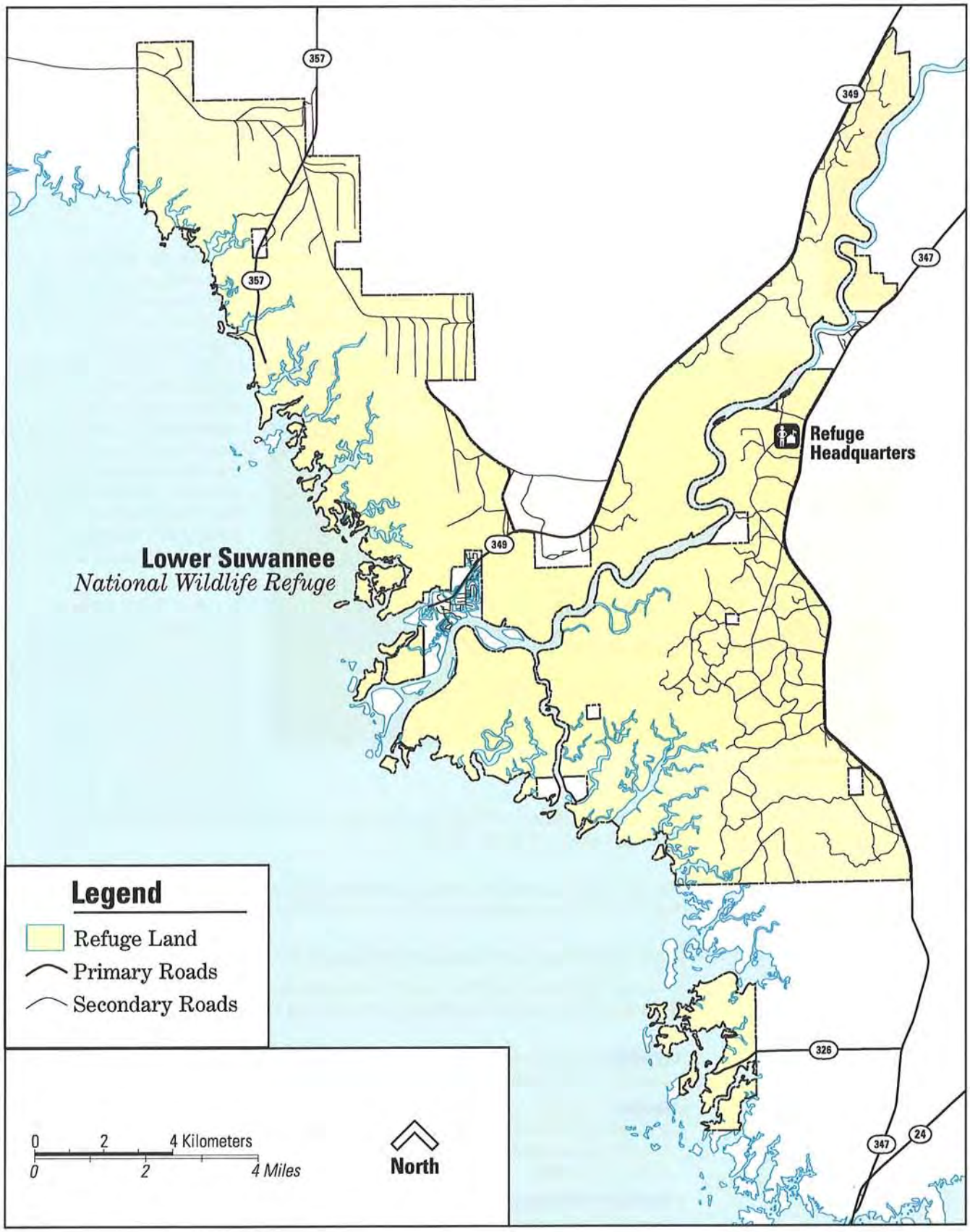
Vision Statement

The watershed and estuary of the Lower Suwannee National Wildlife Refuge contain valuable water resources and fish and wildlife habitat. The refuge will be managed for the conservation of fish and wildlife and their habitat, with special emphasis on the protection and restoration of wetland and upland communities. Education, research, and wildlife-dependent recreational opportunities will be available, insofar as they are compatible with refuge health and preservation. Management will partner with local, state and federal agencies; community organizations; and individuals to ensure the protection and conservation of the vast Suwannee River ecosystem for current and future generations.

Management Alternatives

Once the key issues and concerns were identified, the planning team determined a reasonable range of alternatives for managing the refuge.

Figure 3. Vicinity Map, Lower Suwannee National Wildlife Refuge



Appendix A contains a full review of the alternatives considered and their impacts on the socioeconomic, environmental, and cultural resources, along with alternatives discussed but not fully developed.

Alternative A: Maintain Current Management (No-Action)

Alternative B: Enhance Habitat Management and Public Use (Proposed Action)

Alternative C: Maximize Public Use

Proposed Management Action

The proposed action was selected based on conformity with the refuge's mission, vision, ecosystem function, and current uses, as well as on the needs expressed by the public during the scoping process. The proposed action will result in a better understanding of the refuge resources used by threatened and endangered species, migratory birds, and resident wildlife; the protection and enhancement of these resources; the protection of water quality and quantity; the restoration of refuge habitats; and accessibility of the refuge to the public for compatible wildlife-dependent public uses.

Birders on Canoe Trail
USFWS Ken Litzenberger

An overriding concern reflected in the proposed plan is that wildlife comes first in refuge management. Public uses are allowed and encouraged if they are compatible with wildlife conservation. Wildlife-dependent recreational uses such as hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation will be emphasized.

The end result is a set of goals, objectives, and strategies related to key issues that will guide management of the refuge for the next 10 to 15 years.

Goals, Objectives, and Strategies to Support the Proposed Management Action

Five management goals for Lower Suwannee National Wildlife Refuge were developed from several workshops held during the scoping process.

- **Wildlife** Expand scientifically based monitoring and research to support management decisions regarding wildlife habitat and populations.
- **Habitat** Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitat, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.
- **Resource Protection** Protect the natural and cultural resources of the refuge to ensure their integrity and to fulfill the mission of the National Wildlife Refuge System.
- **Public Use** Provide opportunities for environmental education and interpretation and wildlife-dependent recreation in accordance with the National Wildlife Refuge System Act of 1997.
- **Landscape Management** Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural

resources within the Big Bend Region of Florida, the Suwannee River Basin, and the North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

The goals, objectives, and strategies are the Service's response to the issues and concerns expressed by the planning team and the general public at the workshops, public meetings, and in the comment packet, and will be used to implement the proposed management action. These goals, objectives, and strategies reflect the refuges's commitment to achieving the missions of the Service and of the National Wildlife Refuge System; ecosystem priorities; refuge purposes, mission and vision; and the expressed needs of the public--provided that necessary funding requirements are met.

Wildlife

Goal

1. Expand scientifically based monitoring and research to support management decisions regarding wildlife habitat and populations.

Objective

1.1 Conduct surveys of vertebrates, invertebrates, and plant species and habitat associations; develop monitoring programs for priority species; and establish targets for population levels. Expand current monitoring programs.

Strategies

1.1.1 Continue current monitoring program for bald eagles during the nesting season using aerial surveys to determine nest status and production. Provide data to the Florida Fish and Wildlife Conservation Commission and the Service to aid in monitoring the delisting of this species.

1.1.2 Continue current monitoring program during the osprey nesting season to determine fledgling success and to evaluate overall population trends.

1.1.3 Expand the current, sporadic monitoring program for manatees into a regular, consistent monitoring program using aerial surveys of the coastal and riverine habitats of the refuge. Provide data to the Service Manatee Recovery Coordinator to aid in statewide monitoring and recovery efforts.

1.1.4 Continue to support the U.S. Geological Survey and the Service's efforts to monitor threatened Gulf sturgeon that use the Suwannee River and coastal estuary. Provide assistance for storage, transporting, and setting up equipment. Assist in field research as needed.

1.1.5 Continue monitoring the population status and health of resident wildlife species (e.g., white-tailed deer and wild turkey) and tailor management activities and hunting regulations to maintain healthy and stable populations of game species. Use Southeastern Cooperative Disease Study Unit at the University of Georgia to monitor health of deer herd on a 5-year basis.

1.1.6 By 2001, develop and implement an annual Breeding Bird Survey.

1.1.7 By 2001, participate in migratory shore bird surveys in spring and fall and provide data to the Manomet Laboratory.

Snapping Turtle
USFWS ©Bruce Colin

Youth Hunting
USFWS

1.1.8 By 2001, conduct a population survey of gopher tortoises and their habitat associations. Trap five tortoises and conduct blood tests to determine if the population harbors the respiratory disease which threatens this species. Beginning in 2005, monitor gopher tortoise populations every 5 years to determine long-term population trends. (Resource Project 4)

1.1.9 By 2002, conduct furbearer counts, determine their effects on the ecosystem, and develop population management strategies (e.g., hunting and trapping) to promote diversity and stability among species and their habitats.

1.1.10 By 2002, initiate a nesting survey of swallow-tailed kites to be conducted every 5 years to determine long-term population trends.

1.1.11 By 2003, identify exotic plant and animal species on the refuge and develop a strategy to eliminate or control them.

1.1.12 By 2005, partner with the University of Florida to conduct a survey of herpetofauna and develop a long-term monitoring technique for amphibians.

1.1.13 By 2005, partner with the Suwannee River Water Management District and/or the U.S. Geological Survey to conduct an aquatic inventory of fishes and mussels of the lower reaches of the Suwannee River.

1.1.14 By 2008, develop a list of significant flora and conduct surveys for rare and endangered plant species.

Great Blue Heron
USFWS ©Bruce Colin

Objectives

1.2 By 2004, revise the Wildlife Inventory Plan into a Wildlife Management Plan which would be based on data gathered during initial surveys. The Wildlife Management Plan would guide all aspects of refuge management and be based on reliable data and sound techniques.

1.3 By 2010, conduct a biological review of the refuge. Ideally, this review would have occurred prior to the initiation of this comprehensive conservation Plan. It will be necessary to conduct a biological review prior to its revision to determine if biological strategies outlined in the plan and in the Wildlife Management Plan are resulting in good science and sound management practices.

White Ibis
USFWS ©Bruce Colin

1.4 Develop a Geographic Information System database management and mapping system with plant and wildlife communities and management layers. (Resource Project 7).

Strategies

1.4.1 By 2003, develop a computerized database for current and past monitoring and research activities using Microsoft Access and input all available records.

1.4.2 By 2003, develop a computerized database for current and past forestry and fire activities using Microsoft Access and input all available records.

1.4.3 By 2003, maintain database and develop a query system to facilitate data retrieval.

1.4.4 By 2004, train professional staff in data collection and usage of Geographic Information System.

1.4.5 By 2006, build Geographic Information System databases with several coverages including: roads; land cover types; prescribed burn units; timber sales; inholdings; hydrology; soils; wildfires; boundary maintenance; boundaries; breeding bird survey transects; data points and data; eagle nests; osprey nests; gopher tortoise burrows; gopher tortoise study transects; archaeological and cultural sites; topography; assets (structures and facilities); public use structures and trails; swallow-tailed kite nests; forest compartments and stands; insect/disease/ disturbance events; beaver ponds and dams; refuge ponds; blue bird boxes; and wood duck boxes.

Habitat

Goal

2. Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitats, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.

Objective

2.1 Maintain habitat for migrating, wintering, nesting, and foraging birds, with special emphasis on threatened and endangered species, neotropical migratory birds, and colonial wading birds.

Strategies

2.1.1 Maintain existing pine and hardwood habitat for at least 20 pairs of swallow-tailed kites.

2.1.2 Maintain existing nesting habitat for 4 pairs of bald eagles.

2.1.3 Maintain existing habitat for 30 to 40 nesting pairs of osprey.

2.1.4 Provide high quality foraging habitat for colonial wading birds by manipulating water levels in three existing management areas.

2.1.5 By 2002, initiate a research project with the Service's Ecological Services Division, the University of Florida, and the Suwannee River Water Management District to study mercury levels in the river and its tributaries and the effects on foraging wading birds.

Pine Lily
USFWS Robert LeMarie

Objective

2.2 Refine and implement a prescribed fire program to restore and maintain healthy, fire-dependent communities.

Strategies

2.2.1 Implement the Fire Management Plan (1997), with annual reviews and updates to incorporate applied research findings.

2.2.2 Continue on an annual basis to use prescribed fire on at least 3,000 acres, using a combination of dormant season and growing season burns. Both uplands and marshlands will be burned.

2.2.3 By the 2002 fire season, initiate fire research on the effects of burning frequency, seasonality, and spatial distribution on the refuge's pine flatwoods, mixed cypress, and marsh ecosystems. (Resource Project 5)

2.2.4 By 2003, investigate the impacts of prescribed fire on isolated wetlands in relation to restoring and maintaining aquatic habitats for herpetofauna threatened by hardwood succession caused by the exclusion of fire. (Resource Project 5)

Objective

2.3 Refine and implement an active forest management program to restore and maintain healthy and diverse forest communities.

Strategies

2.3.1 Plant wiregrass plugs in the long leaf pine restoration sites and log decks at a density of 1,000-per-acre with an annual average restoration of 10 acres.

2.3.2 Maintain and promote propagation of wiregrass through prescribed fire.

2.3.3 In 2001, monitor restoration efforts of native long leaf pine and wiregrass communities on slash pine conversion sites (clearcuts). Conduct seedling survival counts in the restoration areas to determine survival rate.

2.3.4 By 2002, update and implement the Forest Management Plan (1989).

2.3.5 By 2002, complete inventory preparations for the forested habitats, including inventory schedules, data to be collected, preparation of cruise maps based on refuge management compartment maps, and methods for analyzing data.

2.3.6 In 2002, begin inventory of the 32,571 acres of forested habitats to obtain the necessary data to refine forest and wildlife management strategies. A minimum of 3000 acres will be inventoried annually. Complete the inventory project in 2011, followed by the necessary revisions to the Forest Management Plan.

2.3.7 Use commercial timber sales to thin slash pine plantations to promote the regeneration of early successional understories, provide quality habitat and forage for native wildlife species, and prepare plantations for a shift to growing season fires. Specific harvest schedules will be developed in the Forest Management Plan.

2.3.8 Monitor and evaluate the wiregrass restoration effort and determine if the project should continue past 2004.

2.3.9 If adequate, wiregrass stands could be used as a seed source. Implement a seed harvest program to expand the restoration process, if previous restoration efforts are successful.

Objective

2.4 Protect wildlife habitat and water quality and quantity through land acquisition. (Resource Project 3)

Strategies

2.4.1 Protect significant spawning habitat for threatened Gulf sturgeon by acquiring, through fee title ownership or easements, the tracts identified in the

Environmental Assessment and Land Protection Plan for the Proposed Expansion of the Lower Suwannee National Wildlife Refuge (1995).

2.4.2 Protect and restore Florida scrub jay habitat and provide contiguous habitat for numerous other species through the acquisition of the Caber Tract, if this land becomes available for purchase.

2.4.3 Acquire the 17 remaining privately owned properties (inholdings) within the original approved acquisition boundary of the refuge, as they become available for purchase.

Resource Protection

Goal

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

Objective

3.1 Protect known archaeological and historical sites on the refuge from illegal take or damage in compliance with the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act.

Strategies

3.1.1 Conduct law enforcement patrols at all known archaeological and historical sites on a regular basis to inspect for disturbance and illegal digging and/or looting.

3.1.2 By 2003, compile a comprehensive literature review of past archaeological, anthropological, and historical investigations within and near the refuge. Produce an annotated bibliography to document the area's history.

3.1.3 By 2006, inventory and GPS the refuge's archaeological sites. (Resource Projects 7 and 14)

3.1.4 By 2010, develop and implement a plan to protect identified archaeological sites in consultation with the Service's Archaeologist, the State Historic Preservation Office, Native American tribes, and the professional archaeological community. (Resource Project 14)

Objectives

3.2 Annually evaluate a minimum of 15 miles of refuge boundary. Delineate refuge boundaries with signs and paint, as needed.

3.3 Continue to protect refuge habitats from wildfire through the fire program, properly trained staff, and equipment readiness. The station will monitor fire conditions and respond according to approved plans and procedures.

3.4 Continue to protect bald eagle nests by monitoring for disturbance and, if necessary, by closing areas around nests during the nesting season.

3.5 Continue to provide visitor safety, protect resources, and ensure compliance with refuge regulations for more than 100,000 annual visitors through law enforcement patrols and public use contacts.

Strategy

3.5.1 By 2005, revise and update the refuge's Law Enforcement Plan.

Objectives

3.6 Continue to work cooperatively with local, state, and other federal law enforcement agencies to enhance resource protection.

3.7 Maintain present road system containing 50 miles of primary refuge roads by grading, mowing, and replacing culverts, as needed, for public vehicle access and for habitat improvement, protection, and management.

3.8 Maintain access to secondary roads system by mowing, boom axing, grading, and replacing culverts, as needed, for habitat protection, management, and improvement for refuge staff and for public foot and bicycle traffic.

3.9 Identify additional lands and seek funding to acquire such lands that will improve resource protection and aid in fulfilling the mission and purpose of the refuge.

3.10 Maintain more than $1,000,000 worth of capitalized equipment used in all aspects of refuge management including habitat, wildlife, and public use.

3.11 By 2005, conduct a wilderness review of the refuge. The purpose of a wilderness review is to determine whether any refuge lands or waters meet the characteristics of wilderness. Any lands determined to meet these criteria will then be nominated for inclusion as Wilderness Areas.

Public Use

Goal

4. Provide opportunities for environmental education and interpretation and wildlife-dependent recreation in accordance with the National Wildlife Refuge System Act of 1997.

Objectives

4.1 By 2002, develop and implement a Visitor Services Management Plan.

4.2 By 2002, identify site for a visitor center or visitor contact station to serve both Lower Suwannee and Cedar Keys National Wildlife Refuges. Visitors will learn about the Service, the National Wildlife Refuge System, and both local refuges and the trust resources they protect. Seek funding support from Congressional representatives, local governments, organizations, and individuals. (Resource Project 2)

4.3 Develop and implement an environmental education program that will result in a greater understanding and appreciation of refuge flora, fauna, and habitats.

Strategies

4.3.1 By 2001, quarterly provide ranger- or volunteer-led canoe tours, wildflower and butterfly walks, and birding trips.

4.3.2 By 2001, develop environmental education curriculum for the refuge consistent with Florida Department of Education (Sunshine State) standards.

4.3.3 By 2001, develop at least three refuge specific messages, complete with a teacher's guide on wetlands and wetlands species for local teachers and community organizations.

4.3.4 By 2003, develop teacher workshop materials and host an annual teacher's workshop for environmental education curriculum.

4.3.5 Provide and train staff, student interns, and community volunteers to implement an environmental education program. By 2003, increase staff and volunteer presence in the public schools and the community for educational purposes.

4.3.6 By 2005, provide temporary housing and transportation for student interns.

Objective

4.4 Update existing materials and develop new interpretive materials, including brochures, interpretive panels, kiosks, and exhibits that highlight refuge resources.

Strategies

4.4.1 By 2001, replace temporary marsh walkways with elevated, accessible boardwalks. To provide resting spots, place benches along the trail. (Resource Project 9)

4.4.2 By 2001, develop interpretive panels which highlight the Dixie County portion of the refuge. The panels will be included on kiosks located near the refuge, on property owned by the county and town of Suwannee.

4.4.3 By 2001, develop a self-guided walking trail through the pine forests and marsh at Salt Creek.

4.4.4 By 2002, replace visitor's kiosk at River Trail with a new structure, panels, and brochure box. (Resource Project 8)

4.4.5 By 2002, develop interpretive panels and build a kiosk at the Shell Mound Unit. Interpretive panels will highlight coastal habitat and associated wildlife. A map will be included to identify refuge lands and public use facilities. (Resource Project 9)

4.4.6 By 2003, construct an observation tower at Dennis Creek Landing similar to the tower/handicap accessible deck on the River Trail. (Resource Project 9)

4.4.7 By 2003, establish a native plants, wildflower, and butterfly garden at the refuge headquarters. Through interpretive signs and an accompanying guide, the area would become an outdoor classroom and serve as a demonstration area for "Backyard Wildlife Management."

4.4.8 By 2004, develop interpretive panels and incorporate

into kiosks for the Dennis Creek and Shell Mound trails similar to those found along the River Trail. (Resource Project 9)

4.4.9 By 2005, construct an observation tower with interpretive panels overlooking an interior freshwater marsh/pond along the visitor loop road in Levy County.

4.4.10 Evaluate other areas where walking trails for wildlife observation might be compatible with the purpose and mission of the refuge or refuge system.

Objective

4.5 Provide opportunities for hunting and fishing on the refuge in a manner which minimizes conflicts between consumptive and non-consumptive user groups.

Strategies

4.5.1 Provide high quality hunting opportunities for small game, big game, and waterfowl consistent with sound biological principles and in accordance with the approved Refuge Hunt Plan (1988).

4.5.1.1 Maintain the archery-only area in Dixie County.

4.5.1.2 Continue to staff a centralized check station in each county during the general gun season to collect harvest data and provide a hunter contact point.

4.5.1.3 Continue to monitor and evaluate the hunt program annually to determine health of game species. Modify seasons and/or regulations, if necessary, to ensure the hunt program is based on sound biological information and achieving management goals.

4.5.1.4 By 2001, increase law enforcement presence during hunting seasons to ensure hunter safety, to provide contact information, and to monitor compliance.

4.5.1.5 By 2001, designate non-hunting areas in both counties to minimize potential conflicts between hunters and non-hunters. Potential areas to be included are the property owned by The Nature Conservancy, Shell Mound, Fishbone Creek, and Shired Island. These areas have public use facilities (e.g., trails and boardwalks).

4.5.1.6 By 2002, modify deer hunting regulations to increase the number of does harvested. This will achieve a balanced sex ratio and improve overall deer herd health.

4.5.1.7 By 2003, evaluate the potential of conducting a youth-oriented deer hunt.

4.5.2 Provide high quality fishing opportunities consistent with sound biological principles.

4.5.2.1 By 2001, increase law enforcement patrol of fishing areas to ensure public safety and maintain refurbished facilities.

4.5.2.2 By 2001, construct a handicap-accessible fishing platform at Fishbone Creek.

4.5.2.3 By 2004, repair boat launch and resurface parking area at Shired Island. (Resource Project 12)

4.5.2.4 By 2005, explore additional ways to increase land based fishing opportunities by emphasizing access and facility improvements.

4.5.2.5 By 2006, develop and implement a fisheries management plan.

4.5.2.6 By 2008, support National Fishing Week by conducting an annual event.

Objective

4.6 Develop a volunteer program which offers resource, educational, and maintenance projects to accommodate a diverse volunteer community.

Strategies

4.6.1 Create partnerships with community-based organizations to adopt specific refuge trails and/or areas.

4.6.1.1 Continue coordinating with the Wetlands Clubs from area high schools to conduct regular clean-up days on the refuge.

4.6.1.2 By 2001, partner with the Suwannee River Chamber of Commerce to adopt the Dixie Mainline Trail.

4.6.2 Provide volunteer training opportunities.

4.6.2.1 Continue to provide training to teach refuge volunteers about the Service, the refuge system, and the local refuges.

4.6.2.2 By 2001, provide opportunities for volunteers to attend teacher workshops to develop skills for conducting educational programs.

4.6.2.3 By 2001, provide opportunities for volunteers to attend Service-sponsored training on related topics to improve their ability to serve refuge needs.

4.6.3 By 2001, provide support and recognition to volunteers for their contributions to refuge operations and programs.

4.6.4 By 2003, develop volunteer-led tours of various refuge trails.

4.6.5 By 2004, use volunteers to assist with staffing needs for the new refuge visitor center or contact station.

Objectives

4.7 By 2001, develop a Friends Group for Lower Suwannee and Cedar Keys National Wildlife Refuges.

Landscape Management

Goal

5. Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural resources within the Big Bend Region of Florida, the Suwannee River Basin, and the North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

Objectives

5.1 Continue participation on North Florida Ecosystem Team and support team priorities and projects.

5.2 By 2005, develop partnerships with local school districts and state environmental agencies such as the Suwannee River Water Management District, Florida Department of Environmental Protection, and Florida Fish and Wildlife Conservation Commission to promote and provide environmental education opportunities on and off the refuge.

Strategies

5.2.1 By 2002, expand partnership with the Levy County School District to include it as an involved participant in the Interdisciplinary Watershed Education Program.

5.2.2 By 2004, expand partnership with the Dixie County School District to assist with the development of environmental education facilities and programs. (Resource Project 10)

Objective

5.3 By 2006, develop partnerships to protect water quality and quantity and to promote research on the trust resources of the refuge.

Strategies

5.3.1 By 2002, expand partnership with the University of Florida to conduct research on the refuge and provide research sites and field experiences to students.

5.3.2 By 2002, expand partnership with the Suwannee River Water Management District and the U.S. Geological Survey to include monitoring water flows and quality in the lower reaches of the Suwannee River, to inventory and study aquatic species, and to protect the Suwannee River corridor from development and activities which could negatively impact water quantity and quality.

5.3.3 By 2003, explore potential for working with the Florida Fish and Wildlife Conservation Commission to reintroduce black bear into the Big Bend Region of Florida.

Objective

5.4 Maintain partnerships with local community organizations and environmental agencies to promote and guide the development of nature-based tourism while maintaining the "wildlife first" requirement of the Refuge Improvement Act.

Strategies

5.4.1 Continue to work with the Florida Park Service and

other governmental agencies, as well as community organizations, in the sponsorship of the Suwannee River Naturefest, an annual nature-based festival.

5.4.2 Continue to partner with local organizations to seek out and apply for grants on collaborative projects.

5.4.3 By 2002, work with the Suwannee River and Dixie County Chambers of Commerce to develop interpretive material about the Dixie County portion of the refuge and nature-based recreation opportunities provided by the refuge.

5.4.4 By 2003, seek support from community organizations and governmental agencies for the establishment of a Refuge Visitor and Education Center which will serve both refuges and could serve as a central information point for environmental activities in the area.

Objectives

5.5 Continue to develop partnerships with national and state organizations to acquire necessary lands for the protection of trust resources and the fulfillment of the purpose and mission of the refuge.

5.6 Seek mutual cooperation with recognized Native American tribes in Florida to protect Native American sites on the refuge.

5.6.1 By 2003, negotiate and implement a long-term archaeological research agreement with the Department of Anthropology at the University of Florida and the Museum of Natural History.

Plan Implementation

Partnerships

A crucial component to implementing this comprehensive conservation plan is the development and expansion of partnerships with the local community and other environmental agencies. Significant partnerships with the Suwannee River Water Management District and The Nature Conservancy contributed to both the establishment and management of the refuge. Local organizations that have contributed to the operation of the refuge include the Suwannee River and Dixie County Chambers of Commerce, the Suwannee Audubon Society, and the "Save Our Suwannee" organization. Personal contacts and working relationships have been established with other governmental organizations including the following: University of Florida; Florida Fish and Wildlife Conservation Commission; Florida Park Service; Florida Department of Environmental Protection; Florida Division of Forestry; Levy County School District; Dixie County School District; Chiefland City Council; Levy County Commissioners; Dixie County Commissioners; Levy County Development Authority; North Florida Economic Development Council; Levy County Economic Development Council; and North Central Florida Regional Planning Council.

In addition to dynamic partnerships with organizations, the refuge is fortunate to have a small but dedicated group of individuals who volunteer and assist the refuge with various projects. These volunteers will continue to play a pivotal role in the accomplishment of refuge objectives and strategies. In addition to assisting with refuge projects, this cadre of volunteers serves as an important link with the community at large, promoting refuge messages and garnering additional support for the refuge system.

Partnerships with other environmental agencies, local school districts, and community groups have the greatest potential to benefit refuge resources. Biological and environmental research and monitoring will be improved through an enhanced partnership with the Suwannee River Water Management District, the University of Florida, and the Florida Fish and Wildlife Conservation Commission. Environmental education opportunities will be enhanced through expanded partnerships with both local school districts, the Suwannee River Water Management District and the Florida Fish and Wildlife Conservation Commission. The limiting factor in the advancement of these partnerships is the lack of staffing and funding to nurture these programs and relationships.

Annual Work Plans

Future annual work plans will be developed to reflect the priorities and intent of this comprehensive conservation plan. When discretionary funding and staff time are available, these work plans will be used to implement various components of the plan.

Step-Down Management Plans

The comprehensive conservation plan provides conceptual guidance for potential future expansion, management and development of the refuge. Step-down management plans are individual, subject-specific plans. Examples are fire management, forestry management and hunting management. The refuge's approved step-down plans are listed below. Before implementing the goals and projects of this comprehensive conservation plan, some specific step-down plans may need revisions, while others will need to be developed.

Approved Plans

- **Aircraft Pre-Accident** Aircraft are used for fire control and management, habitat monitoring, and biological surveys. The purpose of the Aircraft Pre-Accident Plan is to outline general procedures to be followed during routine flights and flight emergencies. (Approved 5/6/94)
- **Continuity of Operations** It is important to maintain the capability to perform essential activities and functions under all circumstances and situations, including human-caused, natural, technological, and national security emergencies that may occur with or without notice. This plan identifies functions necessary for the safety and continuity of operations. (Written 8/10/98)
- **Fire Management** The purpose of the Fire Management Plan is to provide objectives and guidelines for managing refuge habitat. The plan provides a detailed program of action to implement fire management policies and objectives in accordance with the Fire Management Preparedness Handbook (621 FW). (Approved 1/8/97)
- **Hurricane Action** The purpose of the Hurricane Action Plan is to outline general procedures to be followed during and after hurricanes and the associated tornadoes which may occur. (Approved 12/17/90)
- **Station Safety** The purpose of the Station Safety and Environmental Health Management Plan is to outline responsibilities and procedures necessary to minimize accidents/incidents which may result in personal injury or property damage to Service employees and the visiting public. Included are guidelines for employees to follow in case of emergencies, correct procedures for reporting accidents, and an emergency action directory. (Approved 10/21/84)
- **Trapping** The purpose of this plan is to identify methods to reduce beaver impacts on refuge roads and timber in the Dixie County portion of the refuge. The plan does not seek to eliminate beaver from the refuge, merely minimize damage caused to refuge roads and timber by flooding, and thus ensure visitor and staff safety when using these roads. (Submitted 1/12/00)

Approved Plans, Scheduled for Revisions

- **Forest Management** The purpose of this plan is to provide guidelines which will strive to make the best use of available management techniques to provide suitable habitat for native wildlife in refuge forest lands. This plan is scheduled to be updated by 2002. (Approved 4/19/89)
- **Law Enforcement** This plan's purpose is to provide refuge staff with a ready reference to Service, regional and state policies, procedures, and programs concerning refuge law enforcement activities. The present plan was approved on March 29, 1988, and is outdated. It will be revised by 2005.
- **Visitor Services Management Plan (Public Use Management Plan)** The purpose of the Public Use Management Plan, now referred to as the Visitor Services Management Plan, is to outline strategies to accomplish the refuge's public use goals without compromising the original purpose for which the refuge was established. The plan will be revised in 2002. (Approved 6/28/88)
    - **Hunting** The purpose of the Hunting Plan is to establish guidelines for hunting on the refuge which will provide the general public with a quality wildlife-oriented recreational experience, an opportunity to utilize a renewable resource, and the ability to maintain wildlife populations at levels compatible with refuge habitat. This plan will be updated and incorporated into the Visitor Services Management Plan by the 2002-2003 hunt season. (Approved 4/18/88)
    - **Fishing** The purpose of the Fishing Plan is to provide guidelines and objectives for the sportfishing program, which will serve to increase wildlife-dependent recreational opportunities and further the public's opportunity to enjoy a renewable resource. The plan will be updated and included in the Visitor Services Management Plan, which is scheduled to be updated and revised by 2002. (Approved 8/16/88)
    - **Sign (part of Public Use Management Plan)** The sign plan, which is now obsolete, outlined the design and placement of refuge signs to provide information to the public. Sign management will now be included in the Visitor Services Management Plan. (Approved 6/28/88)
- **Wildlife Management Plan (Wildlife Inventory Plan)** The purpose of the Wildlife Inventory Plan was to establish which species to inventory, standard techniques for conducting the inventories, and projected costs. This plan is now obsolete. A new Wildlife Management Plan will be written to replace this plan. This project is to be completed by 2004. (Approved 4/21/86)

Needed Plans or Reviews

- **Cultural Resource Management Plan** The purpose of this plan is to clearly delineate the historic preservation process for the refuge, develop strategies to identify and assess the refuge's historic properties, identify appropriate site protection measures, and identify current and potential partners. The plan shall be in place by 2005.
- **Wilderness Review** The purpose of this review is to determine whether any refuge lands or waters meet the qualifications of a "Wilderness Area." Any areas determined to meet these criteria will then be nominated for inclusion as Wilderness. The Wilderness Review will be conducted by 2006.
- **Fisheries Management Plan** The purpose of this plan is to determine if and what management actions could be conducted to improve fish habitat on refuge waters. Fisheries biologists from the Service's Ecological Field Offices would provide the expertise needed for this evaluation. The fisheries plan will be completed by 2006.

- **Biological Review** Ideally, this review would have occurred prior to the initiation of this comprehensive conservation plan. It will be necessary to conduct a biological review prior to its revision to determine if biological strategies outlined in this plan and the Wildlife Management Plan are resulting in good science and sound management practices. This review should occur by 2010.

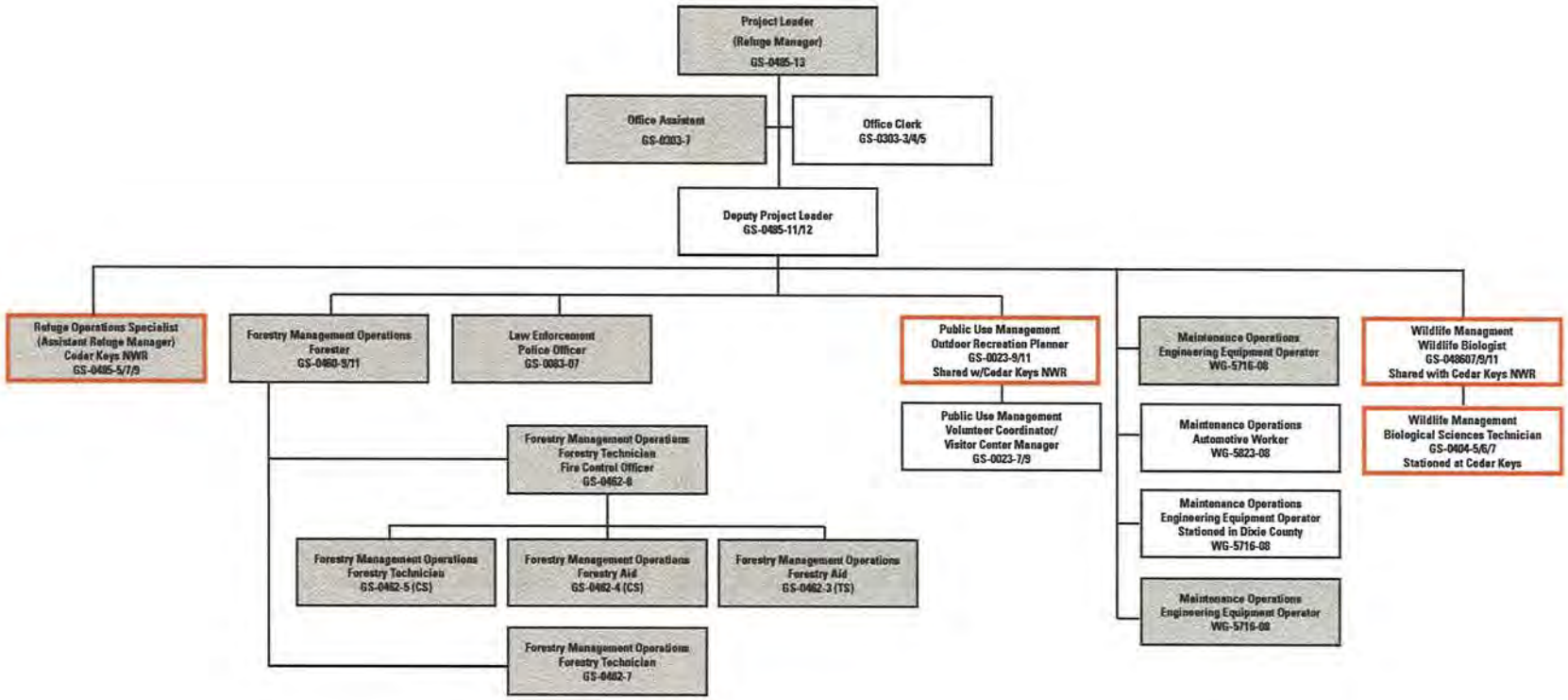
Funding and Staffing

To bring the vision of the Lower Suwannee National Wildlife Refuge to a reality--expanded biological monitoring, enhanced public use opportunities, and construction of related facilities--*appropriate funding and staffing are essential!* Although a portion of this new funding could be from partnership opportunities and grants, the bulk of the funding must be allocated by the U.S. Congress. Current base funding is inadequate to meet staff costs and to complete routine maintenance and upkeep of facilities and equipment.

A staff of eight permanent full-time, one permanent half-time, two career seasonals, and one temporary firefighter (Fig. 4) are currently allocated to Lower Suwannee National Wildlife Refuge (gray boxes). To accomplish the goals, objectives, and strategies outlined in this plan, additional staffing is needed. Five additional full-time permanent positions are required to fully implement this plan (white boxes). Additionally, two full-time positions would be shared with Cedar Keys National Wildlife Refuge (white boxes with bold bordering). Finally, the current Assistant Refuge Manager position, GS-0485-5/7/9, would become a Refuge Operations Specialist position and be transferred to Cedar Keys refuge to oversee daily operations. One of the identified new positions would be a Deputy Project Leader position, GS-0485-11/12, which would oversee staff and daily operations of Lower Suwannee refuge.

If the Service is to succeed in the full implementation of this plan, base funding and minimum staffing must be increased. Along with base funding, maintenance funding must also increase so that the refuge may upgrade and improve facilities and equipment, as needed. Without the financial support from the U.S. Congress, Lower Suwannee National Wildlife Refuge will not be able to successfully manage habitat for threatened and endangered species and trust resources. The refuge will be unable to provide adequate environmental education and outreach. Wildlife-dependent recreational opportunities will be inadequate to meet the needs of society. Finally, the refuge will not endure as a unique resource for future generations.

Figure 4. Organizational Chart for Lower Suwannee and Cedar Keys National Wildlife Refuges



Resource Projects

The following projects directly support the refuge's goals and objectives. They do not necessarily fit under one goal, but rather support several goals.

Project 1

Initial Base Funding. Additional base funding is needed to hire staff and cover normal, routine expenses. Five new full-time positions for Lower Suwannee National Wildlife Refuge and two new full-time positions to be shared with Cedar Keys National Wildlife Refuge are needed to meet minimum staffing needs. These positions would require equipment and transportation and would also affect utility expenses. The estimated costs for these new positions including salaries, benefits, and operations would total approximately $700,000 for the first year and $600,000 for recurring years.

Project 2

Administrative Facilities, Visitor Services, and Education Center. Construction of a headquarter's facility is needed and would include a visitor center with interpretive displays and exhibits; a book store; an environmental education classroom; a large conference room; and six administrative offices. This facility, which would also serve Cedar Keys National Wildlife Refuge, would be in a location that supports both refuges and would serve large numbers of visitors. The construction cost would be approximately $2,000,000.

In lieu of a visitor center, a smaller administrative office and visitor contact station could be constructed. This facility would still support both refuges and have space for minor exhibits and a meeting room. The cost for this project would be approximately $400,000.

Project 3

Land Acquisition. This land acquisition project has two sections--inholdings and refuge expansion. Currently, 17 inholdings are within the approved refuge boundary (Fig. 5). Table 1 prioritizes the purchase of these lands if funding becomes available. If all the tracts were to be purchased, the cost would exceed $10,000,000.

The second part of the land acquisition project concerns the proposed expansion of the Lower Suwannee National Wildlife Refuge. In 1994, several tracts along the Suwannee River, outside the refuge's original acquisition boundary, were identified as critical nursery and spawning habitat for the endangered Gulf sturgeon. At that time, a Preliminary Project Proposal was completed and followed with a Land Protection Plan and Environmental Assessment concerning this proposed expansion of the refuge. The project entered the Land Acquisition Priority System and was ranked number two in the country in 1996. It was not funded and in 2000 was ranked 84th in the country. The total acreage of the proposed acquisition is 9,970 acres with an estimated purchase cost of $15,000,000.

Figure 5. Land Acquisition Map, Lower Suwannee National Wildlife Refuge

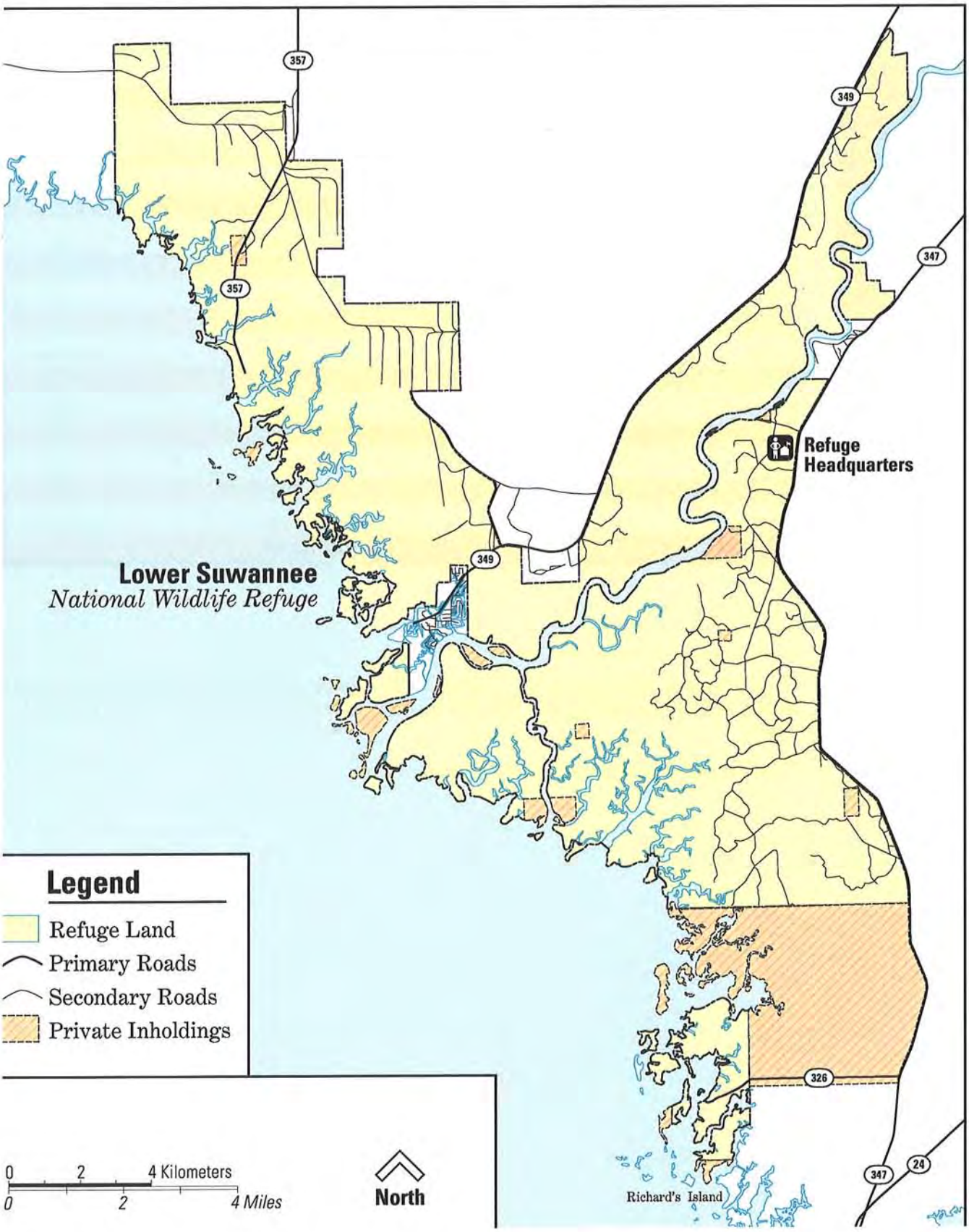


Table 1. Inholdings Within the Approved Boundary of Lower Suwannee National Wildlife Refuge

TRACT	ACRES	ESTIMATED VALUE[1]	WILLING SELLER[2]
Asbell	156	150,000	yes
Drummond	75 (2 parcels)	40,000	yes
Roe	13	200,000	no
Caber	5295	8,000,000	unknown
Sowell	80	200,000	unknown
Calton	11	25,000	no
Williams, et al.	74 (camp cabin)	500,000	no
Hicks	5 (home)	200,000	no
Osteen	1 (home)	75,000	no
Abager	91	300,000	yes
Allen	3	10,000	unknown
Coon Island	<3	10,000	yes
Yon	30 (5 upland)	50,000	yes
Phillips	79	150,000	yes
Brown	10	25,000	yes
Batts	72	150,000	yes
Hudson	65	25,000	unknown
TOTALS	6075	10,110,000	

[1]The estimated value figures are "best guess" estimates. Appraisals would be conducted to obtain fair market value prices. The Service is not allowed, by law, to pay above appraised value.

[2]The Service only acquires land from willing sellers.

Project 4
Gopher Tortoise Population Study. The gopher tortoise is a species of special concern in the State of Florida. As a keystone species for the sandy soil pine woods ecosystem, gopher tortoise absence can indicate a loss of suitable habitat or unfavorable management conditions. Gopher tortoise burrows serve a variety of other species. The absence of gopher tortoises in the ecosystem can have negative implications for rare and threatened and endangered species. Gopher tortoises are falling victim to a contagious respiratory disease that has the potential to adversely affect the species throughout its range. A study of the refuge's population would provide preliminary data, a population index, and determine the prevalence of the disease among this population. This study may also identify secondary burrow users, such as the endangered indigo snake. The cost of the study is estimated at $80,000.

Project 5
Fire Effects Research. The refuge currently has an active fire management program. However, baseline information and post burn vegetation analysis are needed to tailor the burn program to meet specific management objectives. This project would initiate fire research on the effects of burning frequency, seasonality, and spatial distribution on the refuge's pine flatwoods, mixed cypress, and marsh ecosystems. Additionally, there are large reptile and amphibian populations on the refuge (e.g., the endangered eastern indigo snake and the gopher tortoise, a species of special concern). Basic research is needed to evaluate how prescribed fire parameters such as season, ignition methods and burn rotation affect refuge herpetofauna. This study would further investigate the impacts of prescribed fire on isolated wetlands. These wetlands may be maintained and possibly restored through the use of periodic prescribed fire to halt hardwood encroachment and succession. In many areas of Florida, fire was excluded from the isolated wetlands, and subsequently, suitable habitat for herpetofauna disappeared. The third treatment of this study would compare herpetofauna response in isolated wetlands where fire is used to those where fire has been excluded. The results from these three studies would provide information for managing habitats and wildlife populations on Lower Suwannee National Wildlife Refuge, tailor the forestry and fire management programs to meet specific habitat and population objectives, and provide valuable insight about herpetofauna which could be applied by other land managers. The cost of these research projects is estimated at $200,000

Project 6
Dixie Compound Garage Facility and Crew Building. The Dixie County portion of the refuge is a 1-hour drive from the current headquarters. This portion of the refuge contains approximately 29,000 acres and 40 miles of roads. Equipment such as road graders, trucks, and bulldozers are stored in a pole shed located in the Dixie Compound. Presently, the refuge lacks a shop and a place to store tools. Additionally, a 1979 dilapidated mobile home is located in the compound. This structure was used as a sub-headquarters, crew room for staff, and temporary quarters for visiting researchers and volunteers. However, it is unsafe and an eyesore. A small garage with a tool room, crew room, and rest room facilities is needed. The cost of this project is estimated at $240,000.

Project 7
Enhance Resource Assessment through Geographic Information System. A Geographic Information System would permit refuge staff to digitize refuge habitats and incorporate biological, archaeological, and public use resources into databases. The refuge currently has a single-user GIS system and one GPS PLGR unit. A digitizer to capture fine scale data and a plotter for printing scales maps are necessary to have a fully functioning GIS system. The project will require new computer hardware, software, training, and a computer specialist to get the system up and running. The position would be a term position, not to exceed 4 years. This person would be required to train staff on how to use and maintain the system. The cost is estimated at $250,000.

Project 8
River Trail and Entrance Drive Enhancements. The entrance drive to the refuge, which leads to the administrative complex and an adjacent trail head area, is currently surfaced in limerock. This project proposes to resurface the 0.8-mile drive, the 500-square-foot trail head parking area, and the visitor contact station/administrative office parking lot. Additionally, the kiosk at the trail head is rotten and infested with termites. The information panels are outdated and in poor condition. The trail is approximately 0.5-mile in length with a 400-foot boardwalk and observation platform on the historic and beautiful Suwannee River. Approximately 10,000 people annually use this trail area. A new kiosk and interpretive panels are needed to replace the current structure and to highlight the trail improvements including the boardwalk and observation platform. The estimated costs of the entrance drive resurfacing, paving of two small parking lots, and replacing the information kiosk total $340,000.

Project 9
Shell Mound Enhancements. The Shell Mound Unit of the refuge receives more than 50,000 visitors a year. Current public use amenities include a 1-mile, uninterpreted loop trail, a 1/3 mile loop trail with two information panels, a brochure box and small parking area at the trail heads, a small boat launching area, and a 400-foot handicap accessible boardwalk and fishing pier. This project calls for the construction of two marsh boardwalks for the1-mile trail. Currently, this trail is only fully accessible during low tide, as the marsh areas are wet during high tide. Additionally, an observation tower at Dennis Creek would greatly enhance user ability to observe wildlife and scenic vistas. The trail passes through unique coastal habitat and interpretive signs along the trail would educate visitors about the natural features found along the trail. On the Shell Mound Trail, two information panels are outdated and in poor condition. These panels would be replaced with new panels. In the parking area, the refuge sign and brochure box would be replaced with a 3-sided kiosk housing panels about the two trails, natural features and wildlife, for both Lower Suwannee and Cedar Keys Refuges. The estimated cost of this project is $50,000.

Project 10
Develop Education Facilities. The Dixie County School District leases 16 acres of land from the State of Florida, surrounded by the refuge, near Fishbone Creek. The school district has plans to construct an environmental education facility on the property, but is short of funding. The Service needs to work cooperatively with the Dixie County School District to apply for a grant to receive funding for this project. The Service could help with the purchase of materials and provide construction supervision. The county could provide labor, probably from the correctional facility, to build a pole shed type structure. Grant money could be used to purchase a recycling, composting toilet for the site, while installation would be by inmate labor with refuge supervision. The total estimated cost of the project is $20,000, with the Service's share being approximately $10,000, depending on funding or grant specifications.

Project 11
Fire Equipment Storage and Cache. The original site plan for the administration area calls for an enclosed equipment building for vehicle storage. Presently, fire cache equipment is stored in several scattered locations due to space constraints. Additionally, equipment such as the engine, pumper unit, fire transport, and dozer are unprotected. This project would include the construction of an enclosed, 5-bay garage, with 4 bays for fire equipment storage and 1 bay for the fire cache. The estimated cost of this project is $300,000.

Project 12
Shired Island Enhancements. Shired Island receives more than 40,000 visitors annually. The boat launch and parking area are in poor condition. This project would involve clearing and leveling the parking

area and gravel resurfacing. The boat launch is eroding and needs bank stabilization. Currently, no signs or information panels for the refuge are located at this highly visited area. In addition to the parking area and launch improvements, a kiosk with refuge information and panels highlighting the unique natural features of the area would be constructed. The estimated cost of this project is $200,000.

Project 13

Boundary Survey. Boundary surveys between refuge property and adjacent private property have not been completed at several locations in Levy and Dixie Counties. These surveys were never conducted because the property was within the original acquisition boundary and it was assumed that these sites would eventually become part of the refuge. Several locations exist in both counties where the property remains in private ownership and the lack of a boundary line has caused management problems related to forest and fire management activities, public use, and law enforcement. The estimated cost for this project is $250,000.

Project 14

Archaeological and Historical Survey. A comprehensive archaeological survey of the refuge is needed. The refuge contains archaeological sites that are more than 2000 years old. This project is necessary to identify, protect, and interpret the refuge's cultural resources. The estimated cost is $200,000.

Project 15

Replacement of Heavy Equipment. The refuge currently has two pieces of heavy equipment in need of replacement. The Fiat Allis crawler tractor was obtained by the Service as used, excess property from the Army Corps of Engineers in 1984. This tractor is used to maintain 50 miles of road right-of-way. It is also used for land clearing, habitat management projects, and fire protection. A Champion brand motor grader, which is more than 20 years old, needs replacement. This grader was received by the refuge in 1979. The grader is used to maintain more than 50 miles of refuge roads for forestry and wildlife management, fire management and protection, and public access. The estimated replacement cost for both pieces of equipment is $325,000.

Table 2. Funding Needs for Special Resource Projects of Lower Suwannee National Wildlife Refuge

PROJECTS	ONE TIME COST	FIRST YEAR NEED[1]	RECURRING BASE
1. Initial Base Funding		$700,000	$600,000
2. Visitor Center et al.	$2,000,000		50,000
3. Land Acquisition	10,110,000		75,000
4. Gopher Tortoise Study		80,000	5,000
5. Fire Effects	200,000	100,000	
6. Garage and Crew Shop	240,000		5,000
7. GIS System	250,000	100,000	
8. River Trail Projects	340,000		5,000
9. Shell Mound Projects	50,000		
10. Education Facilities	10,000		
11. Fire Equipment Storage	300,000		5,000
12. Shired Island Projects	200,000		5,000
13. Boundary Survey	250,000		5,000
14. Archaeological Survey	200,000		5,000
15. Heavy Equipment	325,000		
TOTAL	14,475,000	980,000	760,000

[1]First year need for these projects is included in the one time cost figure.

Volunteers

Volunteer assistance to the refuge has been valuable, particularly in the area of public use. Lower Suwannee Refuge has a small, but dedicated corps of volunteers. One volunteer works more than 200 hours annually at Shell Mound maintaining the trails and collecting litter. He has also assisted with the construction of a boardwalk and a kiosk. Several volunteers assist with data entry and other office work. Other volunteers lead nature walks, canoe tours, wildflower walks, and birding trips for special refuge events such as National Wildlife Refuge Week and assist in staffing festival exhibits. Still others assist with colonial bird, shore bird, and migratory bird surveys. Volunteers contribute approximately 1,000 hours annually to refuge projects.

Volunteers will continue to play an integral role in assisting staff with fulfilling the mission and vision of this refuge. The current limiting factor in volunteer recruitment is not a lack of community interest, but the lack of staff to nurture and oversee this program. The development of a "Friends" group will provide interested citizens with an outlet to become more involved. However, this program will not fully develop without a staff person to make this dream a reality.

Monitoring and Evaluation

Extensive research and monitoring of natural resources will occur once this plan is implemented and minimum staffing needs are met. This knowledge will give refuge managers and staff specialists the data to judge how habitat management has impacted refuge resources. A major objective of the investigations is not only to provide information to local managers, but to provide a database which will benefit other land managers with similar resources.

This plan will be augmented with detailed step-down management plans to address management actions in support of refuge goals and objectives and to implement the identified strategies. It will be reviewed every 5 years to determine if these goals and objectives are being met and if different strategies are needed to assist the refuge in moving towards fulfilling its vision. Public involvement in the evaluation process and in plan implementation will be encouraged .

CEDAR KEYS NATIONAL WILDLIFE REFUGE

DRAFT Comprehensive Conservation Plan

Cedar Keys
National Wildlife Refuge

Background Information

Location

Cedar Keys National Wildlife Refuge is located along the western coast of Florida, approximately 90 air miles north-northwest of Tampa and 60 miles southwest of Gainesville. Located in Levy County along the southern edge of the Big Bend Region, the 13 islands that make up the refuge surround the coastal town of Cedar Key, Florida, where State Road 24 terminates at the Gulf of Mexico (Fig. 6).

Air North Key
USFWS Ken Litzenberger

History

Cedar Keys National Wildlife Refuge was established on July 16, 1929, by Presidential Executive Order 5158 to protect a breeding ground for colonial nesting migratory birds. The Executive Order included North Key, Snake Key, and Bird (Deadman's) Key. A second Executive Order, dated November 6, 1939, added Seahorse Key to the refuge. Congressional legislative mandate number 92-364, dated August 7, 1972, designated Seahorse Key, Snake Key, North Key, and Deadman's Key as National Wilderness Areas under the Wilderness Act of September 3, 1964 (Public Law 88-577). During the late 1970s and 1980s, additional interior coastal islands surrounding the town of Cedar Key were purchased for inclusion in the refuge. In 1998, the Suwannee River Water Management District purchased Atsena Otie Key and added it to Cedar Keys Refuge through a Memorandum of Understanding. Today, Cedar Keys Refuge is comprised of 13 islands ranging in size from 1 to 120 acres and totaling 762 acres.

Black-crowned Night Heron
USFWS

Purpose

The purpose of Cedar Keys National Wildlife Refuge is:

"..as a refuge and breeding ground for birds and wild animals, subject to valid existing rights...." Executive Order 5158, July 16, 1929,

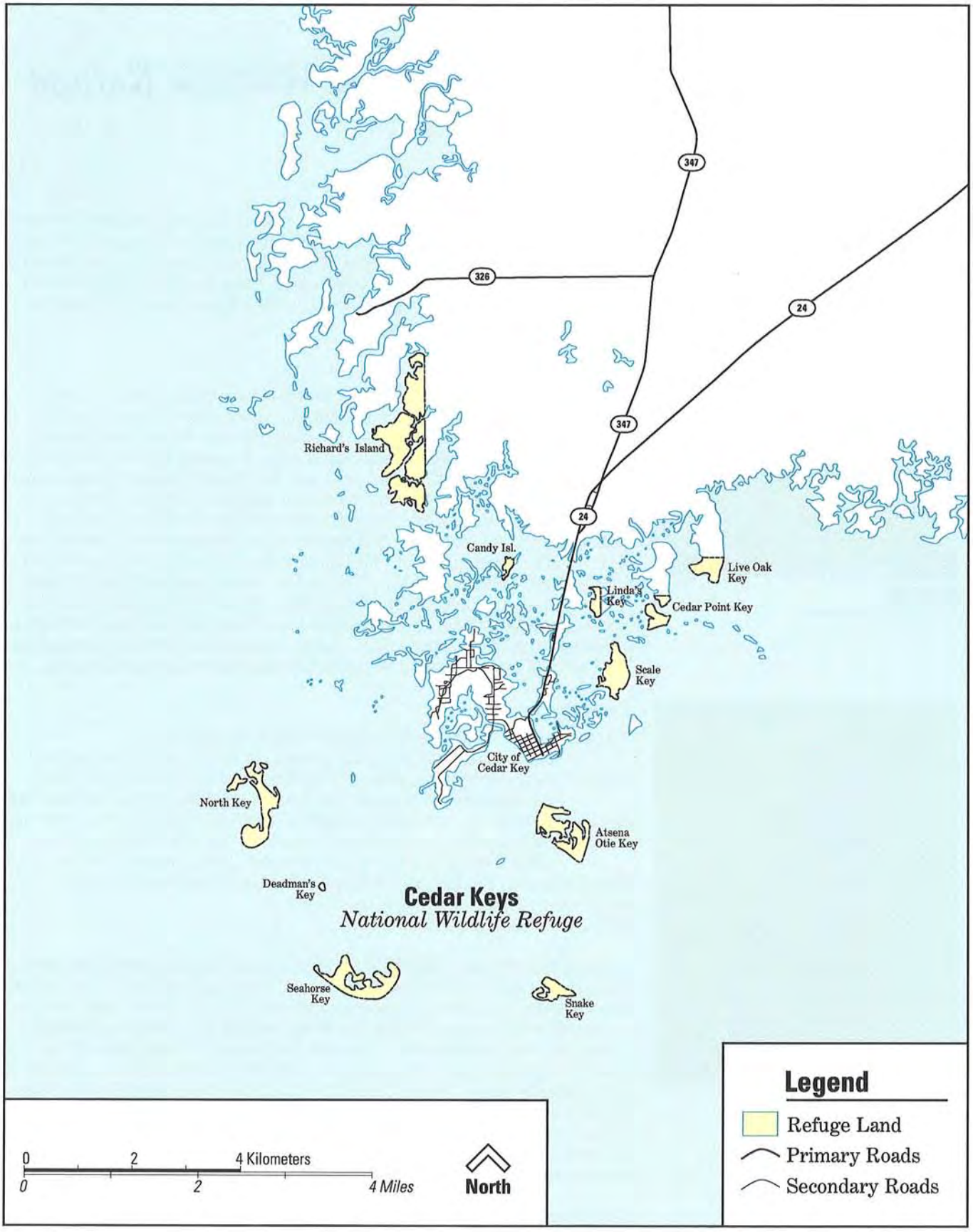
"...suitable for - (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species...." 16 U.S.C. § 460k-1, and

"...the Secretary...may accept and use...real...property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors...."
16 U.S.C. § 460k-2, as amended.

Cedar Keys National Wildlife Refuge was established to protect colonial birds during a time when market hunters, desiring feathers for the ladies' apparel industry, were slaughtering millions of birds. Today, the threat is much different - coastal islands are being rapidly developed and habitat is lost forever. Seahorse Key has been designated Critical Habitat for colonial wading birds. Historically, up to 200,000 birds nested on Snake and Seahorse Keys. Recent data shows approximately 10,000 white ibis; great, cattle, and snowy egrets; great blue, little blue, black-crowned night, yellow-crowned night, and tri-colored herons; cormorants; and brown pelicans nest on Seahorse Key annually. Snake Key has not been used for nesting since the late 1960s.

The Suwannee River Water Management District purchased Atsena Otie Key to protect water quality and to provide recreational opportunities in a natural setting. The refuge islands, with their undisturbed, natural plant communities, are important stopover points for migrating neotropical songbirds. They are important loafing and feeding areas to thousands of

Figure 6. Vicinity Map, Cedar Keys National Wildlife Refuge



shore birds and provide habitat for threatened and endangered species, and species of special concern in the State of Florida. The refuge provides limited public recreation and environmental education.

Function within the Ecosystem

Cedar Keys National Wildlife Refuge includes important coastal barrier island habitat with maritime forests, salt marsh, and the northern most limit of mangrove swamps. About 50 percent of Florida's salt marsh and more than 3,000 square kilometers of seagrass beds occur in the Big Bend region, providing habitat for migratory birds, anadromous and interjurisdictional fish, and threatened and endangered species. The blend of these estuary and riverine habitats creates a large, complex system which exhibits how watersheds function.

Once a sleepy fishing village, the town of Cedar Key has become a unique nature tourist and sportfishing destination. The refuge protects island habitat that would possibly be developed to accommodate increased tourism. The seasgrasses surrounding the islands are important for local shell fisheries and provide valuable habitat for manatees and juvenile sea turtles. Seahorse Key is home to one of the largest colonial wading bird rookeries in North Florida.

AirP Boat on River
USFWS Jerry Gamble

Kiosk
USFWS A. Askins

Agreements

- Memorandum of Understanding with the Suwannee River Water Management District for the Service to manage Atsena Otie Key as part of Cedar Keys National Wildlife Refuge.
- Lease agreement with the State of Florida, Division of State Lands, for the Service to manage a 300-foot buffer zone of state waters surrounding Seahorse Key.
- Special Use Permit with the University of Florida enabling the University to use the Seahorse Key lighthouse and approximately 3 acres around the lighthouse for the purposes of marine science education and research.
- Memorandum of Understanding between the Service and the State of Florida, Department of Agricultural and Consumer Services, Florida Division of Forestry, to provide wildfire suppression.
- Memorandum of Understanding between the Service and Levy County Sheriff's Department allowing either agency to provide emergency assistance to the other upon request.
- Written permission from the Levy County Board of County Commissioners to maintain a kiosk with interpretive information on the county-owned dock in the town of Cedar Key.

Young Ibis
USFWS ©Ken Sourbeer

Proposed Management Direction

Mission

The mission of Cedar Keys National Wildlife Refuge is to protect, maintain, and enhance the unique barrier islands that compose the refuge for the benefit of present and future generations, while protecting the colonial nesting birds.

Vision Statement

The Cedar Keys National Wildlife Refuge is a group of fragile coastal islands that contain significant natural and cultural resources. The refuge will be managed for the conservation of wildlife and wildlife habitat, with special concern for migratory and breeding birds and threatened and endangered species. Management will protect cultural resources and support environmental education, research, and where appropriate, other compatible uses. Management will partner with local, state, and federal agencies; community organizations; and individuals to ensure the protection of these resources for present and future generations.

Management Alternatives

Once the key issues and concerns were identified through the scoping process, it was evident that the number of reasonable alternatives for this refuge is limited by its small size and the need to protect critical habitat and the colonial bird rookery. Appendix B contains a full review of the alternatives considered and their impacts on the socioeconomic, environmental, and cultural resources along with alternatives discussed but not fully developed.

Alternative A: Maintain Current Management (No-Action Alternative)

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

Proposed Management Action

The proposed management action was selected based on conformity with the refuge's mission, vision, ecosystem function, current uses, and needs expressed by the public during the scoping process. The proposed management action will identify biological monitoring and research needs which will result in a better understanding of the use of refuge resources by threatened and endangered species, migratory

Cub Scouts
USFWS A. Askins

birds, and resident wildlife. The proposed management action will result in increased protection of these natural resources, cultural resources, and water quality. It will also result in the restoration of refuge habitats, the maintenance of current public use programs and facilities, and the development of an expanded environmental education program.

An overriding concern, reflected in the draft plan, is that wildlife conservation assumes first priority in refuge management. Public uses will be allowed--where compatible, and if they do not negatively affect the fragile flora and fauna of the refuge. Wildlife-dependent uses such as environmental education and interpretation, wildlife observation, wildlife photography, and fishing will be the emphasized. Improved outreach and environmental education will inform school students, local citizens, and tourists of the rich cultural and natural history and the need to protect these resources. Extensive wildlife and plant inventories, as well as monitoring programs, will be initiated to develop the biological information needed to make management decisions. Resource protection will be increased through better staffing and outreach. Partnerships will be improved and developed to increase environmental awareness and to achieve wildlife and habitat objectives.

The end result is a set of goals, objectives, and strategies related to key issues that will guide management of the refuge for the next 10 to 15 years.

Goals, Objectives, and Strategies to Support the Proposed Management Action

Four management goals for the refuge were developed from several workshops held during the scoping process.

Planning Team
USFWS A. Askins

- **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 of Seahorse Key, threatened and endangered species, and species of special concern in the State of Florida.
- **Resource Protection** Protect natural, cultural, and wilderness resources of the refuge to ensure their integrity and to fulfill the mission of the National Wildlife Refuge System.
- **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 will not negatively affect critical or sensitive habitats.
- **Partnerships** Promote collaboration and partnerships with private citizens

and other agencies to increase research and environmental education opportunities and to protect the coastal ecosystem.

The goals, objectives, and strategies are the Service's response to the issues and concerns expressed by the planning team and the general public at the workshops, public meetings, and in the comment packet, and will be used to implement the proposed management action. These goals, objectives, and strategies reflect the refuges's commitment to achieving the missions of the Service and of the National Wildlife Refuge System; ecosystem priorities; refuge purposes, mission and vision; and the expressed needs of the public--provided that necessary funding requirements are met.

Wildlife and Habitat

Goal

1. 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, of Seahorse Key, threatened and endangered species, and species of special concern in the State of Florida.

Objective

1.1 Continue to monitor colonial bird nesting.

Strategies

1.1.1 Conduct colonial bird rookery flight line surveys at Seahorse Key annually from March through June to determine species present and to develop population indices.

1.1.2 Conduct an aerial survey of pelican nests on Seahorse Key annually to determine the nesting population.

1.1.3 By 2002, develop an unintrusive method to estimate nesting success.

Objectives

1.2 Continue efforts to reestablish colonial nesting on Snake Key. Refuge records indicate that Snake Key was the primary refuge island used by white ibis for nesting prior to the late 1960s.

Brown Pelicans
USFWS ©Ken Sourbeer

Ibis
USFWS Ken Litzenberger

1.2.1 Continue to remove raccoons (if present) from the island using snares, live traps, and by shooting.

1.2.2 Continue to use decoys annually (February through June) to attract colonial birds to the island.

1.2.3 By 2002, explore and determine other methods of restoring nesting bird use to the island.

Objective

1.3 Continue to monitor bald eagle nests.

Strategies

1.3.1 Conduct annual surveys of eagle nests to determine nesting success and number of young fledged.

1.3.2 In 2001, locate bald eagle nests using a GPS system. By 2006, develop an eagle management layer on the refuge's GIS data base.

Objective

1.4 Continue to monitor osprey nesting.

Strategies

1.4.1 Conduct annual surveys of osprey nests on the refuge to determine nesting success and number of young fledged.

1.4.2 Annually inspect and evaluate artificial nesting platforms. Repair, add new platforms, relocate, or remove platforms depending on use and need.

1.4.3 In 2001, locate all osprey nests and platforms. By 2006 using a GPS system develop an osprey management layer on the refuge's GIS data base.

Objective

1.5 Identify exotic plant and animal species on the refuge and develop strategies to eliminate or control them.

Strategy

1.5.1 Continue to actively pursue the elimination of Brazilian pepper trees from the refuge using the recommended herbicide.

Objective

1.6 By 2005, develop a list of the flora and resident fauna present on the refuge.

Strategy

1.6.1 By 2006, locate flora using a GPS unit to create a management layer in the GIS database and to monitor habitat changes over time.

Objective

1.7 Determine the importance of Cedar Keys Refuge to resident and migratory birds.

Strategies

1.7.1 Continue to conduct the annual Audubon Christmas bird count.

1.7.2 In 2001, initiate an annual breeding bird survey for the islands.

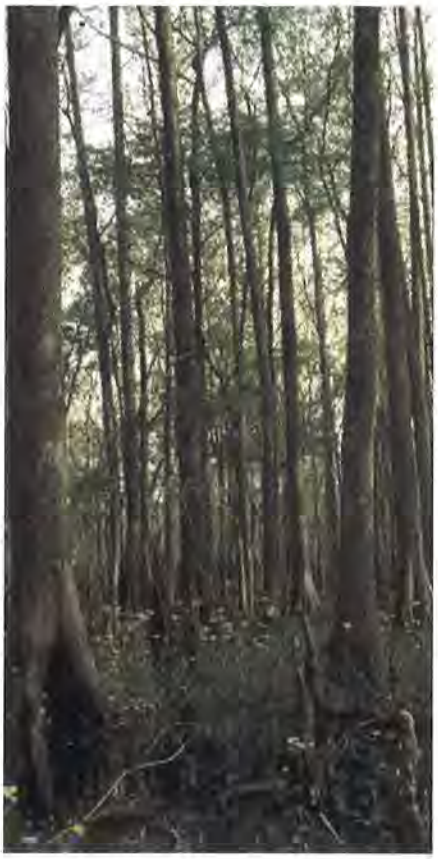
1.7.3 In 2001, initiate a shore bird survey for the islands to be conducted each spring and fall. Data collected will be provided to the Manomet Bird Laboratory for the nationwide shore bird database.

1.7.4 By 2003, identify necessary feeding and loafing areas and, if necessary, protect them from disturbance through closure.

Objective

1.8 By 2010, conduct a Biological Review. Ideally, this review would have occurred prior to the initiation of this plan. It will be necessary, however, to conduct this review prior to its revision to determine if outlined biological strategies and the wildlife management plan are resulting in good science and sound management practices.

Cypress Swamp
USFWS ©Ken Sourbeer



Resource Protection

Goal

2. 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.

Objective

2.1 Continue to protect the colonial bird rookery from human disturbance.

Strategies

2.1.1 Annually, maintain a Closed Area around the island with a 300-foot buffer zone from March 1 through June 30.

2.1.2 Continue to conduct regular law enforcement patrols during the nesting season to enforce the closed area regulations.

Objectives

2.2 Protect the bald eagle nests by monitoring disturbance and, if necessary, close areas around the nests to the public during the nesting season.

2.3 By 2005, revise and update the refuge's Law Enforcement Plan.

2.4 Identify lands that will improve resource protection and aid in fulfilling the mission and purpose of the refuge and seek funding to acquire those lands .

2.4.1 By 2006, conduct a Wilderness Review. The purpose of a Wilderness Review is to determine if any additional refuge lands or waters meet the qualifications of Wilderness. Any lands determined to meet these criteria will then be nominated for inclusion as Wilderness Areas.

Objective

2.5 Protect refuge cultural resources in accordance with federal and state historic preservation legislation and regulations.

Strategies

2.5.1 Conduct law enforcement patrols at all known archaeological sites on a regular basis to inspect for disturbance and illegal digging and looting.

2.5.2 Maintain historical buildings and sites listed on the National Historic Register in accordance with appropriate guidelines.

2.5.3 By 2003, compile a comprehensive literature review of past archaeological, anthropological, and historical investigations within and near the refuge.

2.5.4 By 2005, produce an annotated bibliography to document the region's history.

2.5.5 By 2006, develop a GIS layer for the refuge's archaeological and historic sites.

2.5.6 By 2008, procure funding to inventory, analyze, and curate the archaeological collections from the 1990s excavations of three shell middens located on Seahorse Key.

Seahorse Key Lighthouse
USFWS

2.5.7 By 2010, develop and implement a plan to protect identified archaeological sites in consultation with the Regional Archaeologist, State Historic Preservation Office, Native American tribes and the professional archaeological community. (Resource Project 6)

Public Use

Goal

3. 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 will not negatively affect critical or sensitive habitats.

Objective

3.1 Maintain and expand partnerships with the Suwannee River Water Management District, local government and interested organizations to promote and provide interpretation and wildlife-dependent recreation on Atsena Otie Key.

Strategies

3.1.1 Continue, in partnership with Cedar Key Historic Society, to identify historic features of the island and develop outreach materials to interpret them.

3.1.2 Maintain existing interpretive kiosk and panels, trail, and restroom to ensure visitor safety and comfort.

3.1.3 By 2003, develop interpretive materials for the natural and cultural features of the island. (Resource Project 7)

Bird Watching at Cedar Keys
USFWS Ken Litzenberger

Objective

3.2 Expand partnership with University of Florida to promote environmental education and outreach to 2,000 students annually.

Strategies

3.2.1 Continue to hold annual open house tours of the lighthouse and surrounding facilities.

3.2.2 By 2002, develop an interpretive video about the refuge to be viewed by user groups of the Marine Laboratory.

Fishing at Shell Mound Pier
USFWS Ken Litzenberger

Objective

3.3 Expand partnership with the Levy County School District for educational opportunities on the refuge.

Strategies

3.3.1 By 2001, develop at least three refuge specific lesson plans on wetlands and wetland species for local school teachers and community organizations.

3.3.2 By 2002, become more involved with the Interdisciplinary Watershed Education Program by providing refuge projects and programs for the students.

3.3.3 By 2003, develop teacher workshop materials and host a teacher workshop at the marine laboratory and lighthouse of Seahorse Key.

3.3.4 By 2005, become an active partner with the Levy County School District, the University of Florida,

and the Florida Fish and Wildlife Conservation Commission's Cedar Key Marine Lab in the development of a Marine Environmental Education Center in Cedar Key. (Resource Project 5)

Objective

3.4 Provide wildlife observation, interpretation, and photography opportunities throughout the year for 30,000 visitors annually, while protecting important coastal habitat and water quality.

Strategies

3.4.1 Continue partnership with Levy County Board of Commissioners and the Suwannee River Water Management District to provide interpretive materials which are located on the county-owned dock in Cedar Key.

3.4.2 Continue to maintain and update refuge brochures and web pages to provide the most up-to-date and accurate information possible.

3.4.3 In 2001, develop a "Friends of the Refuge" group and expand the volunteer program to assist with educational and outreach efforts.

3.4.4 By 2002, develop and provide interpretive materials about the refuge to marinas and commercial boat tour and boat rental operations. This will better inform 10,000 visitors annually about the role of the refuge in the coastal ecosystem.

3.4.5 By 2002, identify site for visitor center for Cedar Keys and Lower Suwannee National Wildlife Refuges that would provide both indoor and outdoor environmental education classrooms and display space. (Resource Project 2)

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Partnerships

Goal

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

Objectives

4.1 Continue to seek additional contacts with the University of Florida, Departments of Zoology and Wildlife Ecology to expand refuge-based research. (Resource Projects 3, 4, & 8)

Pine Plantation
USFWS Ken Litzenberger

4.2 By 2002, through cooperation with the University of Florida Marine Research Lab, identify and secure funding for research projects that will aid in the protection and management of trust resources on and around Cedar Keys. (Resource Project 4)

4.3 By 2003, develop and submit a grant to the National Fish and Wildlife Foundation and a matching cooperator for an outreach or educational project.

4.4 Seek mutual cooperation with recognized Native American tribes in Florida to protect Native American sites on the refuge.

4.5 By 2003, negotiate and implement a long-term archaeological research agreement with the Department of Anthropology at the University of Florida and the Museum of Natural History.

Partnerships

A key component to implementing this comprehensive conservation plan is the establishment, development, and expansion of partnerships. Significant existing partnerships that have improved the refuge include the University of Florida, Suwannee River Water Management District, Levy County Board of County Commissioners, and Cedar Key Chamber of Commerce. Local organizations that have contributed to the operation of the refuge include Cedar Key Historical Society, Cedar Key Garden Club, and The Nature Coast Conservancy. In addition, private individuals who volunteer to assist with various projects have been and will continue to be an important partnership factor. Personal contacts and working relations have been established with other organizations including Florida Fish and Wildlife Conservation Commission's Cedar Keys Marine Research Laboratory, Cedar Key Schools, Levy County School District, and Cedar Key City Commissioners.

Fishing
USFWS Ken Litzenberger

Partnerships with state environmental agencies, local educational agencies, and local citizens--if strengthened--have the greatest potential to benefit refuge resources. Research, biological, and environmental monitoring programs will be strengthened through closer partnerships with the Suwannee River Water Management District, the University of Florida and the Florida Fish and Wildlife Conservation Commission. Environmental education and greater ecological awareness will be improved through expanded partnerships with the University of Florida, the Florida Fish and Wildlife Conservation Commission, and the Levy County School District. The limiting factors to educational and biological partnerships are the lack of funding and staffing to nurture these programs.

Many other agencies and organizations exist at the local, regional, and state level that have or can contribute to the refuge through partnerships. The number of partnerships generated is limited only by our imagination and the level of commitment by the Service.

Annual Work Plans

Future annual work plans will be developed to reflect the priorities and intent of this comprehensive conservation plan. When discretionary funding and staff are available, these work plans will be used to implement components of the comprehensive conservation plan.

Step-Down Management Plans

This comprehensive conservation plan provides conceptual guidance for potential future expansion, management, and development of the refuge. Step-down management plans are individual and subject-specific. Examples of step-down plans are fire, forestry, and hunting. The refuge's approved step-down plans are listed below. Before implementing strategies and projects, some of these specific plans may need revisions while others will need to be developed.

Approved Plans

- **Aircraft Pre-Accident Plan and Hazard Map** Aircraft are used for fire control, habitat monitoring and biological surveys. The objective of this plan is

to outline general procedures to be followed during routine flights and flight emergencies. (Revised 5/6/94).

- **Continuity of Operations Plan** It is important to maintain the capability to perform essential activities and functions under all circumstances and situations, including human-caused, natural, technological, and national security emergencies that may occur with or without notice. This plan identifies functions necessary for safety and the continuity of operations. (Written 8/10/98)
- **Fire Management** The purpose of the Fire Management Plan is to provide objectives and guidelines for managing refuge habitat. The plan provides a detailed program of action to implement fire management policies and objectives in accordance with the Fire Management Preparedness Handbook (621 FW). The Fire Management Plan for Cedar Keys Refuge is incorporated in the Lower Suwannee Refuge plan. (Approved 1/8/97)
- **Hurricane** The objective of this plan is to outline general procedures to be followed during and after hurricanes which may occur on or near Lower Suwannee and Cedar Keys Refuges. (Approved 12/17/90)
- **Pest Control** The purpose of this plan is to identify methods to reduce or eliminate raccoons on Snake Key in an effort to restore the island to colonial nesting birds. It was revised in January 2000. (Approved 5/21/93)

Approved Plans, Scheduled for Revisions

- **Law Enforcement** This plan is incorporated in the plan for Lower Suwannee National Wildlife Refuge. Its purpose is to provide refuge staff with a ready reference to Service, regional and state policies, procedures, and programs concerning refuge law enforcement activities. The present plan was approved on March 29, 1988, and is outdated. It will be revised by 2005.
- **Visitor Services Management Plan (Public Use Management Plan)** The purpose of the Public Use Management Plan, now referred to as the Visitor Services Management Plan, is to outline strategies to accomplish the refuge's public use goals without compromising the original purpose for which the refuge was established. The refuge's plan is incorporated in the plan for Lower Suwannee National Wildlife Refuge (Approved 1/7/86). It will need to be revised in the year 2002.
- **Fishing** The purpose of the Fishing Plan is to identify public fishing opportunities on the refuge. It was approved on 1/8/85. To be revised by 2001, it will be incorporated in the Visitor Services Management Plan.
- **Wildlife Management Plan (Wildlife Inventory Plan)** The purpose of the Wildlife Inventory Plan is to establish which species to inventory, standard techniques for conducting the inventories, and projected costs (Approved 4/21/86). This plan is now obsolete. A Wildlife Management Plan will be written to replace this plan. This project is to be completed by 2004.

Needed Plans or Reviews

- **Cultural Resource Management Plan** The purpose of this plan will be to clearly delineate the historic preservation process for the refuge, develop strategies to identify and assess the refuge's historic properties, identify appropriate site protection measures, and identify current and potential partners. The plan shall be in place by 2005.
- **Biological Review** Ideally, this review would have occurred prior to the initiation of this comprehensive conservation plan. It will be necessary to conduct a Biological Review prior to revision of the plan to determine if biological strategies outlined in both it and the Wildlife Management Plan are resulting in good science and sound management practices. This review should occur by 2010.

■**Wilderness Review** The purpose of a Wilderness Review is to determine if any additional refuge lands or waters meet the characteristics of Wilderness. Any lands determined to meet these criteria will then be nominated for inclusion as Wilderness areas. The Wilderness Review will be conducted by 2006.

Funding and Staffing

Cedar Keys National Wildlife Refuge has no staff and receives no funding. All protection, management, biological monitoring, and public outreach are accomplished with funds and staff from Lower Suwannee National Wildlife Refuge, when those resources are available. Cedar Keys Refuge is small and does not require a large staff, but its natural and cultural resources are important, and use of the refuge's pristine beaches and natural maritime forests by the public is increasing. In 1970, there were an estimated 900 visitors to the refuge and 600 of them were associated with the University of Florida's use of the marine science laboratory on Seahorse Key. In 1980, there were 2,800 visitors to the refuge and in 1999, there were approximately 30,000 visitors. To meet this growth and to properly manage and protect these resources, Cedar Keys Refuge must receive funding and staff.

Biological monitoring, research, and coordination with other resource-research-oriented agencies, as outlined in the objectives under goal number one of this plan, can only be accomplished by having a full-time biologist position to oversee the biological program of Cedar Keys Refuge. Concerning environmental education and outreach, only minimal efforts will be made unless a person dedicated full time to nurture these programs is hired. This person would have dual responsibilities for both Lower Suwannee and Cedar Keys Refuges. Tremendous potential exists for programs with local and state partners as well as outreach to many visitors if an outdoor recreation planner/environmental education specialist is hired. In addition to the biologist and outreach positions, a technician is necessary to maintain facilities, signs, and equipment; conduct law enforcement patrol for protection of resources and visitors; and to assist with biological monitoring efforts. The secondary assistant refuge manager, or refuge operations specialist, stationed at Lower Suwannee Refuge for the purpose of career development, will be given the responsibility of overseeing daily operations of Cedar Keys Refuge. A minimum of three staff people and appropriate operational funding is needed in order to complete the objectives and strategies of this plan.

Water Snake
USFWS ©Bruce Colin

Funding can come through a variety of internal and external sources. Refuge maintenance and operation funds should be allocated. The Service also needs to explore ways to leverage dollars through new and innovative matching grant programs with public and private sources. Without funding, the refuge will continue to operate at its present minimal level and the "No Action Alternative" will become the implemented alternative, with the Service not meeting its mandates for protecting the natural resources and providing public use at Cedar Keys National Wildlife Refuge.

Resource Projects

Several resource projects directly support the refuge's goals and objectives. They do not necessarily fit under one particular goal, but rather support several goals.

Project 1

Initial Base Funding Base funding is needed to employ personnel and cover normal, routine expenses. Three new staff positions and their connection to refuge goals are identified in the funding and staffing section of this plan. These positions will require equipment and transportation and will increase utility expenses (fuel, electricity, telephone). The estimated initial cost for these three full-time positions including salary, benefits,

equipment, and operation needs is approximately $300,000. The recurring annual cost would be approximately $250,000.

Project 2

Administrative Facilities, Visitor Services, and Education Center Construction of a headquarter's facility is needed and would include a visitor center with interpretive displays, exhibits, and book store; an environmental education classroom; a large conference room; and six administrative offices. This facility will also serve Lower Suwannee National Wildlife Refuge and will be in a location that supports both refuges and will serve a large number of visitors. The estimated construction cost is $2,000,000.

In lieu of a visitor center, a smaller administrative office and visitor contact station could be constructed. This facility would still support both refuges and have space enough for minor exhibits and a meeting room. The cost for the project would be approximately $400,000. (The costs associated with either facility were identified in the projects listed in the Lower Suwannee National Wildlife Refuge Comprehensive Conservation Plan and does not represent additional funding needs.)

Project 3

Study of Mercury Contamination at Seahorse Key Compared with Other Rookeries in Florida In 1998, the Seahorse Key colonial bird rookery was used as the control site in a comparison of contaminated sites to distinguish the effect of mercury on juvenile survival, as well as to determine the relative importance of mercury in the egg and mercury acquired through food as a nestling. Surprisingly, mercury levels in white ibis and great egret chicks at Seahorse Key were found to be some of the highest in the state. In 1999, the statewide sample was not collected, but the sample at Seahorse Key was continued in an effort to determine the source of the mercury concentration. Mercury levels in 1999 were approximately 63 percent lower than in the previous year. Researchers also conducted following flights to identify where the adult birds were feeding. The data suggests that most birds are feeding in salt marshes. Traditionally, the birds used predominantly freshwater areas for feeding. However, during the 1999 survey the area experienced drought conditions and fresh water was limited. This study would continue the research to determine where the birds from the rookery are foraging and if the source of mercury is from the freshwater wetlands where they forage. The approximate cost of this project is $50,000.

Project 4

Amphibian and Reptile Population Dynamics Refuge islands support healthy amphibian and reptile populations, including high densities of venomous snakes. Due to habitat conditions on the islands, the lack of standing fresh water, and dependence on colonial birds for food, these populations and their dynamics and relationships to avian use need to be assessed. An extension of this study would be the mercury contamination study of project number 3. The snakes feed on eggs, young birds, and dropped food that adult birds bring to the nest for their young. The mercury levels of the birds should be reflected in the snakes. The University of Florida is interested in this research and would provide professors and students as principal investigators. The research would take 2-3 years to complete at an estimated cost of $120,000.

Project 5

Develop Education Facilities Comments from the public during the scoping process clearly indicated the need for and support of improved environmental education opportunities. The refuge is part of the Aquatic Education Advisory Committee in Cedar Key with Florida's Marine Research facility, the University of Florida, and Levy County Schools. This committee has identified the need for an outdoor classroom facility

in Cedar Key, off refuge property. Ideally, it would be located next to the state's research facility. The facility would include a pole shed type structure with running water, electricity, wet and dry diagnostic tanks; and facilities for lodging and feeding the students. These facilities could serve school children of all ages, not only in the tri-county area, but throughout the state. The Service's share of the cost is estimated at $100,000.

Project 6

Archaeological and Historical Survey A comprehensive archaeological survey of the refuge should be conducted. A portion of the Cedar Keys Historic and Archaeological District, listed on the National Register of Historic Places, is on the refuge. Included in the district are a number of Native American sites, many dated to between 500 B.C. and 12 A.D.; the town of Atsena Otie Key; the Seahorse Key Lighthouse; and several Native American and historic period cemeteries. This project is critical to identifying, mapping, protecting, and interpreting the refuge's cultural resources. The estimated cost is $200,000 and is included in Comprehensive Conservation Plan for Lower Suwannee National Wildlife Refuge.

Project 7

Atsena Otie Key Enhancements Depending on the tides, the deck of the public dock at Atsena Otie Key is 6 to 8 feet above the water. In order to improve visitor safety, hand rails need to be constructed on both sides of the 400-foot-long dock. In 1999, a kiosk was constructed on Atsena Otie Key. It provides general information about Cedar Keys National Wildlife Refuge and its history. Additional information panels are needed along the trail and a map panel is needed at the kiosk. Interpretive panels will improve the visitor experience and provide information about the natural and cultural resources. The estimated cost for this project is $20,000.

Project 8

Sea Turtle Population Use The near shore habitat along the north-central Gulf Coast of Florida is important summering grounds for three sea turtle species: loggerhead, green, and Kemp's ridley. The Kemp's ridley sea turtle is the most endangered of the seven extant marine turtle species. Grassbed, channel, and flats habitats are important feeding areas for all three species. Such habitat in the Suwannee Sound, including miles of refuge coastline, may be critical to survival of the Kemp's ridley. This study would inventory sea turtles, determine relative abundance, identify patterns of habitat use, and determine seasonal use. The estimated cost for the study is $50,000.

Table 3. Funding Needs for Special Resource Projects of Cedar Keys National Wildlife Refuge

PROJECTS	$ FUNDING COST	FIRST YEAR NEED	RECURRING BASE
1. Initial Base Funding	$300,000		$250,000
2. Visitor Center et al.		**[1]	**
3. Mercury Study		50,000	
4. Amphibian Study	120,000		
5. Educational Facilities	100,000		5,000
6. Archaeological Study	**[1]		
7. Atsena Otie Key Enhancements	20,000		
8. Sea Turtle Use	50,000		

[1] Project shared with Lower Suwannee Refuge; funding was identified in the Lower Suwannee Refuge Resource Project Funding Table.

Volunteers

Volunteer assistance to the refuge continues to be stable. The number of volunteers is low, but those individuals who do volunteer have made substantial contributions to the refuge. Students, local organizations, and retired individuals have provided volunteer assistance. However, many opportunities exist through the implementation of this comprehensive conservation plan and through staffing to greatly expand volunteer involvement. The formation of an official, registered "Friends Group" for Lower Suwannee and Cedar Keys National Wildlife Refuges will provide a source for recruiting interested citizens, developing meaningful projects for the volunteers, and accomplishing refuge goals and objectives.

Monitoring and Evaluation

As indicated throughout this comprehensive conservation plan, the importance of monitoring flora and fauna and evaluating the effects of visitor use are critical to obtaining the stated goals and objectives. This plan will be augmented by revised, step-down management plans that will address specific types of monitoring and targeted species. Every 5 years the plan will be reviewed to document progress and reassess direction. Public involvement in evaluating progress and implementation will be encouraged.

Since Cedar Keys National Wildlife Refuge is a collection of small coastal islands with limited resources, monitoring is very important and achievable. Although not all inclusive, monitoring priorities include:

- colonial bird rookery
- neotropical bird use
- predation
- exotic species control
- natural vegetative communities
- aquatic grass beds
- water quality
- public use and impacts
- cultural resource

CEDAR KEYS NATIONAL WILDLIFE REFUGE

DRAFT Comprehensive Conservation Plan

Appendix A
Lower Suwannee
National Wildlife Refuge
ENVIRONMENTAL ASSESSMENT

U.S. Fish and Wildlife Service
1875 Century Boulevard
Atlanta, Georgia 30345

December 2000

Purpose and Need for Action

The U.S. Fish and Wildlife Service proposes to implement a Comprehensive Conservation Plan to guide the management of the Lower Suwannee National Wildlife Refuge located in Levy and Dixie Counties, 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 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 state and federal jurisdictions, interest groups, and private citizens have 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 Habitat Management and Public Use, 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. To effectively address them, they were grouped into three categories: Wildlife Habitat Management, Public Use, and Partnerships.

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 due to the lack of biological staff dedicated to developing a comprehensive biological program. Many people felt that staffing and funding should increase to address this need.

WH3 Staff should initiate research partnerships with U.S. Geological Survey and Suwannee River Water Management District to assist and expand water flow and water quantity impact studies on refuge habitat.

People were concerned that the growth of the Tampa Bay area would put too much pressure on the Suwannee River and its natural resources. Some individuals mentioned that partnerships offer an increased opportunity to protect the Suwannee River ecosystem and the wildlife and habitats found therein, and would ensure that water quality and quantity are protected.

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

People valued the opportunities to participate in wildlife-dependent recreation on the refuge, but there was an overwhelming concern that public use be monitored and managed. One suggestion centered around clustering public use areas within the refuge in order to limit degradation of resources in certain areas. Other areas would remain natural, without the development of public use facilities.

WH5 Management activities should preserve and restore refuge ecosystems.

Many people wanted to see the refuge restored and managed in as natural a condition as possible. Much of the lands acquired to establish Lower Suwannee National Wildlife Refuge was severely degraded or was intensively altered by prior land use practices. Thousands of acres of longleaf, native slash, and scattered loblolly pines were cut and replanted with genetically improved slash pine in plantations. In addition, thousands of acres of mixed pine/hardwood stands were converted to slash pine plantations. Intensive site preparation, which altered the understory vegetation, was used to make these sites suitable for pine trees. Additionally, an extensive network of roads and ditches was developed to facilitate timber management.

Public Use

PU1 The refuge should continue to provide the public with access and compatible consumptive and non-consumptive uses in a manner that minimizes conflicts between user groups and does not significantly impact habitat.

Some people believed the refuge was not open to the general public during hunting season, was unsafe, and that the entire refuge was open to hunting. Both hunters and non-hunters wanted a better understanding of game seasons and closed areas. The majority of people supported both consumptive and non-consumptive uses. A few people were opposed to hunting.

PU2 Hunter groups requested better management and access for hunting activities on the refuge.

Hunters felt access to refuge habitats was inadequate and a few hunters requested access to the refuge via 3- or 4-wheelers. A majority of the public, however, opposed this type of access. Some hunting groups also suggested that we could improve the hunting experience as well as improve overall game species health by establishing food plots. Many hunters believed that game populations were low on the refuge due to inadequate forage.

PU3 Other user groups requested more opportunities for passive recreational uses on the refuge.

The majority of people wanted additional opportunities to watch and photograph birds and other wildlife. One group and a few individuals disapproved of any consumptive public uses (hunting, fishing, trapping) on all national wildlife refuges. Another group specifically requested additional bike trails on the refuge.

PU4 Staff is needed to expand environmental education and interpretation programs and increase involvement with public schools.

People expressed that the refuge's present environmental education and interpretation programs were not meeting the demands for these programs for area youth. People believed staffing is inadequate to conduct such programs.

PU5 Environmental education and outreach should include adult groups, as well school-aged groups.

It was also felt that refuge staff needed to reach adult groups and provide wildlife conservation and ecological preservation information to them.

PU6 The public thought staff and facilities should be increased, particularly for the Dixie County portion of the refuge.

At Lower Suwannee Refuge, all staff are based out of the Levy County compound and administrative area. The Dixie County portion of the refuge is more than 50 miles from the administration area. Because of lack of staff presence on a daily basis, vandalism and littering are growing problems. People felt that if staff were stationed in this county, maintenance issues could be addressed on a daily basis, and relationships could be developed with local people so they might feel a sense of pride and ownership of the refuge.

People in Dixie County also requested improved facilities. Currently, there is only a small administrative area and maintenance compound including a 5-bay pole shed, fuel tanks, and an abandoned, dilapidated trailer.

PU7 Staff should recruit student interns and more volunteers to assist with projects and research. There was 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. The people were concerned that there were still lands within

the acquisition boundary that were in private ownership. Many individuals believed that the refuge should actively seek to purchase these lands in order to ensure that they would remain natural and would not be developed.

Alternatives Discussed but Eliminated from Further Analysis

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

Alternative D	Custodial Management
Alternative E	Maximize Resource Management with Minimum Public Use

These alternatives were eliminated from further consideration early in the planning process. Alternative D 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. In Alternative E, all staffing and funding would support resource management. While this alternative would benefit wildlife and habitat management, the refuge would not be able to provide wildlife compatible recreational opportunities as required by the National Wildlife Refuge System Improvement Act of 1997. Staff would be unable to maintain existing public use facilities and minimum public use standards could not be met. The alternative was eliminated from further consideration because it is incompatible with the above referenced Act.

Alternatives Including Proposed Action

The following section analyzes the three management alternatives for Lower Suwannee 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 under each alternative. The three alternatives can be compared by reviewing the objectives and strategies related to each issue.

Alternative A. Maintain Current Management (No Action)

This alternative 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, protection of resources, and outreach would remain the same. Current biological monitoring would continue, but not be modified or expanded. Research would continue to be piecemeal with limited refuge involvement and with no projects initiated by professional staff. Environmental education would occur at current levels with no expansion and no systematic involvement by refuge staff. Public use facilities such as boardwalks, fishing piers, trails, and kiosks would be maintained, but not improved to include interpretation. Resources would be protected at current levels. Finally, contact with potential partners would continue, but those relationships would not grow or strengthen due to a lack of consistent nurturing. The present staffing and funding levels would remain unchanged.

Goal 1

Wildlife

Expand scientifically based monitoring and research to support management decisions on wildlife habitat and populations.

Objective:

1.1 Continue current monitoring programs for bald eagle, osprey and manatee; continue to support U.S. Geological Survey and

Service efforts to monitor threatened Gulf sturgeon that use the Suwannee River and coastal estuary by providing assistance in storing, transporting, and setting up equipment for field research, as needed; develop and implement a Breeding Bird Survey; participate in migratory shore bird surveys in the spring and fall seasons; conduct a baseline survey of gopher tortoises; and continue to participate in the Audubon's Christmas bird counts.

Goal 2

Habitat Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitat, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.

Objectives:

2.1 Maintain habitat for migrating, wintering, nesting, and foraging birds, with special emphasis on threatened and endangered species, neotropical migratory birds, and colonial wading birds.

2.2 Refine and implement a prescribed fire program to restore and maintain healthy, fire-dependent communities. Implement the Fire Management Plan.

2.3 Refine and implement an active forest management program to restore and maintain healthy and diverse forest communities. Update the Forest Management Plan.

Goal 3

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

Objectives:

3.1 Protect known archaeological and historical sites on the refuge through sporadic law enforcement patrol.

3.2 Evaluate a minimum of 15 miles of refuge boundary annually. Mark refuge boundaries with signs and paint as needed.

3.3 Protect refuge habitats from wildfire through the fire program, staffing, proper training, and equipment readiness. The station would monitor fire conditions and respond according to approved plans and procedures.

3.4 Protect bald eagle nests by monitoring for disturbance and, if necessary, close area around nests during the nesting season.

3.5 Provide visitor safety and resource protection, and ensure compliance with refuge regulations for 100,000 visitors annually through law enforcement patrol and public use contacts.

3.6 Work cooperatively with local, state, and other federal law enforcement agencies to enhance resource protection.

3.7 Maintain present road system containing 50 miles of primary refuge roads for public vehicle access and for habitat improvement, protection, and management through grading, mowing, repairs, and culvert replacement.

3.8 Maintain secondary road system for habitat protection, management, and improvement, as well as for foot or bike traffic by the public by mowing, boom axing, grading, and replacing culverts.

3.9 Maintain more than $1,000,000 worth of capitalized equipment used in all aspects of refuge management including habitat, wildlife, and public use.

1.4 Develop a Geographic Information System database management and mapping system with plant and wildlife communities and management layers. (Resource Project 7).

Goal 2

Habitat

Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitats, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.

Objectives:

2.1 Maintain habitat for migrating, wintering, nesting, and foraging birds, with special emphasis on threatened and endangered species, neotropical migratory birds, and colonial wading birds.

2.2 Refine and implement a prescribed fire program to restore and maintain healthy, fire-dependent communities.

2.3 Refine and implement an active forest management program to restore and maintain healthy and diverse forest communities.

2.4 Protect wildlife habitat and water quality and quantity through land acquisition.

Goal 3

Protection of Resources

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

Objectives:

3.1 Protect known archaeological and historical sites on the refuge from illegal take or damage in compliance with the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act.

3.2 Annually evaluate a minimum of 15 miles of refuge boundary. Delineate refuge boundaries with signs and paint as needed.

3.3 Continue to protect refuge habitats from wildfire through the fire program, properly trained staff and equipment readiness. The station will monitor fire conditions and respond according to approved plans and procedures.

3.4 Continue to protect bald eagle nests by monitoring for disturbance and, if necessary, by closing areas around nests during the nesting season.

3.5 Continue to provide visitor safety, protect resources, and ensure compliance with refuge regulations for more than 100,000 annual visitors through law enforcement patrols and public use contacts.

3.6 Continue to work cooperatively with local, state, and other federal law enforcement agencies to enhance resource protection.

3.7 Maintain present road system containing 50 miles of primary refuge roads by grading, mowing, and replacing culverts as needed, for public vehicle access and for habitat improvement, protection, and management.

3.8 Maintain access to the secondary roads system by mowing, boom axing, grading, and replacing culverts as needed, for habitat protection, management, and improvement for refuge staff, public foot and bike traffic.

3.9 Identify additional lands and seek funding to acquire such lands that would improve resource protection and aid in fulfilling the mission and purpose of the refuge.

3.10 Maintain more than $1,000,000 worth of capitalized equipment used in all aspects of refuge management including habitat, wildlife, and public use.

3.11 By 2005, conduct a wilderness review of the refuge. The purpose of a wilderness review is to determine whether any refuge lands or waters meet the characteristics of wilderness. Any lands determined to meet these criteria will then be nominated for inclusion as Wilderness Areas

Goal 4

Public Use

Provide opportunities for environmental education and interpretation and wildlife-dependent recreation in accordance with the National Wildlife Refuge System Improvement Act of 1997.

Objectives:

4.1 By 2002 develop and implement a Visitor Services Management Program.

4.2 By 2002, identify site for a visitor center or visitor contact station to serve both Lower Suwannee and Cedar Keys National Wildlife Refuges. Visitors will learn about the Service, the National Wildlife Refuge System, and both local refuges and the trust resources they protect. Seek funding support from Congressional representatives, local governments, organizations, and individuals.

4.3 Develop and implement an environmental education program that will result in a greater understanding and appreciation of refuge flora, fauna, and habitats.

4.4 Update existing materials and develop new interpretive materials, including brochures, interpretive panels, kiosks, and exhibits that highlight refuge resources.

4.5 Provide opportunities for hunting and fishing on the refuge in a manner that minimizes conflicts between consumptive and non-consumptive user groups.

4.6 Develop a volunteer program which offers resource, educational, and maintenance projects to accommodate a diverse volunteer community.

4.7 By 2001, develop a Friends Group for both Lower Suwannee and Cedar Keys National Wildlife Refuges.

Goal 5

Landscape Management

Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural resources within the Big Bend Region of Florida, the Suwannee River Basin, and the North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

Objectives:

5.1 Continue participation in North Florida Ecosystem Team and support team priorities and projects.

5.2 By 2005, develop partnerships with local school districts and state environmental agencies such as the Suwannee River Water Management District, Florida Department of Environmental Protection, and Florida Fish and Wildlife Conservation Commission to promote and provide environmental education opportunities on and off the refuge.

5.3 By 2006, develop partnerships to protect water quality and quantity and to promote research on trust resources of the refuge.

5.4 Maintain partnerships with local community organizations and environmental agencies to promote and guide the development

of nature-based tourism while maintaining the "wildlife first" requirement of the National Wildlife Refuge System Improvement Act.

5.5 Continue to develop partnerships with national and state organizations to acquire necessary lands for the protection of trust resources and the fulfillment of the purpose and mission of the refuge.

5.6 Seek mutual cooperation with recognized Native American tribes in Florida to protect Native American sites on the refuge.

Alternative C. Maximize Public Use

This alternative emphasizes public use over biological monitoring and habitat enhancement. The biological program would be maintained at current levels. Habitat management would occur at current levels, but no evaluation and modification of management would occur. Any new staffing or funding would promote the six priority public uses. Protection efforts would concentrate on visitor safety. This alternative would support strengthening of partnerships with community organizations; however, partnerships with researched-based agencies and universities would not be enhanced or emphasized. Two new positions that are identified in the plan (biologist and biological technician), would not be added to current staffing levels. Project No's. 3, 4, 5, 7, 11 and 14 would be omitted from the Resource Projects section of the Lower Suwannee National Wildlife Refuge Comprehensive Conservation Plan. Table 2, Special Resource Project Funding, would reflect the reduced cost resulting from eliminating these non-public use resource projects as they are not related to maximizing public use.

Goal 1

Wildlife

Expand scientifically based monitoring and research to support management decisions regarding wildlife habitat and populations.

Objective:

1.1 Continue current monitoring programs for bald eagle, osprey, and manatee; continue to support U.S. Geological Survey and Service efforts to monitor threatened Gulf sturgeon that use the Suwannee River and coastal estuary by providing assistance for storing, transporting, and setting up equipment and for field research, as needed; develop and implement a Breeding Bird Survey; participate in migratory shore bird surveys in spring and fall seasons; conduct a baseline survey of gopher tortoises; and continue to participate in the Audubon Christmas bird counts.

Goal 2

Habitat

Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitat, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.

Objectives:

2.1 Maintain habitat for migrating, wintering, nesting, and foraging birds, with special emphasis on threatened and endangered species, neotropical migratory birds, and colonial wading birds.

2.2 Refine and implement a prescribed fire program to restore and maintain healthy, fire-dependent communities. Implement the Fire Management Plan.

2.3 Refine and implement an active forest management program to restore and maintain healthy and diverse forest communities. Update the Forest Management Plan.

Goal 3

Protection of Resources

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

Objectives:

3.1 Protect known archaeological and historical sites on the refuge through sporadic law enforcement patrol.

3.2 Evaluate a minimum of 15 miles of refuge boundary annually. Mark refuge boundaries with signs and paint, as needed.

3.3 Protect refuge habitats from wildfire through the fire program, staffing, proper training, and equipment readiness. The station would monitor fire conditions and respond according to approved plans and procedures.

3.4 Protect bald eagle nests by monitoring for disturbance and, if necessary, close area around nests during the nesting season.

3.5 Provide visitor safety and resource protection, and ensure compliance with refuge regulations for 100,000 visitors annually through law enforcement patrol and public use contacts.

3.6 Work cooperatively with local, state, and other federal law enforcement agencies to enhance resource protection.

3.7 Maintain present road system containing 50 miles of primary refuge roads for public vehicle access and for habitat improvement, protection, and management through grading, mowing, repairs, and culvert replacement.

3.8 Maintain access to the secondary road system by mowing, boom axing, grading, and replacing culverts for habitat protection, management, and improvement and for public foot and bike traffic.

3.9 Maintain more than $1,000,000 worth of capitalized equipment used in all aspects of refuge management including habitat, wildlife, and public use.

Goal 4

Public Use

Provide opportunities for environmental education, interpretation, and wildlife-dependent recreation in accordance with the National Wildlife Refuge System Improvement Act of 1997.

Objectives:

4.1 Develop and implement a Visitor Services Management Program.

4.2 Identify a site for visitor center or visitor contact station to service both Lower Suwannee and Cedar Keys National Wildlife Refuges. Seek funding support from local governments, organizations, and individuals.

4.3 Develop and implement an environmental education program that results in a greater understanding and appreciation of refuge flora, fauna, and habitats.

4.4 Develop and produce interpretive materials including brochures, panels, and kiosks that highlight refuge resources.

4.5 Provide opportunities for hunting and fishing on the refuge in a manner that minimizes conflicts between consumptive and non-consumptive user groups.

4.6 Develop a volunteer program which offers resource, educational, and maintenance projects to accommodate a diverse volunteer community.

4.7 Develop a Friends Group for both Lower Suwannee and Cedar Keys National Wildlife Refuges.

Goal 5

Landscape Management Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural resources within the Big Bend Region of Florida, the Suwannee River Basin, and the North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

Objectives:

5.1 Continue participation in North Florida Ecosystem Team and support team priorities and projects.

5.2 Develop partnerships with local school districts and state environmental agencies such as the Suwannee River Water Management District, Florida Department of Environmental Protection, and Florida Fish and Wildlife Conservation Commission to promote and provide environmental education opportunities on and off the refuge.

5.3 Maintain partnerships with local community organizations and environmental agencies to promote and guide the development of nature-based tourism while maintaining the "wildlife first" requirement of the National Wildlife Refuge System Improvement Act.

Issues and Concerns

Wildlife Habitat Management

Below is a summarized list of the issues and concerns for Lower Suwannee National Wildlife Refuge. The abbreviations used in the list are also used in Table 4 which describes how each alternative addresses the needs and issues voiced by the public concerning future refuge 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.

WH3 Staff should initiate research partnerships with U.S. Geological Survey and Suwannee River Water Management District to assist and expand water flow and 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 refuge should continue to provide the public with access and compatible consumptive and non-consumptive uses in a manner that minimizes conflicts between user groups and does not significantly impact habitat.

PU2 Hunter groups requested better management and access for hunting activities on refuge.

PU3 Other user groups requested more opportunities for passive recreational uses on the refuge.

PU4 Staff is needed to expand environmental education and interpretation programs and increase involvement with public schools.

PU5 Environmental education and outreach should include adult groups, as well as school-aged groups.

PU6 The public thought staff and facilities should be increased, particularly for the refuge.

PU7 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 4. Issues and Alternatives Matrix for Lower Suwannee National Wildlife Refuge *(Cont'd.)*

ISSUES	ALTERNATIVE A No Action	ALTERNATIVE B Enhance Habitat Management	ALTERNATIVE C Maximize Public Use
Wildlife Issues ■WH1 ■WH2	Continue existing monitoring programs Does not expand monitoring programs	Expands monitoring and research programs Evaluates population parameters and recommends management alternatives Initiates baseline surveys of plants, animals, and invertebrates Partners to conduct research Updates Wildlife Inventory Plan Develops GIS database, analysis, and mapping capabilities	Continues existing monitoring programs Does not expand monitoring or research
Habitat Issues ■WH1 ■WH2 ■WH5	Maintains current habitat management regimesin forestry, fire,and restoration programs	Expands and improves forestry, fire, and restoration programs by applying research findings and tailoring management based on wildlife population parameters Partners to conduct research	Maintains current habitat management regimes in forestry, fire and restoration programs
Protection of Resources ■P2	Continues sporadic protection of known archaeological sites and maintains current levels of resource protection and maintenance	Improves protection of known archaeological sites through regular law enforcement patrol; inventories refuge archaeological sites; compiles a comprehensive literature review of archaeological, anthropological, and historical investigations within and near the refuge; and develops and implements an archaeological site protection plan Continues sporadic protection of known archaeological sites and maintains current levels of resource protection and maintenance Improves resource protection through an active land acquisition program	Continues sporadic protection of known arcaeological sites and maintains current levels of resource protection and maintenance

Table 4. Issues and Alternatives Matrix for Lower Suwannee National Wildlife Refuge *(Cont'd.)*

ISSUES	ALTERNATIVE A No Action	ALTERNATIVE B Enhance Habitat Management	ALTERNATIVE C Maximize Public Use
Land Acquisition ■WH2 ■WH3 ■WH5 ■P1 ■P2	**No Program**	Provides an active land acquisition program to acquire significant habitats for threatened and endagered species and inholdings within the approved refuge boundary $10,010,000 estimated acquisition costs	**No Program**
Public Use ■WH4 ■PU1 ■PU2 ■PU3 ■PU6	**Maintains current public use and maintenance of structures**	Enhances public use program through the development of interpretive materials, improved facilities, and improved hunting and fishing opportunities	**Expands public use program by developing additional trails and facilities, developing interpretive materials, maximizing hunting opportunities within state seasons, and improving fishing access**
Funding and Staffing Issues ■PU6	**Maintains current levels of staffing and funding** **$537,000 (FY2000) (operations, maintenance, and staffing)**	Maintains current levels and adds new positions to support biological, management, outreach and education programs and increases funding in all refuge programs $1,997,000 (first year need, operations and staffing) $1,297,000 (recurring operations and staffing) $4,395,000 (special project monies)	**Maintains current levels and adds new positions to support outreach and education. Increase funding to support public use and outreach programs only** **$1,557,000 (first year need, operations and staffing)** **$1,057,000 (recurring, operations and staffing)** **$3,415,000 (special project monies)**
Outreach and Environmental Education Issues ■PU4 ■PU5 ■PU7	**Maintains current levels of outreach, environmental education, and partnerships** **No visitor center**	Expands outreach, environmental education, and partnerships Identifies site for a visitor center	**Maximizes outreach, environmental education, and partnerships** **Identifies site for a visitor center**

Table 4. Issues and Alternatives Matrix for Lower Suwannee National Wildlife Refuge

ISSUES	ALTERNATIVE A No Action	ALTERNATIVE B Enhance Habitat Management	ALTERNATIVE C Maximize Public Use
Partnership Issues ■WH1 ■WH3 ■WH5 ■PU4 ■PU5 ■PU7 ■PU1 ■P1 ■P2	**Supports the North Florida Ecosystem** **Maintains partnerships with local organizations for the development of ecologically sound nature-based tourism** **Continues sponsorship of Naturefest**	Suports the North Florida Ecosystem Expands partnerships with schools Expands partnership with District to monitor water quality and quantity, inventory and study of aquatic species, and protect river corridor Expands partnership with University of Florida for increased research Expands partnerships with local organizations for the development of ecologically sound nature-based tourism Continues sponsorship of Naturefest Seeks community support for visitor/education center Coordinates with organizations to apply for grants on collaborative projects Seeks cooperation with Tribes to protect Native American sites on the refuge	**Supports the North Florida Ecosystem** **Expands partnerships with schools** **Expands partnerships with local organizations for the development of ecologically sound nature-based tourism** **Continues sponsorship of Naturefest** **Seeks community support for visitor/education center** **Coordinates with oprganizations to apply for grants on collaborative projects which support public use, outreach, and environmental education**

Affected Environment

The following section describes the natural environment of the areas which could be affected by the proposed management direction. It also addresses the human environment and the socioeconomic factors that could be affected.

General

Lower Suwannee National Wildlife Refuge is located on the Gulf Coast of Florida in Dixie and Levy Counties, about 50 miles southwest of Gainesville. The refuge protects the lower reaches of the Suwannee River, which has been designated as an "Outstanding Florida Water" by the state. The Suwannee River originates in the Okefenokee Swamp in Georgia and flows through the Florida peninsula for 245 miles before emptying into the Gulf of Mexico. The refuge lies within the Florida Panhandle Watersheds Unit, as classified by the U.S. Geological Survey and within a subtropical coastal zone characterized by flat lowlands and gently rolling sandhills.

Economic and Social Conditions

Although Levy and Dixie Counties are located on the Gulf Coast, they have not yet had the extensive growth experienced by many other Florida areas. Both counties are rural and rank among the lowest 20 percent in the state for population density. Levy County is about 75 percent forest, and Dixie County is about 90 percent forest. Farming activities are oriented more to cattle raising and horse breeding, followed by crop farming with corn, peanuts, and watermelons accounting for the primary crops. Industrial activities in the counties are associated with forestry, farming, and road construction. Commercial fishing and shell fishing are significant industries, although catches have declined appreciably in recent years. Personal and family incomes in these counties are among the lowest in the state. Approximately one out of five families was living at or below the poverty level in 1989. Although tourism and the number of retired residents have not been major factors thus far in the economic and social growth of this area, they are becoming more significant and can be expected to grow at an increasing rate.

Geology and Water Quality

The Suwannee River and its tributaries drain more than a 10,000-square-mile-area. Starting from boggy channels of coffee-colored waters in the Okefenokee National Wildlife Refuge near Waycross, Georgia, the river begins its 265-mile course to the Gulf of Mexico. During its course from the Okefenokee to the Gulf, the water character changes substantially. The upper portion of the river flows through the yellow clay of Georgia's Tifton Upland and then through the white sand country of Florida's Trail Ridge. Below Branford, the Suwannee River assumes the water qualities of a giant spring while above Ellaville, the flows characterize the typical cypress-stained waters of the Okefenokee. These characteristics are occasionally overridden by the muddy flood waters of Georgia's Withlacoochee and Alapaha Rivers.

The coastline of the refuge is marshy and quite irregular with many islets lying just offshore. Many creeks of various lengths originate at the inner boundary of the marshland and flow in meandering channels toward the Gulf. The coastal waters are quite shallow. Nautical charts show the 1-fathom contour being 1 to 5 miles offshore and the 5-fathom contour about 25 miles offshore, indicating a slope slightly in excess of 1-foot per mile. The coastal marshes are from 1 to 3 miles wide and consist of mud and silt which support the marsh plant communities. Occasionally, there are barren stretches where rock is exposed. The coastal marshes extend up the mouths of streams and merge with the alluvial flats that border the stream channels.

Of particular importance to this area is the geologic feature named the Silver Bluff Terrace and Shoreline. The 10-foot contour line may be used to mark the strand line of the Silver Bluff Sea. This is the youngest of

three Pleistocene surfaces and shorelines. The two preceding were the Pamlica and Wicomica.

Total stream flow of the Suwannee varies greatly from year-to-year and during a given year. The river flow in the 30-year period of record has been as great as 84,000 cubic feet per second (cfs) (gauge height of 22.32 feet at U.S. Highway 19) in April 1948, and as low as 3,270 cfs (gauge height of .57 feet) in February 1957, resulting in an average stream flow of 10,942 cfs, as measured at the gauging station near the town of Suwannee. Up river at Fargo, Georgia, the maximum gauge height was 19.6 feet and there was no flow in the river for certain periods in 1931, 1943, and 1954. Zero flows probably occur more often below the sill in the Okefenokee Swamp than at Fargo. In its most menacing flood conditions, as in 1928 and 1948, the Suwannee fills its basin with relatively quiet water. Flood damage is seldom due to strong current, but rather to the slow rate of the water's departure. The slow advance and retreat of flood waters are attributed to absorbing capacities of the Okefenokee Swamp and the Florida Aquifer, combined with the 6-inch gradient per mile of the river.

The Suwannee River is relatively free of biological and chemical pollutants. Some bacteriological pollution exists in localized areas near towns and in the Okefenokee Swamp. The river enters Florida low in dissolved inorganic matter, but with a high concentration of dissolved organic material resulting in a pH of about 4.5. Hardness and pH increase progressively downstream due to the flow over limestone. The murkiness decreases, the color becomes lighter, and the clarity increases with the dilution by springs. Potential sources of pollutants which require continuous monitoring include: (1) effluent from paper mills on the With thelacoochee River in Georgia; (2) chemically polluted waters from the Santa Fe River; (3) runoff from strip mines draining into the Swift Creek tributary; and (4) nitrates from dairies and poultry farms, which are increasing along the middle reaches of the Suwannee River.

At present, the quality of Suwannee River water is being determined by a detailed cooperative monitoring program conducted bimonthly by the Suwannee River Water Management District and the U.S. Geological Survey. Under this program, river water samples are taken at nine sites in Florida and one site in Georgia. The Suwannee River is an interstate stream, and water quality standards have been established by Florida and Georgia. The water quality criteria established by the two states are subject to further revision in the future.

The Suwannee River Water Management District is presently in the process of determining minimum flow requirements for the river as required by Florida law. There has also been some discussion within the past few years to pipe water from the Suwannee River watershed to the heavily populated Tampa Bay area.

Topography

Lands within the refuge are relatively flat and are primarily of elevations below and slightly above mean high tides. Much of the surface soil is inundated by tidal action or by surface runoff and an impeded drainage system.

This portion of the west coast of Florida is an area of low energy exchange with a mean tidal amplitude of about 2.5 feet. The winds play an extremely important part in controlling the movements of water and resulting depths. The influence of the Suwannee River on this estuary is very significant.

Refuge elevations rarely exceed 20 feet above mean sea level. These elevations are generally found as islands within the tidal marsh zone or small remnant dunes. The 10-foot contour is the general line prescribing the refuge boundary. The vegetative patterns along the coast and the Suwannee River delineate the approximate 5- and 10-foot contour lines.

Minerals and Soils

The soils of the coastal plains are derived primarily from unconsolidated, stratified, marine sediments. The underlining bedrock is generally limestone with sediments of thin-bedded, fine-grained dolostone that alternates with phoshorite and quartz. Limestone is mined in both Dixie and Levy Counties. Phosphate is mined to the north of the area in Hamilton County. Other counties in the Suwannee Basin are also considered to hold reserves of both limestone and phosphate.

The Levy County portion of the refuge has been mapped for soils. Along the coast the primary soil is tidewater mucky clay, along the river, it is primarily terra ceia soils. Moving inland, Placid and Samsula soils and Myakka mucky sand dominate. The higher elevations are fine sands with Placid and Popash soils in the depressions.

No known gas or oil deposits exist within the refuge. Exploration for petroleum and natural gas within the Suwannee Basin apparently revealed no producing wells.

Climate

Levy and Dixie Counties are low-lying, subtropical, coastal areas. Because they lie within the frost belt, tropical fruits and vegetables do not flourish. The annual temperatures average about 77° Fahrenheit, ranging from a mean 81° August temperature to a 57° January average. No predictable dry or rainy season exists for the region, although December, January, and February are generally the driest months, with June, July, and August being the wettest. During the summer months, rain clouds form offshore and move inland to precipitate showers 15 to 20 miles from the coast. These showers account for a significant portion of the average annual rainfall of 54 inches. The area is in the hurricane belt and these tropical disturbances produce winds of very high velocity and destructiveness.

Land Uses

Forestry constitutes the primary land use within the area. The most intensive forestry is practiced on the higher upland areas where hardwood hammocks and longleaf pine sand ridges have been converted primarily to monoculture slash pine plantations. A large market has developed within the past decade for cypress garden mulch. For this reason, cypress logs are bringing better prices in the market than pine and most hardwoods. As a result, when the pine plantations and upland sites are harvested for timber, many of the cypress bogs are routinely clear cut. There is also an active forestry industry in the area for bottomland hardwood species. Within the refuge, forestry has been limited to improving the pine plantations through thinning operations and prescribed fire as addressed in present Forestry and Fire Management Plans.

Cattle raising is being practiced on a limited basis, but dairy farming has become a major industry in the tri-county area.

Until recently, this area of Florida had not felt the pressure of waterfront developments for either tourist accommodations or homes. However, this situation is changing rapidly. Outdoor recreation is probably the greatest single and best use of the area. There are limited developments and facilities, but communities and chambers of commerce are embracing nature-based tourism. Fishing, hunting, and boating are prime attractions.

Refuge Management Programs

Prescribed burning is the primary refuge management tool used to maintain and enhance refuge habitat. Historically, wildfires were ignited by lightning or infrequent prescribed burns set by Native Americans, and later by settlers who sought to improve habitat conditions for hunting and for cattle grazing. Prescribed fire is a well established and effective habitat management tool. Properly used, fire reduces the risk of

catastrophic wildfires, and improves food and cover conditions for wildlife. The specifics of the station's prescribed fire management program are addressed in the Fire Management Plan and the Annual Fire Prescriptions Plan.

Forest management on the refuge involves both select harvesting of trees and planting of seedlings. The specifics are addressed in the Forest Management Plan.

Public use on the refuge includes both consumptive and non-consumptive wildlife-dependent activities. The refuge is open to hunting of big game, small game, and migratory waterfowl. Sport fishing by the use of pole or rod and reel is permitted on the refuge in accordance with State regulations. There are approximately 50 miles of primary roads maintained for public vehicle travel. There are additional secondary roads that are maintained for official vehicles only, but the public can access them by bicycle or foot.

The Shell Mound area has two designated walking trails, interpretive displays, a fishing pier and wildlife observation boardwalk, and a boat ramp for small boats. There is an interpretive trail and boardwalk to the Suwannee River near the refuge headquarters. The Salt Creek area has a wildlife observation point and fishing pier. At Shired Island there are two boat launching ramps and an observation deck. Wildlife observation, wildlife photography, and environmental education and photography are permitted public activities throughout the refuge.

Vegetation

Water and marsh areas. The normal seagrasses of the area do not become particularly well established until reaching considerable distance offshore, away from the Suwannee River mouth and some of the larger tidal creeks. Manatee grass (Cymodocea manatorum), turtle grass (Thalassia testudinum), and shoal grass (Halodule wrightii) are the most common.

The tidal salt marsh of the refuge is dominated by needlerush (Juncus roemerianus) at the higher elevations and saltmarsh cordgrass (Spartina alterniflora) along the tidal creeks, sunken bars, and other lower elevations. The coastal marsh at the mouth of the Suwannee River presents a fairly unique environment inhabited by many freshwater plants. Generally, the marsh does not reflect a typical coastal marsh profile, but rather represents apparent competition between fresh and salt marsh plants for dominance. Even at the Gulfward extremities of the marsh, there exists a number of more typically fresh marsh plants such as arrowhead (Sagittaria latifolia), cattail (Typha domingensis), bulrush (Scirpus sp.), and sawgrass (Cladium jamaicense). These fresh marsh plants exist among the more typical salt marsh species such as needlerush, saltmarsh cordgrass, and saltgrass (Distichlis spicata). Along the many tidal creeks away from the mouth of the Suwannee River, a considerable amount of freshwater influence results in the growth of such plants as pickerelweed (Ponterderia cordata), smartweed (Polygonum sp.), morning glory (Ipomoea sagittaria), phragmites (Phragmites communis) and even swamp-lily (Crinum americanum).

Small scattered areas of freshwater marsh, wet prairie and open water are found throughout the refuge. These are the typical "sawgrass ponds" found in the pine flatwoods (slash pine overstory with palmetto-gallberry understory) of the lower coastal plain. Northeast of Cedar Key, these ponds take on the character of the "flag" ponds of central and southern Florida where the edges are ringed with sawgrass; covered with white waterlily (Nymphaea odorata); and interspersed with clumps of pickerelweed, arrowhead, and occasionally maidencane (Panicum hemitomon). A small amount of emergent marsh occurs along the banks of the Suwannee River. These are dominated by spatterdock (Nuphar lutum) with some cattail and a little wild rice (Zizania aquatica).

Timbered swamp. The dark colored waters feeding the numerous small tidal creeks have their origin in the timbered swamps. The timbered swamp is a most conspicuous feature of the area. Timbered swamps, while composed of many of the same tree species, occur primarily as two separate types: flood plain hardwoods and hardwood swamps. The flood plain forest occurs primarily along the Suwannee River with smaller acreages along the larger creeks. Water tupelo, pumpkin ash, water locust, water elm, bald cypress, red maple, and river birch are characteristic species of this type. In addition to being in standing water most of the year, these trees are subject to periodic high water floods. The hardwood swamp forest is subject to lesser periods of inundation and therefore consists of such species as sweetgum, swamp chestnut oak, water oak, sweetbay, and several species of hickories. These swamps occur as low, ill-defined drainages and depressions throughout the area.

Away from the river where the bedrock is limestone, shallow sinks are filled with dome-like groves of pond cypress. When surrounded by pines, these domes which are called cypress heads, are quite conspicuous. Accompanying trees are water tupelo, slash pine, red maple, and sweetbay (magnolia). Water is usually present in these sinks.

Along the river, the forest is broken by dense thickets of small broad-leaved evergreen trees, mainly sweet, loblolly, and red bays. This plant community is called a bayhead. It occurs most often where the floodplain widens. A bayhead consists of highly acidic soils containing sphagnum. Near the mouth of the river, cabbage palm appears more common than elsewhere. Southern red cedar reacts favorably either to the brackish condition or to some other environmental factor which causes it to grow commonly near the water.

Upland Areas. Upland areas are represented by four basic habitat types: climax hardwood hammocks, pine "flatwoods," pine-cedar-palm islands, and scrub oak dunes. The hardwood hammock and oak knolls are climax communities for this region. This habitat type occurs above the timbered swamp and distribution and composition are dependent upon the width, elevation, and drainage pattern of the flood plain. The dominant species within the climax condition are live oak, laurel oak, and sweetgum with lesser numbers of southern magnolia, swamp chestnut oak, and several hickories. About fifty kinds of trees are to be expected in old mixed hardwood stands and, were it not for high-grading by early lumbermen, the Florida maple, basswood, holly, and white oak would probably also be dominant species. Of the hammocks, the laurel and live oaks are best represented by the large individual trees left standing because of their low commercial value. These large oaks line the upper reaches of the river with their thick draperies of Spanish moss, a distinctive trademark of the coastal plain.

The pine flatwoods are characterized by a monotypic slash pine overstory with a saw palmetto, wax myrtle, gallberry and fetterbush understory. This habitat type is generally found on moderately to poorly drained soils above the timbered swamps.

The pine-cedar-palm islands are found scattered throughout the vast expanse of needlerush marsh on elevations slightly higher than the surrounding salt marsh. Typically, this habitat consists of a dominant stand of mature slash pine and/or cabbage palm with an understory of southern red cedar. Some of these islands appear to be influenced by increased saltwater intrusion which is negatively affecting tree survival and regeneration.

The scrub oak dune type is very limited and is found primarily along the southeastern boundary. This habitat is dominated by the low-growing Chapman, myrtle and sand live oaks.

Open Land. There is essentially no open land within the refuge boundary, except that which has been clear cut prior to regeneration and semi-improved pasture lands with tree stocking reduced, but not eliminated.

A summary of the major habitat types is illustrated in Figure 7, and the approximate acreage and percentages within the refuge are shown in Table 5.

Table 5. Summary of Major Habitat Types within Lower Suwannee National Wildlife Refuge

HABITAT TYPES	PERCENTAGE OF TOTAL	APPROXIMATE ACREAGE
Tidal salt marsh	28	15,036
Freshwater marsh and open water	5	2,828
Tidal forest	6	3,074
Hydric hardwood hammock	34	18,410
Pine	12	6,330
Bottomland forest	5	2,881
Wet flatwoods (cypress, pine, cabbage palm)	6	3,343
Mixed pine/hardwoods	2	837
Shrub and brush	1	154
Open administrative areas	1	42
TOTALS	100	52,935

Wildlife Resources

Threatened and Endangered Species. Several species federally listed as "threatened" or "endangered" are known to exist on the refuge, either seasonally or year-round. In addition to the federally listed species discussed below, habitat on the refuge has the potential to support other rare flora and fauna. 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.

- The Florida manatee uses the tidal creeks, the Suwannee River estuary and the Suwannee River from spring through fall. The dark water associated with tannins make manatee difficult to see in the river; however, they are often observed at the mouth of the river and tidal creeks, as well as at Manatee Springs State Park and Fanning Springs, where the water is clearer.
- 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.
- The American alligator population has made a comeback, but is protected and listed due to similarity of appearance to the crocodile.
- The Eastern indigo snake is found on the higher, better-drained sites, especially on the scrub oak dunes and upland pine areas.
- Bald eagles, which have been delisted from endangered to threatened, are common on the refuge during the winter months. There are four active nests on the refuge with additional eagle nests on lands adjacent to the refuge.
- The Suwannee River supports the only healthy, viable population of Gulf sturgeon still remaining in coastal rivers of the Gulf of Mexico.

- Wood storks are observed periodically through the year but no nesting occurs on the refuge.
- There is a plan to establish a migratory flock of whooping cranes that will winter at Chassahowitzka National Wildlife Refuge, south of Lower Suwannee refuge. If this becomes successful, the cranes will probably utilize the large expanse of salt marsh on Lower Suwannee refuge.

None of the refuge area has actually been classified as "critical habitat" for any endangered species. However, the lower Suwannee River is a candidate area as critical habitat for the manatee due to the numerous springs along the river banks and the traditional use of the area by manatee.

Waterfowl. The large raft of redhead ducks which winter off the Gulf Coast drift into this area near the end of the winter periods, but generally stay north and well offshore from the refuge. Other species represented are lesser scaup, red-breasted merganser, hooded merganser, bufflehead, green-winged teal, blue-winged teal, and the occasional widgeon and gadwall. Wood ducks are common on the refuge during the winter. However, nesting cavities and suitable brood-rearing habitat may be the limiting factors to hosting a summer population.

Marsh and Water Birds. The tidal marshes support a substantial population of clapper rails. King rails inhabit the numerous sawgrass ponds and swamp edges throughout the area and Virginia rails are seasonal visitors. Black rails, a species of concern, are thought to be present on the refuge. Common snipe and woodcock are found in limited numbers where the habitat is suitable.

Both the coastal marshes and the freshwater swamps and wetlands ponds serve as key feeding areas for many long-legged wading birds that nest on Cedar Keys Refuge, including white ibis, snowy egret, great egret, tri-colored heron, great blue heron, little blue heron, night herons and green heron. Limpkin are less common, but are regularly observed in the wooded swamps. The numerous oyster bars, sand flats, and extensive shoreline provide excellent feeding, loafing, and nesting for a wide variety of shorebirds such as oyster catchers, willets, greater and lesser yellowlegs, dunlin, and a number of sandpipers. A variety of gulls and terns can be found in the area, although suitable nesting areas for these species are limited.

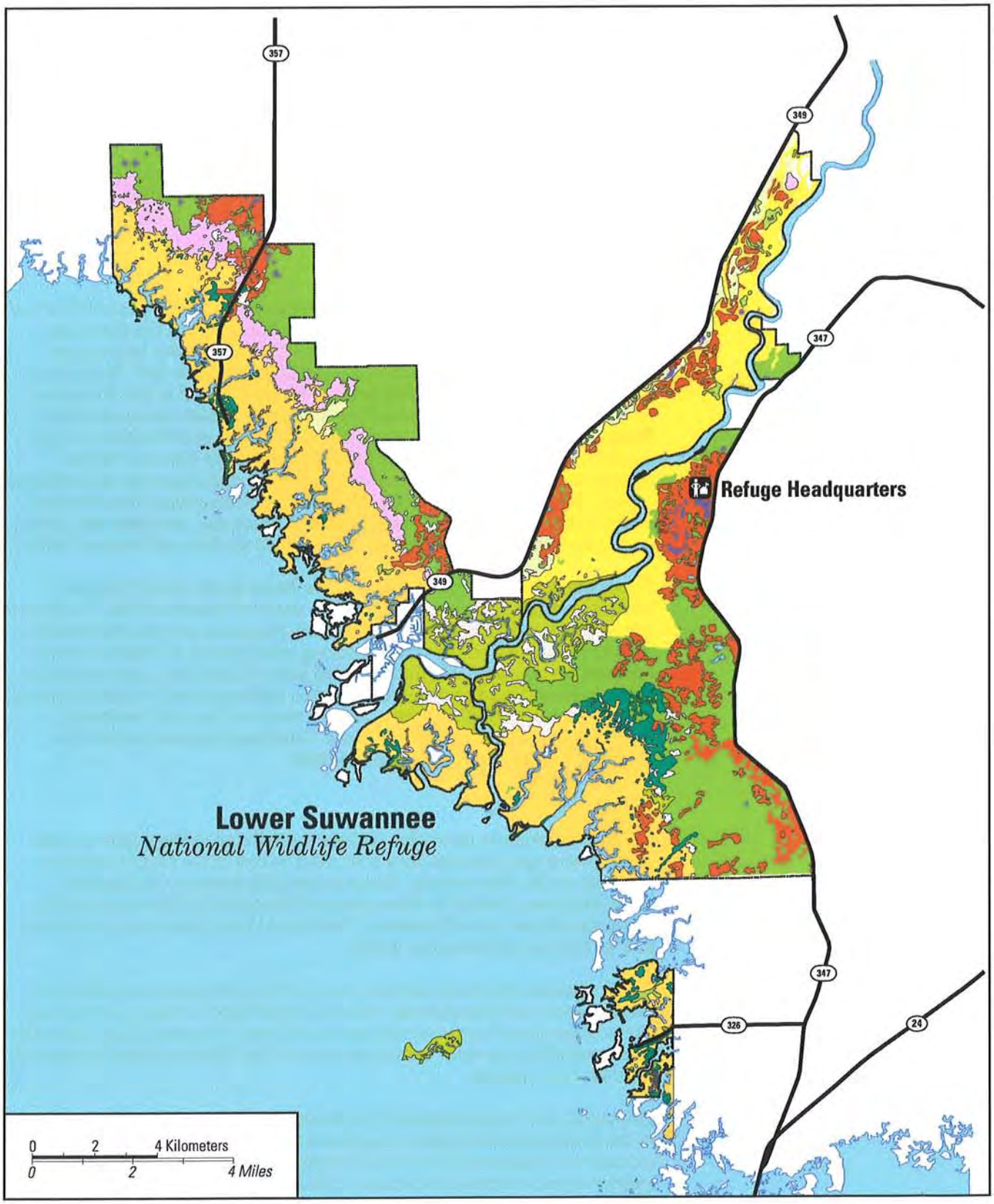
Song Birds. The bottomland hardwoods and coastal hammocks provide important habitat for song birds. One species of special concern that is common on the refuge is the swallow-tailed kite. The refuge checklist includes a total of 254 different species of birds and an additional 25 species which are listed as accidental occurrences to the refuge.

Upland Game Birds. The bobwhite quail is present on the refuge; however, suitable upland habitat is somewhat limited and the total population is not large. Mourning doves are present both as resident nesters and as migrant flocks. Turkey are commonly observed along the timber access roads, which indicates that a fair population of these birds exists throughout the timbered swamp and upland portions of the refuge.

Big Game. White-tailed deer are the principal big game species present. Most all of the refuge lands were previously owned by timber companies that leased the property for deer hunting. Refuge forest management practices have improved habitat for resident wildlife including deer. Within the refuge, forestry has been limited to improving the pine plantations through thinning operations and prescribed fire, as addressed in present Forestry and Fire Management Plans.

Other Wildlife. Gray squirrel, raccoon, opossum, otter, gray fox, bobcat, and striped skunk are among the other furbearers and game animals which are relatively abundant on the refuge. Although bears were historically

Figure 7. Major Habitat Types, Lower Suwannee National Wildlife Refuge



present in this part of Florida, most were shot by early settlers. Reptiles and amphibians are numerous in the bottomland hardwoods along the river. Two species listed by the State of Florida as species of special concern are the Suwannee cooter and the alligator snapping turtle. The gopher tortoise, also a species of special concern, is common on upland sites.

Problem Species. Feral hogs are present in the timbered swamps and adjacent upland areas. Sport hunters are permitted to take hogs during the refuge deer hunting season. This pressure has appeared to keep the population from becoming overabundant. Brown-headed cowbirds are present on the refuge, but their effects on nesting song birds are not known. The species and extent of exotic plants on the refuge and their impacts on native species are unknown.

Fishery Resources

At least 62 species of freshwater fish are found in the Suwannee River and its tributaries. Many are small fish but are important to the food chain and maintenance of sport and commercial fish. These can be grouped conveniently into two categories: game fish or nongame fish. Most sport fish are members of the sunfish family. Of the 17 found in the Suwannee River, the redbreast sunfish (redbelly), spotted sunfish (stumpknocker), bluegill (bream), and redear sunfish (shell cracker) are the species most commonly caught. Largemouth bass and Suwannee bass are highly desired in the creel. Channel catfish and white catfish are the most desired catfish. Nongame fish include chubsucker, spotted sucker, American eel, yellow bullhead, brown bullhead, bowfin, Florida gar, mosquito fish, pirate perch, topminnow, dollar sunfish, blue spotted sunfish, and banded sunfish.

Fresh water flowing from the Suwannee River to the Gulf of Mexico creates an estuary that is home to more than 140 species of fish. Such prize fish as spotted seatrout, red drum, mullet, pompano, permit, sheepshead, and others depend on the estuary during some period of their life cycle. "Anadromous species, those that spend part of their life in salt water and enter fresh water to spawn, are limited to Alabama shad, skipjack herring, striped bass, and Gulf sturgeon. All are rare; and the Gulf sturgeon, the Suwannee's prize, is classified as a 'threatened species' under the Endangered Species Act" (Clugston 1999).

Cultural Resources

There is evidence to show that Indians were living in the region at least 10,000 years ago, and that they continued to live in the region until the first half of the 19th century. Early in the 16th century, the Spanish conquistadores, Panfilo de Narvarez and Hernando DeSoto crossed the Suwannee River in northwestern Florida and later described the habitat and wildlife to the European world.

The Suwannee River has played a major role in the human habitation of these coastal and inland areas. Numerous prehistoric camps, towns, and mound sites have been reported along the river. It appears likely that the river provided a corridor for the invasion of the Weeden Island culture into southeastern Georgia.

Although very little systematic archaeological research has taken place in the Suwannee River area, it is known that the cultural resources are extensive. Because of the known archaeological potential, the Service will exercise special care to protect any cultural resources that may be on the refuge. Before undertaking any construction or management actions that might impact such resources, comprehensive surveys will be undertaken to identify and evaluate any historic remains that might be present.

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

(historic, architectural, and archaeological) 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.

The following discussion assesses the impacts to the physical, biological, cultural, and socioeconomic environments by the implementation of the three alternatives proposed in the Draft Comprehensive Conservation Plan for Lower Suwannee National Wildlife 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, are considered.

Environmental Consequences

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, water resources, or climate. However, under this alternative, no research would be conducted to identify external pollution potentials.

Alternative B (Proposed) The alternative to Enhance Habitat Management and Public Use 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 for researching, monitoring, and protecting the soil, water and air quality.

Alternative C (Maximize Public Use) The alternative to Maximize Public Use could potentially have negative environmental consequences on the soils, air and water resources. Under this alternative, no research to identify external pollution potentials would be conducted and no monitoring of impacts on refuge programs that could negatively impact the physical environment would occur.

Biological Environment (Wildlife and Habitat)

Alternative A (No Action) The No Action alternative would not adversely affect the biological environment of wildlife and habitat on Lower Suwannee National Wildlife Refuge. This alternative would continue to provide important habitat for threatened and endangered species, neotropical migratory birds, and resident wildlife. However, the current biological monitoring program provides only minimal information on the highest priority species. Staff and funds are insufficient to conduct wildlife and habitat surveys and research to address critical management issues. The No Action alternative would continue the "status quo" and would not adequately monitor or evaluate wildlife and habitat present to identify population trends or suggest remedial actions to improve wildlife populations or habitat.

Alternative B (Proposed) The alternative to Enhance Habitat Management and Public Use would not adversely impact the biological environment. Important habitat for threatened and endangered species, neotropical migratory birds, and resident wildlife would still be provided and protected. The wildlife goal under this alternative would expand scientifically based monitoring and research. Strategies to help reach the refuge's wildlife goal under this alternative include the following: amphibian and reptile surveys and long-term monitoring programs would be initiated; gopher tortoise populations would be monitored and tested for respiratory disease; and breeding bird and shore bird surveys would be added to the present osprey and eagle surveys to help determine trends and important habitat. The refuge would be evaluated to determine if any rare or endangered plant populations are present. Identification of these plants would be the first step in their protection and management.

Manatee, Gulf sturgeon, and sea turtles that use adjacent state waters would be afforded better research, protection, and monitoring. With proper funding and staff, databases would be developed through GIS to map and monitor threatened and endangered species and species of special concern. Partnerships would be actively sought to expand awareness of Service ideals and goals.

This alternative would customize habitat management to maximize healthy populations of wildlife. Procedures would be incorporated to evaluate the refuge's prescribed fire and forest management activities to determine impacts on important plant and animal species.

Public use of our natural resources is anticipated to increase both on and off the refuge; the proposed alternative identifies increased public use. However, it also provides safeguards to protect the refuge environment by grouping public use facilities in central locations rather than allowing them to expand uncontrolled on their own. It calls for a Visitor Services Plan and proper staffing to implement and monitor public use and its effects on wildlife and habitat. With this alternative, the Service would be able to control expansion and better protect trust resources. Programs would be developed to reach out to students and the general public to educate and inform them about the importance of national wildlife refuges.

Alternative C (Maximize Public Use) The alternative to Maximize Public Use may adversely affect the biological environment of wildlife and habitat on Lower Suwannee National Wildlife Refuge. This alternative would continue to provide important habitat for threatened and endangered species, neotropical migratory birds, and resident wildlife. However, the current biological monitoring program provides only minimal information on the highest priority species. Staff and funds are insufficient to conduct baseline wildlife and habitat surveys and research to address critical management issues. The Maximize Public Use alternative would continue the "status quo" and would not adequately monitor or evaluate wildlife and habitat present to identify population trends or suggest remedial actions to improve wildlife populations or habitat. Additionally, no monitoring or evaluation of public use impacts on wildlife populations or habitat quality would be conducted.

Cultural and Historical Environment

Under all three 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 varies between each alternative.

Archaeological and related scientific investigations on the refuge have been limited to C.B. Moore's 1902 investigation of several mounds and shell middens on islands or keys and along the Suwaneee River; Goggin's 1948 investigations on Hog Island and Shired Island West; and Bullen and Dolan's 1959 investigations on Shell Mound. These investigations were preliminary in nature and have been summarized by Willey (1949), and Dorian and Stoutmire (1980).

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-related investigations of illicit looting and collecting. Data relating to the refuge's hydrological regime, geomorphology, changing vegetation patterns, and past cultural land use patterns would be garnered only through reviews of existing technical literature and 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) Alternative B seeks to enhance habitat management and public use. Several specific objectives and strategies are proposed to aid the Service in the 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.

Alternative C (Maximize Public Use) This alternative is the most destructive to cultural resources due to the proposed construction of facilities, such as boardwalks and restrooms. Although increased visitation leads to opportunities for education about past cultures and habitats, it also leads to an increased potential for site loss due to public use related activities, illicit looting, and unpermitted collecting. Education opportunities should focus on responsible site stewardship, introduce the public to the region's rich cultural history via interpretive programs, and provide for a comprehensive archaeological survey of the refuge. This alternative neither identifies nor seeks funding for these purposes. Similar to other alternatives, project-specific investigations and/or site assessments would still be required for proposed construction of facilities and for other management activities. The increased funding and staff levels proposed for this alternative would enhance the Service's ability to protect known sites from vandalism, looting, and ongoing natural processes. In spite of the increased funding and staff, this alternative's overall impact on historic properties is similar to that of Alternative A.

Socioeconomic Environment

Alternative A (No Action) The No Action alternative may have negative environmental consequences on the socioeconomic environment because public use of the refuge continues to grow; however, staff and management of these uses would remain at current levels. Refuge staff would not be actively involved in implementing ecologically sound nature-based tourism efforts. Outreach and environmental education would remain at current levels.

Alternative B (Proposed) The alternative to Enhance Habitat Management and Public Use would not adversely affect the socioeconomics of the area. The Service expects that the implementation of this alternative would support the economy by providing a destination for nature-based tourists. Improved wildlife and habitat management would mean increased opportunities for wildlife viewing and photography. Enhanced public use facilities would provide additional opportunities for visitors to extend their stay, thus supporting the local economy through hotels, food vendors, and merchants. The Service plans to implement monitoring and evaluation procedures to ensure the integrity of wildlife and habitat. Additionally, the refuge has clustered public use areas in an effort to minimize overall impacts across the refuge landscape. Finally, the refuge would have dynamic and progressive partnerships with community organizations and chambers of commerce and will guide the development of ecologically sound, nature-based tourism efforts.

Alternative C. (Maximize Public Use) This alternative would have significant impacts on the socioeconomics of the area. Increased visitation and public use opportunities on the refuge would bring increased revenues to the local economy not only in tourism, but in construction as well, as there is currently insufficient infrastructure to meet increased tourism demands. The expanded environmental education and volunteer programs would also positively impact the community and build a refuge constituency.

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 vehicles 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. Proper road and trail signs would inform visitors of potential hazards. Time and space zoning has been and would continue to be utilized to minimize potential conflicts between hunters and other user groups. Air quality effects from prescribed fire would be of short duration and minimized by following procedures outlined in the refuge's fire plan, which considers weather and atmospheric conditions prior to burning.

Regulatory Effects

As indicated in the Introduction section of the Draft Comprehensive Conservation Plan and Appendix C, Legal Mandates, the Service must comply with a number of federal laws, executive and administrative orders, and policies 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 provides recreational opportunities and supports nature-based tourism in surrounding areas. Through its active forest management practices, it contributes to timber production in both counties. Presently, most of the lands surrounding the refuge are being used for commercial timber production and private hunting clubs. Wildlife move freely across public and private ownership boundaries. At times, the refuge may supply sanctuary for wildlife from the hunting that occurs on private property. While at other times, the surrounding lands supply food and cover to refuge wildlife species. The alternatives would not adversely affect surrounding lands and may benefit neighboring hunt clubs by serving as a breeding ground for game species.

Uncertainty of and Future Action Effects

The commercial timber company lands adjacent to the refuge provide important habitat for wildlife species that utilize the refuge. As more people move to this portion of rural Florida, urban expansion would continue to convert agricultural lands into housing and commercial developments. This loss of wildlife habitat would adversely affect wildlife populations and would make active management of refuge lands even more important.

Cumulative Impacts

All three 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, Enhance Habitat Management and Public Use, would reduce any potential for cumulative impacts due to improved biological research and monitoring of all refuge programs and consideration of resource conflicts within the broad management framework of the comprehensive conservation plan. The greatest internal threat to the resources of Lower Suwannee National Wildlife Refuge is the long-range use of the refuge by increasing numbers of visitors. The comprehensive conservation plan allows for the monitoring of wildlife and habitat, as well as impacts by increased public use. The public use program can be restructured, restricted, or eliminated if the cumulative impacts of increased visitation are detrimental to the purpose, mission, and vision of the refuge.

If Alternative A (No Action) is implemented, cumulative impacts may not be identified due to the issue-by-issue, problem-by-problem, fragmented approach currently in place. If Alternative C (Maximize Public Use) is implemented, cumulative impacts would not be identified because all funding and staffing would emphasize public use and not address monitoring and evaluating wildlife and habitat resources. Additionally, due to the expansion of public use facilities beyond clustered areas, it would be difficult to restructure, restrict, or eliminate public use programs to mitigate negative impacts on biological resources.

Mitigation and Residual Impacts of the Proposed Action

No mitigation would be necessary in the adoption and implementation of the proposed/preferred 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 monitor and regulate any proposed activities to reduce potential impacts. Consideration would be given to zoning activities by space or time to reduce potential impacts. Public use activities would be monitored and visitation numbers recorded. If wildlife or habitat become negatively impacted, the use would be modified or adjusted accordingly to mitigate such impacts.

LOWER SUWANNEE

Environmental Assessment

APPENDIX A

Appendix B
Cedar Keys
National Wildlife Refuge
ENVIRONMENTAL ASSESSMENT

U.S. Department of the Interior
Fish and Wildlife Service
1875 Century Boulevard
Atlanta, Georgia 30345

December 2000

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 site 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 and the Dixie County portion of the Lower Suwannee 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
Wildlife and Habitat Issues ■WH1 ■WH2 ■WH5	Continue existing monitoring programs for nesting birds Continue efforts to eliminate Brazilian Pepper	Develop more accurate monitoring techniques Develop flora and fauna list Expand exotic species control Collect data with Global Positioning System and develop Geographic Information System database Survey and monitor shore bird, neotrpical songbird, reptile, and amphibian use
Public Use and Outreach Issues ■WH4 ■PU1 ■PU2 ■PU3 ■PU5 Staffing and Funding ■PU4	Maintain present level of use on Atsena Otie Key Limited on-refuge and off-refuge outreach activities No staffing or funding	Improve public use facilities on Atsena Otie Key Active on-refuge and off-refuge outreach activities Increase staffing and funding $555,000 (first year operations and staffing) $255,000 (recurring need, operations and staffing) $290,000 (special projects monies)
Partnerships Issues ■WH3 ■P1 ■P2	Limited environmental education through the University of Florida Present level of research	Increase partnerships for environmental education with the University of Florida, the Suwannee River Water Management District, and Florida Fish and Wildlife Conservation Commission Develop research proposals and seek grants
Protection Issues ■WH5 ■P2	Present level of patrol and no additional land acquisition	Greatly improve protection through staffing and land acquisition

Affected Environment

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 by1890. 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 laurelcherry 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)

- 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.

- The Proposed Action Alternative, Enhance Protection and Public Awareness, 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.

- The No Action Alternative 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.

- The Proposed Action Alternative, Enhance Protection and 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 theses 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

- 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.

- 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.

Appendix C
Legal Mandates

LEGAL POLICY AND ADMINSTRATIVE GUIDELINES

This section outlines current legal, policy, and administrative guidelines for the management of national wildlife refuges. It begins with the more general considerations such as laws and executive orders for the Service, and moves toward those guidelines that apply specifically to the Lower Suwannee and Cedar Keys national wildlife refuges.

This unit also includes sections dealing with specially designated sites such as historical landmarks and archaeological sites, all of which carry with them specific direction by law and/or policy. In addition, consideration is given to guidance prompted by other formal and informal natural resource planning and research efforts.

All the legal, policy, and administrative guidelines provide the framework within which management activities are proposed and developed. These guidances also provide the framework for the enhancement of cooperation between the two refuges and other surrounding jurisdictions in the ecosystem.

Legal Mandates

Administration of the refuges takes into account a myriad of bills passed by the United States Congress and signed into law by the President of the United States. These statutes are considered to be the law of the land as are Executive Orders promulgated by the President. The following is a list of most of the pertinent statutes establishing legal parameters and policy direction to the National Wildlife Refuge System. For those laws that provide special guidance and have strong implications relevant to the Service or the refuges, legal summaries are also included. Many of the summaries have been taken from The Evolution of National Wildlife Law by Michael J. Bean.[1] For the bulk of applicable laws and other mandates, legal summaries are available upon request.

Congressional Acts, Treaties, and other Legal Acts that Relate to Administration of the National Wildlife Refuge System:

1. Lacey Act of 1900, as amended (16 U.S.C. 701).
2. Antiquities Act of 1906 (16 U.S.C. 431).
3. Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711) and 1978 (40 Stat. 755).
4. Migratory Bird Conservation Act, (1929) as amended. (16 U.S.C. 715-715s).
5. Migratory Bird Hunting Stamp Act of 1934, (U.S.C 718-718h).
6. Fish and Wildlife Coordination Act, (1934) as amended (16 U.S.C. 661-666).
7. Historic Sites Act of 1935 (16 U.S.C. 461).

[1] Bean, Michael J., 1983. The Evolution of National Wildlife Law, Praeger Publishers, New York.

8. Convention Between the United States of America and the Mexican States for the Protection of Migratory Birds and Game Mammals, (1936) (50 Sta. 1311).
9. Convention of Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940 (56 Stat. 1354).
10. Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742-742j).
11. Refuge Recreation Act, as amended, (Public Law 87-714.76 Sta. 653; 16 U.S.C. 460k-4) September 28, 1962.
12. Refuge Revenue Sharing Act of 1964, (16 U.S.C. 715s) as amended (P.L. 95-469, approved 10-17-78).
13. Land and Water Conservation Fund Act of 1965, as amended (16 U.S.C. 460L-4 to 460L-11), and as amended through 1987.
14. National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee).
15. National Historic Preservation Act of 1966 (16 U.S.C. 470).
16. National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321-4347).
17. Protection and Enhancement of Environmental Quality Executive Order of 1970 (Executive Order 11514, dated March 5, 1970).
18. Environmental Education Act of 1975 (20 U.S.C. 1531-1536).
19. Use of Off-Road Vehicles on the Public Lands Executive Order of 1972, as amended (Executive Order 11644, dated February 8, 1972, as amended by Executive Order 11989, dated May 24, 1977).
20. Endangered Species Act of 1973 (16 U.S.C. 1531-1543 87 Stat. 884) P.L. 93-205). The Endangered Species Act as amended by Public Law 97-304, The Endangered Species Act Amendments of 1982, dated February 1983.
21. Floodplain Management Executive Order of 1977 (Executive Order 11988, dated May 24, 1977). Wetlands Preservation Executive Order of 1977 (Executive Order 11988, dated May 24, 1977).
22. The Archaeological Resource Protection Act of 1979 (P.L. 96-95, 93 Sta. 721, dated October 1979). (16 U.S.C. 470aa - 47011).
23. Fish and Wildlife Conservation Act of 1980 (P.L. 96-366, dated September 29, 1980). ("Nongame Act") (16 U.S.C. 2901-2911; 94 Stat. 1322).
24. Administrative Procedures Act (5 U.S.C. 551-559, 701-706, 1305, 3105, 3344, 4301, 5362, 7521; 60 Stat. 237), as amended (P.L. 79-404, as amended).
25. Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d; 54 Stat.), as amended.
26. Canadian United States Migratory Bird Treaty (Convention Between the United States and Great Britain (for Canada for the Protection of Migratory Birds. (39 Stat. 1702; TS 628), as amended.
27. Clean Air Act (42 U.S.C. 1857-1857f; 69 Stat. 322), as amended.
28. Convention on Wetlands of International Importance Especially as Waterfowl Habitats (I.L.M. 11:963-976, September 1972).
29. Cooperative Research and Training Units Act (16 U.S.C. 753a-753b, 74 Stat. 733), as amended. P.L. 86-686).
30. Federal Aid in Fish Restoration Act (16 U.S.C. 777-777k, 64 Stat. 430).
31. Federal Aid in Wildlife Restoration Act (16 U.S.C. 669-669i; 50 Stat. 917), as amended.
32. Federal Environmental Pesticide Control Act of 1972 (7 U.S.C. 136-136y; 86 Stat. 975), as amended.

33. Federal Land Policy Management Act of 1976 (43 U.S.C. 1701-1771, and other U.S.C. sections; 90 Stat. 2743). Public Law 94-579, October 1976.
34. Federal Property and Administrative Services Act of 1949 (40 U.S.C. 471-535, and other U.S.C. sections; 63 Stat. 378), as amended.
35. Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251-1265, 1281-1292, 1311-1328, 1341-1345, 1361-1376, and other U.S.C. titles; 86 Stat. 816), as amended.
36. Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421; 92 Stat. 3110) P.L. 95-616, November 1978.
37. Flood Control Act of 1944 (16 U.S.C. 460d, 825s and various sections of title 33 and 43 U.S.C.; 58 Stat. 887), as amended and supplemented.
38. Freedom of Information Act (5 U.S.C. 552; 88 Stat. 1561).
39. Refuge Trespass Act (18 U.S.C. 41; Stat 686).
40. Transfer of Certain Real Property for Wildlife Conservation Purposes Act of May 1948, (16 U.S.C. 667b-667d; 62 Stat. 240), as amended.
41. Water Resources Planning Act (42 U.S.C., 1962-1962a-3; 79 Stat. 244), as amended.
42. Waterfowl Depredations Prevention Act (7 U.S.C. 442-445; 70Stat. 492), as amended.
43. Clean Water Act of 1972, Section 404.
44. The Food Security Act of 1985 (Farm Bill).
45. Native American Graves protection and Repatriation Act of 1990
46. Management and General Public Use of the National Wildlife Refuge System (Executive Order 12996, April 1996). This executive order redefines the mission of the National Wildlife Refuge System and sets out four guiding principles for the management and general public use of the system.
47. National Wildlife Refuge System Improvement Act of 1997 (H.R. 1420, 105th Congress). This law is the first "organic" act for the National Wildlife Refuge System. The Act amends portions of the National Wildlife Refuge System Administration Act and the Refuge Recreation Act, and reiterates into law Executive Order 12996.

Service-Wide Policy Directions

Since the early 1900s, the Service mission and purpose have evolved, while adhering to a fundamental national commitment to threatened and endangered wildlife ranging from the endangered bison to migratory birds of all types. The earliest national wildlife refuges and preserves are examples of this. Pelican Island National Wildlife Refuge, the first refuge, was established in 1903 for the protection of colonial nesting birds such as the snowy egret and the endangered brown pelican. The National Bison Range was instituted for the endangered bison in 1906. Malheur National Wildlife Refuge was established in Oregon in 1908 to benefit all migratory birds with emphasis on colonial nesting species on Malheur Lake. It was not until the 1930s that the focus of refuge programs began to shift toward protection of migratory waterfowl (i.e., ducks and geese). As a result of drought conditions in the 1930s, waterfowl populations became severely depleted. The special emphasis of the Service (then called the Bureau of Sport Fishery and Wildlife) during the next several decades was on the restoration of critically depleted migratory waterfowl populations.

The passage of the Endangered Species Act of 1973 refocused the activities of the Service as well as other governmental agencies. This Act mandated

the conservation of threatened and endangered species of fish, wildlife, and plants, both through federal action and by encouraging the establishment of state programs. In the late 1970s, the Bureau of Sport Fishery and Wildlife was renamed the U.S. Fish and Wildlife Service to broaden its scope of wildlife conservation responsibilities to include endangered species, as well as game and nongame species. A myriad of other conservation-oriented laws followed, including the Fish and Wildlife Conservation Act of 1980, which emphasized the conservation of nongame species.

Until recently, the Service had no "organic" act to focus upon for the purposes of generating an agency mission. The agency mission has always been derived in consideration of the various laws (as listed in Section 2 of this Unit) and treaties that collectively outlined public policy concerning wildlife conservation. The Department of the Interior Manual states:

"The U.S. Fish and Wildlife Service is responsible for conserving, enhancing, and protecting fish and wildlife and their habitats for the continuing benefit of people through Federal programs relating to wild birds, endangered species, certain marine mammals, inland sport fisheries, and specific fishery and wildlife research activities."[2]

The National Wildlife Refuge System is the only existing system of federally owned lands managed chiefly for the conservation of wildlife. The System mission is a derivative of the Service mission. This mission was most recently revised by the President of the United States in Executive Order 12996 to reflect the importance of conserving natural resources for the benefit of present and future generations of people. The Executive Order states:

"The mission of the National Wildlife Refuge System is to preserve a national network of lands and waters for the conservation and management of fish, wildlife, and plant resources of the United States for the benefit of present and future generations."

The Executive Order continues by specifying broad guiding principles describing a level of responsibility and concern for the nation's wildlife resources for the ultimate benefit of the people. These principles are as follows:

Public Use: The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Habitat: Fish and wildlife will not prosper without high-quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.

Partnerships: America's sportsmen and sportswomen were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other Federal agencies, State agencies, Tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.

Public Involvement: The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our National Wildlife Refuges.

[2] Departmental Manual 142 DM 1.1.

Appendix D

The Public Involvement Process

The scoping process concerning the future management of the Lower Suwannee and Cedar Keys National Wildlife Refuges consisted of two meetings, two stakeholder workshops, and a comment packet. The first public scoping meeting was held on July 27, 1999. The participants (24) were invited as potential members of the comprehensive conservation plan stakeholders' team. The second public scoping meeting on September 21, 1999, was widely advertised and the participants (approximately 40) represented user groups and the general public. The scoping meeting goals were to:

- Present background information about the National Wildlife Refuge System and about the Lower Suwannee and Cedar Keys National Wildlife Refuges, in particular;
- Present the mission of the National Wildlife Refuge System to the participating public;
- Present the planning process required to develop the comprehensive conservation plan; and
- Provide opportunities for the public to share their thoughts about the refuge by sharing comments at the scoping meeting and by returning an individual comment sheet.

During the welcoming comments, the refuge managers presented a thorough and engaging overview of the refuges and the comprehensive conservation planning process. These presentations included a video on the National Wildlife Refuge System entitled, "America's National Wildlife Refuge System, Where Wildlife Comes First," and a slide presentation on both Lower Suwannee and Cedar Keys National Wildlife Refuges. Comment sheets on which participants could individually respond to key issues concerning the future management of the refuges were passed out and explained. The refuge managers asked for the comment sheets to be returned by October 21, 1999.

After the presentations, the facilitator asked the participants to work in self-selected sub-groups. Three sub-groups were formed (at both meetings) and each group met for 50 minutes discussing the future management of the refuges. Each sub-group selected a recorder who wrote the major comments of each individual.

Attachment One is a summary of the major issues and concerns raised in both meetings. Attachment Two presents the unedited easel paper notes from the meeting on September 21, 1999, and Attachment Three contains the notes from the July 27, 1999, meeting. Since there was no attempt in the sub-groups to create consensus suggestions, some of the comments generated in the sub-groups were diametrically opposed to each other. During the final comments, participants appreciated the chance to hear the comments of others. Also during the scoping process, two stakeholder workshops were held. The first workshop was held on August 12, 1999, with 26 participants representing the following groups: Fish and Wildlife Service; Florida Fish and Wildlife Conservation Commission;

Florida Department of Environmental Protection; Florida's Nature Coast Conservancy; Save Our Suwannee; Cedar Key Garden Club; University of Florida; Cedar Key Historical Society; Development Advisory Services, Inc.; Cedar Key Chamber of Commerce; Nature Coast Canoe and Kayak; Suwannee River Chamber of Commerce; and the Suwannee River Water Management District. The purposes of the workshops were to develop vision statements for each refuge and to review a comment packet that would be distributed to the public.

Following the September public scoping meeting, another stakeholder workshop was held to discuss the range of reasonable alternatives that the planning team should consider. The 16 participants at this meeting created a framework for goals, objectives, and strategies to be developed within the comprehensive conservation plan. Stakeholders at this meeting represented the Fish and Wildlife Service; Florida Department of Environmental Protection; Save Our Suwannee; Florida Fish and Wildlife Conservation Commission; Cedar Key Garden Club; Suwannee River Chamber of Commerce; Suwannee Audubon Society; and the Suwannee River Water Management District.

The final mechanism used to gather public input was a comment packet (Attachment Four). This packet contained general information about the refuges; management statements to agree or disagree with; open-ended questions which allowed the respondent to elaborate on the values, issues, and concerns of the refuges; and a mailing request form and release. This packet was available at the public meeting (September 21, 1999), from the refuge office, and on the Internet at the refuge's web site. A total of 250 packets was distributed at the public meeting, at community meetings, and from the refuge office. It is unknown how many packets were viewed or printed from the Internet.

Forty-three comment packets were returned to the refuge office. Several of these were printed from the refuge's web site. The data from these packets were analyzed and evaluated along with the comments from the public meetings and stakeholder workshops, and from letters received at the refuge office. All comments, whether written or oral, were given equal consideration during preparation of these comprehensive conservation plans. A planning update newsletter (Attachment Five) was developed and sent to all names on the mailing list (Attachment Six).

The following is a summary of what the public valued most about the refuges:

Value Statements

- Diversity of wildlife and habitats
- Quality of the ecosystem
- Water quality
- Natural, unspoiled, wild beauty
- Protection of plant and animal life and habitat, especially from development
- Serenity and isolation
- Public access
- Opportunities for wildlife-dependent recreation, especially hunting, fishing, wildlife observation and wildlife photography
- Research opportunities
- Environmental education programs
- Refuge staff
- Partnerships

Several key issues and concerns surfaced during the scoping process. The planning team reviewed the issues and concerns raised by the approximately 100 people who participated in the scoping process and in comments received in the 43 comment packets that were returned to the refuge office. This list was based on the team's knowledge of the area, information gathered during the scoping meetings, and written comments submitted by the public. Following each statement is the Service's response to the issue, concern, or recommendation.

Key Issues and Concerns Summary

Wildlife Habitat Management

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

The plan addresses these deficiencies in the strategies developed for the wildlife and habitat management goals. These strategies outline a systematic approach for surveying and monitoring trust species and for evaluating refuge habitat management practices, such as forest thinning, restoration, and prescribed fire. The end result is a set of goals, objectives, and strategies to systematically collect and analyze data and tailor management programs to best meet the needs of the wildlife that use refuge habitats.

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

Lower Suwannee National Wildlife Refuge was established in 1979, but only recently received staffing and funding to begin monitoring trust species and to evaluate refuge habitats. Cedar Keys National Wildlife Refuge is an unfunded and unstaffed refuge. Neither station has biological staff dedicated to developing a comprehensive biological program. These draft comprehensive conservation plans outline an aggressive wildlife and habitat monitoring, management, and evaluation program to address this need. This program can only be achieved if appropriate staffing and funding are received.

WH3 Staff should initiate research partnerships with U.S. Geological Survey and Suwannee River Water Management District to assist and expand water flow and water quantity impact studies on refuge habitat.

Within the draft comprehensive conservation plans, several strategies are identified to address this need. Dynamic partnerships with the Suwannee River Water Management District, the University of Florida, and other resource agencies would be developed and expanded. Partnerships throughout the 10,000-square-mile Suwannee River Basin would be fostered. The value of these partnerships lies in the increased opportunity to protect the Suwannee River ecosystem, the wildlife and habitats found within the basin, and to ensure water quality and quantity are protected.

WH4 Staff need 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 within the refuges in order to limit degradation of resources to certain areas. Other areas would remain natural, without the development of public use facilities. The plan clusters public use areas and improves the facilities available in these areas. However, the plan also allows for the development of trails and facilities in other areas if wildlife compatibility is addressed.

Monitoring the impacts of public use will be accomplished through biological and habitat management programs. For example, an eagle's nest is located on North Key. The beaches of this island are open year round and the nest is located near the beach. If beach use (including wildlife observation, wildlife photography, and fishing) disturbs the nesting pair, then the area around the eagle's nest would be closed during the nesting season to ensure that wildlife use of the area has first priority.

WH5 Management activities should preserve and restore refuge ecosystems.

Many of the lands acquired to establish Lower Suwannee National Wildlife Refuge were severely degraded or were intensively altered by land use practices. Thousands of acres of longleaf, native slash, and scattered loblolly pines were cut and replanted with genetically improved slash pine in plantations that were harvested on a 16- to 20-year rotation. In addition, thousands of acres of mixed pine/hardwood stands were converted to slash pine plantations. Intensive site preparation, which altered the understory vegetation, was needed to make these sites suitable for pine trees. Additionally, an extensive network of roads and ditches was developed to facilitate timber management. Finally, most of the forested land in the swamps and bottoms is second or third generation; there are only a few remnant stands of old growth timber.

The objectives and strategies listed under the habitat management goal outline a plan to restore native ecosystems. Strategies identified include reforestation with longleaf pine and wiregrass, silvicultural thinnings to reduce stand density and create more natural forest conditions, and prescribed fire to reduce woody stems and promote herbaceous understories which were historically present. The Forest Management Plan will address hardwood silvicultural management concerns as well.

Management of refuge habitats on Cedar Keys National Wildlife Refuge is diametrically opposed to management of Lower Suwannee National Wildlife Refuge. Cedar Keys 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, management of the islands has been "hands off." The draft comprehensive conservation plans outline strategies for preserving these delicate coastal ecosystems without using intensive management techniques.

Public Use

PU1-LS Lower Suwannee National Wildlife Refuge should continue to provide the public with compatible consumptive and non-consumptive uses and access in a manner that minimizes conflicts between user groups and does not significantly impact habitat.

The draft comprehensive conservation plan specifically addresses this need by clustering public use areas and by establishing non-hunting areas in both counties. One of the major concerns expressed by user groups was safety during the hunting season. Currently, the Shell Mound and River Trail areas in Levy County are closed to hunting. These areas are used by an estimated 60,000 visitors a year. The plan proposes closing the Shired Island and Fishbone Creek areas in Dixie County. These areas contain 194 and 58 acres of uplands, respectively, but are mainly characterized as coastal marsh. An estimated 40,000 visitors annually use these two areas. A portion (16 acres) of the Fishbone Creek area

is leased to Dixie County Schools for environmental education. Additionally, Resource Project No. 10 calls for the establishment of environmental education facilities (e.g., pole shed, picnic tables, and restrooms) to be located in this area. Closing this area to hunting would ensure public safety and would minimize conflicts between user groups. Approximately 35,000 acres of suitable habitat will remain open to hunting. The remaining acreage is comprised of marsh and the closed areas referenced above.

PU2-LS Hunter groups requested better management and access for hunting activities on Lower Suwannee National Wildlife Refuge.

As discussed above, approximately 35,000 acres of refuge habitats are open to hunting. To provide access to these areas, the refuge maintains 50 miles of improved limerock roads for public vehicle traffic and an additional 50 miles of secondary roads, which are open to bicycle and foot traffic. The public may also access the refuge via boat from the Suwannee River and its many creeks. Refuge staff believe that this extensive network of roads and river entry provide adequate access opportunities for hunters as well as other user groups.

A few hunters requested access to the refuge via 3- or 4-wheelers. A majority of the public, however, opposed this type of access. When the refuge was established, this activity was found to be an incompatible use. Further, hunters may access the refuge by automobile on primary refuge roads, by foot or bicycle on secondary refuge roads, or by boat from the river. Current hunting regulations provide for special all-terrain vehicle access by mobility impaired hunters. Those hunters that meet the criteria of "mobility impaired" can apply for a Special Use Permit that allows all-terrain vehicle use within designated areas of the refuge.

Hunter groups suggested that the hunting experience could be improved, as well as the overall game species health, by establishing food plots. Many hunters believed that game populations are low on the refuge because inadequate forage is available. While refuge managers support improving habitat conditions for all wildlife species, they do not support the establishment of food plots. The first concern of refuge management is safety. It is the staff's opinion that hunters would be concentrated at food plots, thus increasing the risk of a hunting accident. Additionally, staff believe that habitat management techniques currently employed; e.g., forest thinnings and prescribed fire, stimulate growth of grasses and forbs, offering native forage. In the book entitled "Wildlife Management" Yarrow and Yarrow (1999), it states "Native foods should be inventoried, evaluated, and managed before investing in wildlife food plantings. In most cases, managing existing native wildlife plants constitutes a more practical and cost effective method of enhancing wildlife habitat." Therefore, the staff feels it should inventory and evaluate what is present before establishing food plots. Finally, hunter bag reports are consistent from year-to-year and deer analyzed by the Southeastern Cooperative Disease Study Unit are healthy.

PU3-LS Other user groups requested more opportunities for passive recreational uses on Lower Suwannee National Wildlife Refuge.

There are six priority uses on national wildlife refuges as defined by the National Wildlife Refuge System Improvement Act (1997): hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. Of these, wildlife observation, wildlife photography, and interpretation would be

considered passive recreational opportunities. As mentioned previously, Lower Suwannee National Wildlife Refuge has clustered public use areas in each county. At Shell Mound, 2 short walking trails and a 400-foot boardwalk are available. The River Trail is a 43-mile trail with a 400-foot boardwalk and observation platform on the Suwannee River. In Dixie County, 4 public use areas have been established. At Salt Creek, there is a boardwalk overlooking the salt marsh. Connecting Salt Creek and Shired Island, the Dixie Mainline Trail is a 9-mile driving, bicycle, or foot trail. Spectacular views can be seen from the observation platform on Fishbone Creek. Finally, on Shired Island and at the end of the Duck Pond Road, 3 short walking trails offer views of a small beach, coastal island habitat, and a natural pine forest, respectively. All of these facilities offer opportunities for passive recreation.

In the draft comprehensive conservation plan, several new public use facilities would be constructed and the areas mentioned above would be enhanced. The trails at Shell Mound would be marked with interpretive panels. At Dennis Creek, an observation platform would be constructed to offer marsh views. On the Levy County Loop Road, an observation platform would offer observers an opportunity to view an interior freshwater marsh and the wildlife therein. At Salt Creek, a loop trail through several different habitats is planned. Finally, kiosks housing refuge information and interpretive materials would be located in the public use areas to improve the visitor's experience. These projects would enhance passive recreational opportunities on the refuge.

PU4-CK The public urged Cedar Keys National Wildlife Refuge to continue to provide only limited public uses to protect sensitive wildlife habitat.

The draft comprehensive conservation plan continues the provisions that guide public use on Cedar Keys National Wildlife Refuge. Currently, all refuge island interiors, except Atsena Otie Key, are closed to public use for the protection of island flora and fauna. Additionally, there are healthy populations of venomous snakes on most of the island interiors. On Atsena Otie Key, the closest island to the town of Cedar Key, a kiosk, restroom, and short hiking trail provide visitors an opportunity to enjoy the natural environment and to learn about the natural and cultural history of the area. The beaches of all the islands, except Seahorse Key, are open year round for activities such as wildlife observation, wildlife photography, and fishing. Seahorse Key and a 300-foot buffer around the island is closed to all public entry from March 1 through June 30, annually, to protect the next colonial wading birds.

The number of tourists visiting Cedar Key has grown exponentially in the last 10 years. Refuge staff will closely monitor the numbers of people visiting the refuge islands and the impact this visitation may have on the refuge environment and wildlife. Additional closures and other protective measures may be employed to ensure the ecological integrity of these fragile coastal islands.

PU5 Staff is needed to expand environmental education and interpretation programs and increase involvement with public schools.

The draft comprehensive conservation plan outlines objectives and strategies to greatly improve our environmental education

program and to expand partnerships with the schools, agencies, and organizations that are involved in environmental education in the area of the refuge. However, these objectives and strategies can only be met with additional staffing to develop these programs and to nurture their growth. The draft comprehensive conservation plan calls for the employment of an outdoor recreation planner and a volunteer coordinator. These two positions would serve both refuges. In addition to these two positions, a cadre of volunteers would be trained to implement our environmental education program not only in the schools, but in civic organizations (e.g., scouts) as well.

PU6 Environmental education and outreach should include adult groups as well as youth groups.

While the focus of the environmental education program for the refuges will be involvement with school youth, the draft comprehensive conservation plan does include programming for adults. An outdoor recreation planner and volunteer coordinator would be employed to facilitate these programs. The draft plan calls for the establishment of quarterly activities, such as canoe tours, butterfly and wildflower walks, and birding trips. It also continues participation in community events and festivals, such as Naturefest and the Cedar Key Spring Arts and Fall Seafood Festivals. Adults would comprise most of the volunteers recruited by the volunteer coordinator. These volunteers would develop educational programs for the young and young at heart.

PU7 The public thought staff and facilities should be increased, particularly for Cedar Keys National Wildlife Refuge and the Dixie County portion of the Lower Suwannee National Wildlife Refuge.

Currently, Cedar Keys Refuge is unstaffed and unfunded. Management activities occur when staff and funding are available from Lower Suwannee Refuge. The draft comprehensive conservation plan identifies the staffing needs of Cedar Keys Refuge. Staff to be hired include a refuge operations specialist (assistant refuge manager) and a biological technician. A biologist and outdoor recreation planner would also be hired and shared between the two refuges.

At Lower Suwannee Refuge, all staff are based out of the Levy County compound and administrative area. The Dixie County portion of the refuge is more than 50 miles from the administration area. Because of a lack of staff presence on a daily basis, vandalism and littering are growing problems. If staff were stationed in this county, maintenance issues could be addressed on a daily basis. Staff could also forge relationships with the local people and work to establish ownership of the refuge by the local people, i.e., wanting to care for the refuge instead of trashing it.

A small administrative area is located in Dixie County. The compound currently includes a 5-bay pole shed, fuel tanks, and an abandoned, dilapidated trailer. The draft plan calls for the construction of an enclosed shop with a crew room and restroom facility. The maintenance worker stationed in Dixie County would work out of this office.

Finally, with the hiring of additional staff, a new office/visitor contact station is needed. The plan identifies two options: a multi-million dollar visitor center or a new administrative office with a display area. Professional staff from Cedar Keys and Lower Suwannee Refuges would be based out of this office. Technical and maintenance staff would be based out of the existing shop office

and crew space. The current office would be converted to housing for volunteers, interns, and visiting researchers as outlined in the plan.

PU8 Staff should recruit student interns and more volunteers to assist with projects and research.

The draft comprehensive conservation plan addresses this need by 1) hiring a volunteer coordinator and 2) by providing training opportunities for these individuals. It also calls for the formation of a Refuge Friends Group. This group would serve as another mechanism for recruiting volunteers.

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.

The draft comprehensive conservation plan outlines objectives and strategies to accomplish this need. Specifically, it calls for the hiring of additional staff to conduct day-to-day refuge operations. This would allow the project leader to devote more time to developing and expanding partnerships. Additionally, professional staff over biological and public use programs would also be involved in partnerships. Finally, several partnership projects are proposed.

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

The drat comprehensive conservation plan proposes an aggressive land acquisition program. The limiting factor in implementing this program is funding. An alternative to purchasing land is to establish management agreements or conservation easements with the landowners to bring in conservation partners like The Nature Conservancy or the Trust for Public Lands. It calls for creative solutions to the ever-growing problem of insufficient funding.

Attachment One

Summary of Public Meeting Comments

Summary of Appreciation and Suggested Changes Comments

Wildlife Habitat Management

- There is a need to conduct more research on species and habitats to enhance the native biodiversity and integrity of both refuges and to maintain traditional public uses.
- There is a need to preserve Cedar Keys Refuge for wildlife, except Atsena Otie Key.
- There is a need to assure that water of sufficient quality and quantity is available to maintain wildlife populations and habitats and to also restore and conserve the natural diversity, abundance, and ecological function of both Lower Suwaannee and Cedar Keys Refuges.
- There is a need to reduce the increasing number of exotic and invasive plant and animal species that are negatively impacting wildlife and habitat on both refuges.
- There is a need to assess the feasibility of re-introducing the black bear.
- There is a need to assess the feasibility of developing food plots after tree removal to improve the health of the animals and increase observation opportunities.
- There is a need to assess the feasibility of creating a management plan for wild turkeys.

Public Use

- There is a need to create more compatibility of uses throughout the year between hunting and environmental education and interpretation.
- There is a need for increased access to the Lower Suwannee Refuge for observation of wildlife and its habitat in a quiet environment and for active recreational uses.
- There is a need for Lower Suwannee Refuge to enhance its access for hunting.
- There is a need to expand the environmental education and interpretation programs.
- There is a need to develop outreach programs with the local communities, user groups, and the general public.

Partnerships

- There is a need for both refuges to develop more partnerships with state, county, and community agencies; universities and educational institutions; user groups; and natural resource based organizations.
- There is a need to hold more community functions to assist funding of both refuges.

Administration

- There is a need for more staff, student interns, and volunteers to implement the desired programs identified at the scoping meetings.
- There is a need for funding to implement the program and infrastructure needs identified during the scoping meetings.

Attachment Two

Public Scoping Meeting (September 21, 1999)

Easel Notes (Unedited) of the Three Dialogue Sub-Groups

The listed recommendations were made for actions that individual participants would like to see continued, started, or stopped.

Group One

- Make feeding plots after removing trees to improve the health of the animals and increase observation opportunities.
- Create a controlled checkpoint for hunting access so you know who goes in and out. Utilize student volunteers.
- Increase law enforcement.
- Construct a Refuge Education Center.
- Provide more organized tours of refuge.
- Increase research and monitoring of water quality.
- Buy more lands and increase the size of the refuge.
- Maybe we should plant a wider variety of pines?
- Provide more hunting days.
- Provide fewer hunting days.
- Create a management plan for wild turkeys.
- Post designated hunting areas for visitors.
- Provide more information to public about refuge and its uses via the newspapers, radio, television, and Internet. Most of the public doesn't know the refuge exists.
- Don't over-inform the public so the refuge will not be overused. Wildlife should come first before the public.
- Add more staff and funding, particularly Public Use Specialists, to work with schools and home schoolers.
- Use refuge lands to release "rehabbed wildlife."
- Check toxicity level in birds to know health of habitat.

Group Two

- Maintain the natural habitat.
- Preserve Cedar Key Refuge for wildlife except Atsena Otie Key.
- Maintain and restore the natural drainage.
- Increase the natural plant program.
- Remove invasive and exotic species.
- Continue the excellent hunting program and expand if possible. Have a spring hog season. Pursue the introduction of black bear.
- Allow electric wheelchairs throughout the refuge.
- Increase law and citizen enforcement for actions like stopping noisy and speeding boats off the river.
- Increase litter control.
- Increase access around the cabin.
- Share money and staff between our refuges and other refuges so we can provide more species.

Group Three

- Hold more community functions to assist funding of these two local refuges.
- Need more funds for this refuge for staff and programs. Need more law enforcement and education staff.
- More research on habitat to maintain fisheries and wildlife.
- Provide more education in schools on wildlife management and environment.
- Limit entry from river so we can have stricter enforcement of public property being abused next to refuge. More directions need to be provided to use wastebaskets, etc.
- Extend the general gun season to coincide with state regulation or the first of December.
- Hold hog hunting at the same time as small game hunting season.
- Burn refuge one side of the river at a time and allow hunting on the other side.
- Develop wildlife feedplots.
- More doe tags.
- No introduction of black bear.
- Provide more and better signage at entrances; e.g., weapon uses such as bows, black powder, and guns not loaded in vehicles and on roads.
- Open up more inside access roads.
- Have fewer inside access roads.
- More bike trails.
- More river access to refuge by docks, walks, observation towers, etc.
- Make walks more compatible for people with disabilities and mark benches as to how far apart they are.
- Better maintenance of boat ramps.
- Adequately mark islands as to public access.

Attachment Three

Public Scoping Meeting (July 27, 1999)

Easel Notes (Unedited) of the Three Dialogue Sub-Groups

Group One

Appreciate the refuges for the following:

- Can be alone in the woods.
- Love those wild flowers.
- Road openings create greater access to wild fire.
- A place for wildlife conservation.
- Diverse habitat of flora and fauna.
- Lack of facilities.
- Presence of birds.
- Large area with public access.
- Greater photo opportunities.
- Conserved land with no development.
- Easy access.
- It is free.

Recommend the following changes:

- Pursue the introduction of black bear.
- Greater educational programs.
- More intense deer management for improved harvesting and habitat and herd quality.
- Better boat launching facilities
- No boat launching changes.
- A couple of non-hunting days every week during the hunting season.
- Better communications and exchange of information between agencies developing programs to attract researchers.
- Remove exotic plants.
- Increased state and federal funding.
- Publicity.

Group Two

Appreciate the refuges for the following:

- Appreciate the trails available at the present time (Lower Suwannee).
- Presence and protection of wildlife and habitat (both).
- Appreciate public access at Atsena Otie.
- Serenity and isolation of refuges.
- Appreciate the wildlife but like public access we don't have the feeling that we are kept out.
- Environmental education like the fact that the university has access privileges to refuges and programs.
- Appreciate Water Management District with Atsena Otie.
- Appreciate Ken Litzenberger.
- Appreciate partnerships.

- Appreciate interest of the Office of Greenways and Trails to coopereate interconnecting trails throughout Lower Suwannee.
- Size and diversity of refuge also uniqueness (both).

Recommend the following changes:

- Would like to see a trail down the Levy side.
- Would like to see Cedar Keys linked somehow to Lower Suwannee (ferry, water taxi).
- Need more marked trails on Lower Suwannee (interp. signs).
- Need designated campgrounds (limit number of people and sites) for Lower Suwannee.
- Would like to see compatibility of uses-primarily hunting versus trail/walking/interpretation.
- Establish a wildlife rehabilitative program.
- Expand/strengthen volunteer program (both refuges).
- Increase dollars for research (from grants, government).

Group Three

Appreciate the refuges for the following:

- The fact that it is there.
- Unspoiled beauty.
- Bio-diversity.
- Especially the lack of people.
- General health of the refuge.
- Open for hunting and fishing.
- Remoteness.
- Habitat diversity.
- Water quality and quantity.
- Artistic and photographic paradise.
- Quality of seafood (yummy) shellfish and finfish, etc.

Recommend the following changes:

- Need botanist.
- Need biologist.
- Need more staffing!!!
- Need visitor and interpretive center.
- Partnership with Aquatic Preserve.
- Partnerships with other state and local agencies.

LOWER SUWANNEE AND CEDAR KEYS WILDLIFE REFUGE

DRAFT

The Public Involvement Process

APPENDIX D

Attachment Four

Future Management

The U.S. Fish and Wildlife Service is developing a Comprehensive Conservation Plan for Lower Suwannee and Cedar Keys National Wildlife Refuges that will guide their management for the next 15 years. We would like to know the issues and concerns about the refuge that are important to you.

This Comment Packet is divided into three sections: Background Information, Comment Sheet, and Mailing Request Form. These materials will provide you with information concerning the refuge and planning process. If you would like to give us your ideas, please complete the Comment Sheets. Use additional sheets if the space provided is not adequate to fully address your ideas and concerns. If you wish to be on our mailing list, please complete the Mailing Request Form. You may return some or all of the sections to the refuge mailing address found inside or outside the packet. This packet may be reproduced.

Background Information

National Wildlife Refuge System. The U.S. Fish and Wildlife Service is the principal Federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife and their habitat. As a part of its major responsibility for migratory birds and fish, endangered species, and certain marine mammals, the Service manages the National Wildlife Refuge System. The System began in1903 when President Theodore Roosevelt designated Pelican Island, a pelican and heron rookery in Florida, as a bird sanctuary.

The System, now consisting of more than 500 refuges, is a "network of lands and waters managed for the conservation, management, and where appropriate, restoration of fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (Refuge Improvement Act of 1997). In the management of the National Wildlife Refuge System:

- Wildlife has first priority.
- Recreation uses are allowed as long as they are compatible with wildlife conservation.
- Wildlife-dependent recreational activities will be emphasized.

Refuge Environment. Established in 1979, the purpose of Lower Suwannee National Wildlife Refuge is to "develop, advance, manage, conserve, and protect fish and wildlife resources." The refuge encompasses nearly 53,000 acres of bottomland hardwoods, upland pine forests, salt and freshwater marsh, and oak hammocks. The refuge flanks 20 miles of the lower reaches of the Suwannee River and fronts more than 20 miles of the Gulf of Mexico. It provides habitat for migratory birds, wading birds, threatened and endangered species, and several species of special concern, such as the gopher tortoise and swallow-tailed kite.

The vision for the refuge is:

The watershed and estuary of the Lower Suwannee National Wildlife Refuge contain valuable water resources and fish and wildlife habitat. The refuge will be managed for the conservation of fish and wildlife and their habitat, with special emphasis on the protection and restoration of wetland and upland communities. Educational, research, and wildlife-dependent recreational opportunities will be available, insofar as they are compatible with refuge health and preservation. Management will partner with local,

state, and federal agencies, community organizations, and individuals to ensure the protection and conservation of the vast Suwannee River ecosystem for current and future generations.

The refuge's diversity of wildlife species, coupled with excellent access roads and public use structures, provides opportunities for hunting, fishing, wildlife observation, photography, environmental education and interpretation.

Cedar Keys National Wildlife Refuge was established in 1929 as a "refuge and breeding ground for the birds and wild animals." The refuge contains 13 islands and nearly 800 acres. Four of the islands, Snake, Deadman's, Seahorse and North Keys, are designated wilderness areas. Atsena Otie Key is owned by the Suwannee River Water Management District, but managed by the U.S. Fish and Wildlife Service as part of the refuge. The lighthouse at Seahorse Key is leased by the University of Florida for marine research and environmental education.

The forested habitat contains live oak, red bay, cabbage palm and laurel oak. The lower elevations of the islands, comprising nearly 40 percent of the refuge, are subject to frequent flooding and dominated by salt marsh and mangrove trees. The most significant wildlife resource is the colonial wading bird rookery found on Seahorse Key. Other birds that nest on the islands include pelicans, bald eagles and osprey. The vision of Cedar Keys refuge is:

The Cedar Keys National Wildlife Refuge is a group of fragile coastal islands that contain significant natural and cultural resources. The refuge will be managed for the conservation of wildlife and wildlife habitat, with special concern for migratory and breeding birds and threatened and endangered species. Management will protect cultural resources and support environmental education, research and where appropriate, other compatible uses. Management will partner with local, state and federal agencies, community organizations and individuals to ensure the protection of these resources for present and future generations.

Public use opportunities are limited because the refuge is relatively small and inaccessible and can only sustain limited public use if it is to be maintained for the purpose for which is was established. The refuge provides critical habitat for ibis, herons, and egrets; habitat that is disappearing rapidly throughout Florida. The beaches of the islands, except Seahorse Key, are open year-round for compatible activities such as wildlife observation, photography, fishing, environmental education and interpretation.

Comprehensive Planning. A planning team, consisting of persons from government agencies, state universities, conservation organizations, and community groups, has been assembled to assist in this Comprehensive Conservation Planning effort. They will:

- Gather information about the refuge environment;
- Identify problems affecting the refuge;
- Evaluate the impacts of various management alternatives; and
- Recommend a plan of action to the U.S. Fish and Wildlife Service.

In keeping with the National Environmental Policy Act (NEPA), the U.S. Fish and Wildlife Service will look at, and seriously consider, all reasonable alternatives in the development of the plan. The planning team will actively seek public input in the preparation of the comprehensive plan. To carry out the project, the U.S. Fish and Wildlife Service has begun a six-step planning process:

Step 1. Gather information on the refuge environment

Step 2. Hold a public meeting to identify issues and concerns

Step 3. Identify management alternatives, and evaluate their effects

Step 4. Prepare and release a draft comprehensive plan and environmental assessment

Step 5. Hold a public meeting on the draft plan and environmental assessment

Step 6. Prepare the final comprehensive conservation plan

Involvement Opportunities. The U.S. Fish and Wildlife Service is looking for your ideas concerning the future management of Lower Suwannee and Cedar Keys National Wildlife Refuges. Please give us you ideas at a public meeting on September 21, 1999 at 7:00 p.m. at the Tommy Usher Center. The Center is located at 506 SW 4th Avenue (CR 345), Chiefland. This meeting will give you an opportunity to learn more about the refuge and express your ideas about issues, concerns, and needed management programs.

This packet will be given to everyone who attends the public meeting or requests a copy from the office. If you cannot attend the meeting, your comments will still be considered if you complete the comment sheet and mail it to: Lower Suwannee National Wildlife Refuge, U.S. Fish and Wildlife Service, 16450 NW 31st Place, Chiefland, FL 32626.

The packet provides:

- Background information on the refuge, the refuge system, and the planning process
- A way to share your concerns, ideas, and thoughts on refuge management
- An effective way to make certain your thoughts will be taken into consideration

The comment sheet should be returned to the refuge no later than **October 21, 1999.**

LOWER SUWANNEE AND CEDAR KEYS NATIONAL WILDLIFE REFUGES

COMMENT SHEET

INSTRUCTIONS: The U.S. Fish and Wildlife Service is developing a new management plan that will guide future management of both refuges. Please take a few minutes to give us your ideas about various refuge programs and the course of future management. Your responses are voluntary and completely anonymous.

1. Listed below are some of the issues concerning the future management of the refuges. These issues were generated by the Planning Team, consisting of representatives from local, state, and federal agencies, community organizations and private individuals. Some of the issues overlap, while others are specific to a particular refuge.

To what degree do you agree or disagree with the following statements? ***Circle the number that best reflects your opinion.***

Issues	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion
Build a visitor and education center that will be used by both refuges	4	3	2	1	0
Conserve habitat for native wildlife and plants	4	3	2	1	0
Develop a volunteer program	4	3	2	1	0
Expand environmental education and interpretative programs	4	3	2	1	0
Increase law enforcement to protect refuge resources	4	3	2	1	0
Increase staff and funding to support refuge programs (e.g., Biological, Public Use, Maintenance)	4	3	2	1	0
Increase research opportunities and research funding	4	3	2	1	0
Protect the whole biological system	4	3	2	1	0
Protect threatened, endangered species and wildlife of special concern	4	3	2	1	0
Remove and control exotic, invasive species	4	3	2	1	0
Work closely with community organizations	4	3	2	1	0
Maintain water quality and quantity on Lower Suwannee NWR	4	3	2	1	0
Maintain the hunting and fishing programs on Lower Suwannee NWR	4	3	2	1	0
Manage game species more intensively to improve the hunting program on Lower Suwannee NWR	4	3	2	1	0
Pursue the re-introduction of the Florida Black Bear to the Big Bend Area with Lower Suwannee NWR as the core habitat	4	3	2	1	0
Improve public use facilities (e.g., trails, boat launches, boardwalks) on Lower Suwannee NWR	4	3	2	1	0
Limit the amount of new public use facilities (e.g., trails, boardwalks, boat launches) on Lower Suwannee NWR	4	3	2	1	0
Improve accessibility of Lower Suwannee NWR	4	3	2	1	0
Promote Lower Suwannee NWR to increase public knowledge and participation in refuge programs	4	3	2	1	0
Provide more recreational opportunities at Lower Suwannee NWR	4	3	2	1	0

Please answer the following questions. Provide as much information as you like. ***Use additional sheets if necessary.***

2. What do you **VALUE** about Lower Suwannee National Wildlife Refuge? (List all that comes to mind).

_____

_____

_____

3. What are your major **CONCERNS** about Lower Suwannee National Wildlife Refuge, current refuge management, or its future direction?

_____

_____

_____

4. Are there other issues about Lower Suwannee National Wildlife Refuge that concern you?

_____

_____

_____

5. Have you ever visited the Lower Suwannee National Wildlife Refuge? _____Yes _____No

6. Listed below are **SOME** of the recreational activities occurring Lower Suwannee National Wildlife Refuge. Please check which activities, if any, you would like to do.

_____ wildlife observation	_____ photography	_____ hunting
_____ canoeing/kayaking	_____ boating	_____ hiking
_____ fishing	_____ bicycling	_____ other (list below)
_____ interpretation/environmental education (e.g.,self-guided trails)		_____
		_____
		_____

7. What activities, if any, should **NOT** be allowed on Lower Suwannee National Wildlife Refuge?

_____

_____

_____

8. Where do you reside **MOST** of the year? City_____ State_____

9. Are you attending the public meeting as a member of an organization? _____Yes _____No
If yes, what is its name? _____

10. Where did you obtain the Comment Sheet? _____

Please fill out the next page if you would like to comment on Cedar Keys National Wildlife Refuge.

11. **To what degree do you agree or disagree with the following statements?** ***Circle the number that best reflects your opinion.***

Issues - Cedar Keys NWR	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion
Provide more recreational opportunities at Cedar Keys NWR	4	3	2	1	0
Improve public use facilities (e.g., trail, boat dock) at Cedar Keys NWR	4	3	2	1	0
Limit the amount of new public use facilities (e.g., trails, restrooms, boat docks) at Cedar Keys NWR	4	3	2	1	0
Make Cedar Keys NWR more accessible to the public	4	3	2	1	0
Limit public access to Cedar Keys NWR to protect wildlife	4	3	2	1	0
Promote Cedar Keys NWR to increase public knowledge and participation in refuge programs	4	3	2	1	0

12. What do you **VALUE** about Cedar Keys National Wildlife Refuge? (List all that comes to mind).

_____

_____

_____

13. What are your major **CONCERNS** about Cedar Keys National Wildlife Refuge, current refuge management, or its future direction?

_____

_____

_____

4. Are there other issues about Cedar Keys National Wildlife Refuge that concern you?

_____

_____

_____

15. Have you ever visited Cedar Keys National Wildlife Refuge? _____Yes _____No

16. Listed below are **SOME** of the recreational activities occurring on Cedar Keys National Wildlife Refuge. Please check which activities, if any, you would like to do.

_____ wildlife observation	_____ photography	_____ fishing
_____ canoeing/kayaking	_____ boating	_____ beachcombing
_____ interpretation/environmental education (e.g.,self-guided trails)	_____ other (list below)	
	_____	
	_____	

17. What activities, if any, should **NOT** be allowed on Cedar Keys National Wildlife Refuge?

_____

_____

_____

THANK YOU VERY MUCH FOR YOUR COMMENTS! Please place the blue and green sheets in the Comment Box at the Public meeting or mail it to: Lower Suwannee National Wildlife Refuge, U.S. Fish and Wildlife Service, 16450 NW 31st Place, Chiefland, FL 32626. Your comments are needed by **October 21, 1999**.

Mailing Request Form

To place your name and address on our mailing list, we must have your written permission. The reason for this is that federal government mailing lists must be released to the public upon request. If you wish to receive future information about Lower Suwannee and Cedar Keys National Wildlife Refuges Comprehensive Conservation Plan and Environmental Assessment, please complete the information below and return the form to:

Lower Suwannee National Wildlife Refuge
U.S. Fish and Wildlife Service
16450 NW 31st Place
Chiefland, FL 32626

Yes, I wish to be on the mailing list to receive future information about the comprehensive conservation plan for Lower Suwannee and Cedar Keys National Wildlife Refuges. I understand that the names and addresses on federal government mailing lists must be released to the public upon request, under the provision of the Freedom of Information Act of 1974.

Signature_____ Date_____

First Name _____ Last Name_____

Mailing Address:_____

_____

City_____ State _____ Zip_____

If you are acting in an official capacity as the representative of an organization, please compete the following two items:

Organization:_____

Title:_____

Note: After you have completed the Comment Sheet and / or Mail Request Form, simply fold it in half (with the return mailer on the outside), and tape or staple it together. Attach the proper postage and drop it in the mail. Your comment sheet must be received by **October 21, 1999**. Thank you for your comments.

Attachment Five

Planning Update

Planning Update

Lower Suwannee and Cedar Keys National Wildlife Refuges

Public Supports Refuge Planning Process

The U.S. Fish and Wildlife Service initiated Comprehensive Conservation Planning for Lower Suwannee and Cedar Keys National Wildlife Refuges in June 1999. During the summer and the fall, public meetings, workshops and presentations were conducted to explain the master planning process and to solicit input from the public. In addition, a comment packet was distributed to approximately 250 individuals. Of these, 43 packages were returned to the refuge office. This Planning Update reports what participants considered important on the refuges.

The most important value expressed about the refuges was the conservation and management of the land for wildlife. Conserving habitat received the strongest support at public meetings and in the questionnaire. When asked what they valued most about the refuges, diversity of wildlife and habitat on Lower Suwannee and protection of Cedar Keys' plants and animals were The most frequent responses. This strong support for wildlife and habitat will be emphasized in the management plan.

Supporters also expressed a strong interest in having adequate access to the refuges for wildlife-oriented recreation. Their primary purpose for coming to the refuges is to observe wildlife and to enjoy the natural environment. In the Plan, we will include methods to improve visitor opportunities for these kinds of activities. Environmental education also received strong support and ideas for expansion will be incorporated into the Plan. Traditional uses, such as hunting and fishing on Lower Suwannee were also important and will be continued.

The biggest concern that the public had is that the refuges will become overused through increased tourism and that the refuge does not have the staff or budget to monitor and manage these increased demands.

These comments were used to generate issue statements which will be addressed in the Plan. These issuess were also used in two public workshops in which participants drafted a vision for each refuge and formulated goals to achieve this vision. The issues, visions and goals are included in this Planning Update.

In this issue....refuge receives public input for management plan; visions and goals formulated for both refuges; becoming involved!

The draft Plan is presently being written. When completed it will be distributed through our mailing list and will also be available on the Internet. Public meetings will be conducted to gather input for changes prior to the final version. We hope to hear from you then. In the meantime, if you would like to be on our mailing list, please fill out the form on the last page of this update and return it to the refuge office. Thank you for your continued support of Lower Suwannee and Cedar Keys National Wildlife Refuges!

Ken Litzenberger
Refuge Manager

Comment Packet Results

1. To what degree do you AGREE or DISAGREE with the following statements. Rated on a scale of 1 to 4 with 1 representing strongly Disagree and 4 representing strongly Agree. The values represent the average for each statement.

Conserve Habitat	3.86
Protect Water Quality	3.81
Protect Endangered Species	3.74
Protect Biological System	3.70
Remove Exotic Species	3.50
Increase Staff and Funding	3.48
Increase Research Funding	3.30
Develop Volunteer Program	3.26
Expand Environmental Education and Programing	3.19
Increase Law Enforcement	3.12
Work With Community Organizations	3.10
Reintroduce Florida Black Bear	3.09
Build a Visitor and Education Center	3.05
Limit New Public Use Facilities	2.88
Increase Public Participation in Refuge Programs	2.88
Improve Public Use Facilities	2.73
Maintain Hunting and Fishing Programs As Is	2.64
Manage Game Species to Improve Hunting	2.24
Provide More Recreational Opportunities	2.21
Improve Accessibility	2.05

2. What do you VALUE most about Lower Suwannee NWR?

COMMENT	%
Diversity of wildlife and habitat	**34**
Natural, wild beauty	29
Protection of plant and animal life	**27**
Wildlife Compatible Recreation	22
Peace and Quiet	**20**
Research and study of habitat	15
Hunting	**15**
Fishing	7
Photography & Education	**5**
Quality of the ecosystem & island habitats	2

3. What are your major CONCERNS about Lower Suwannee NWR, current management or its future direction?

CONCERNS	%
Increased tourism	**39**
Increased hunting	17
Maintain or increase staffing	**11**
Keep in natural state	8
Also mentioned: Community education, decreased hunting rights, looting and vandalism, pollution, becoming too restrictive, pollution, improving biological data, access for disabled, closure during budget cuts, volunteer programs, game decreasing due to adjacent private land management, hunting and trapping, wild turkey management, airboats, may pave roads	

Whitetail Deer

4. Are there other issues about Lower Suwannee NWR that concern you?

COMMENTS
Need food plots to keep wildlife in area, increase in public use without increase in staff, relations with people in Dixie County, disabled use of motorized vehicles, commitment to river and ecosystem, too few does harvested, should restrict harvest of young bucks, litter, commitment to wildlife, pollution from dairies and other sources, lack of visitor center, not capitalizing assets, safety courses, forest fires, habitat destruction, more interested in roads than habitat, pine beetles, restoration of habitat, reduce timber harvest, add a shooting range, add archery only area in Levy Co., hunting and trapping, improve turkey habitat, poaching, might add A.T.V. trails, adequate law enforcement, irresponsible boaters, keep from becoming a tourist attraction, feral hogs, protecting the manatee

5. Have you ever visited Lower Suwannee National Refuge?

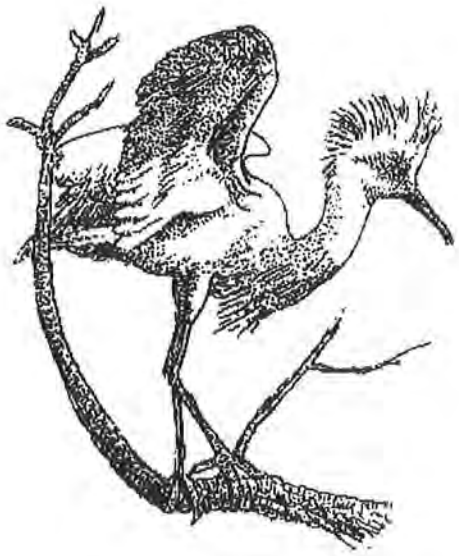
95% of the people answering had visited the refuge.

6. Listed below are SOME of the recreational activities occurring on Lower Suwannee NWR. Please check which activities you would like to do. Number of people responding was 42. Activities in the Other category were written in and are currently not available on the refuge.

ACTIVITY	RESPONSES
Wildlife observation	**40**
Hiking	31
Canoeing / kayaking	**28**
Environmental education	27
Photography	**26**
Fishing	24
Boating	**21**
Bicycling	21
Hunting	**13**
Other - Horseback riding, target range, A.T.V. trail.	5

7. What activities should NOT be allowed on Lower Suwannee NWR? Out of the 43 worksheets, 36 answered this question.

ACTIVITY	RESPONSES
A.T.V.'s, off-road vehicles	14
Hunting	7
Camping	6
Airboats, jet skis	5
Commercial Development, horses, hunting with dogs, motor boating, timbering without replanting	3
Increased hunting, recreational development, swamp buggies	2
All, anything that would adversely impact refuge, bicycling, dirt bikes, fishing, hunting bears, hunting raptors, mining, motorized vehicles (except wheelchairs), night use, pine plantations, planting bait crops, RV's, speeding, trapping	1



Snowy Egret

8. Where do you reside MOST of the year?

Levy County	24
Dixie County	3
Gilchrist County	5
Other - Florida	7
Other - Out of State	3

9. Are you attending the public meeting as a member of an organization?

Yes	10
No	26
Blank	7

10. Where did you obtain the Comment Sheet?

Refuge	10
Mail	8
Public Meeting	10
Internet	4
Person	5
Blank	6

11. To what degree do you AGREE or DISAGREE with the following statements. Rated on a scale of 1 to 4 with 1 representing strongly Disagree and 4 representing strongly Agree. The values represent the average for each statement.

Limit public access to Cedar Keys NWR to protect wildlife	3.42
Limit the amount of new public use facilities (e.g., trails, restrooms, boat docks)	3.38
Promote Cedar Keys NWR to increase public knowledge and participation in refuge programs	2.69
Provide more recreational opportunities at Cedar Keys NWR	2.11
Improve public use facilities (E.g., trail, boat dock)	2.11
Make Cedar Keys NWR more accessible to the public	1.76

12. What do you VALUE about Cedar Keys NWR?

COMMENT	%
Protection of plants, animals, marsh, especially from development	36
Diversity, abundance of wildlife and habitat (birds =27%)	33
Natural, wild beauty	15
Wildlife Compatible Recreation - Observation & Photography	15
Remoteness	12
Peace and Quiet, not crowded	9
Research and study of habitat	9
Water Quality	3
Wildlife Compatible Recreation - Fishing	3

13. What are your major CONCERNS about Cedar Keys NWR, current management or its future direction?

COMMENTS	%
Increased tourism, too many people, too commercial, overused	**38**
Increase staffing to meet growing responsibilities, not enough law enforcement	21
Also mentioned: Hunting and trapping, keep in natural state, loss of beauty, community education on value of refuge, outreach, pollution, erosion and storm damage to nesting areas on Seahorse Key, allow hunting, exotic species removal, too much boat traffic, too many snakes, no concerns	

14. Are there other issues about Cedar Keys NWR that concern you?

COMMENTS
Adequate Law Enforcement, increase in public use without an increase in staff, keep from becoming tourist attraction, maintaining commitment to wildlife, hunting and trapping on the refuge, lack of a visitor center, litter, poachers, need to open lighthouse more often, looting of archaeological sites, not capitalizing on assets, Atsena Otie was made into interpretive area, air boats and jet skis, no concerns

15.Have you ever visited Cedar Keys NWR?

87% of those answering had visited the refuge.

16. Listed below are SOME of the recreational activities occurring on Cedar Keys NWR. Please check which activities you would like to do. Number of people responding was 34. Activities in the Other Category were written in and are currently not available on the refuge.

ACTIVITY	RESPONSES
Wildlife observation	**31**
Photography	22
Canoeing/kayaking	**20**
Interpretation/Environmental Education	19
Fishing	**15**
Boating, beach combing	14
Other- Biking, hiking, hunting	**1**

17. What activities should NOT be allowed on Cedar Keys NWR? Out of 38 forms returned, 31 answered this question.

ACTIVITY	RESPONSES
Camping	**13**
Hunting	9
Anything that would adversely impact refuge	**6**
Other comments: Motor boating, entry to interior of islands, beach activities (wind surfing, swimming, etc.), All activities, commercial development, jet skis, large-scale recreational development, Trapping, fires, poaching, littering	1

Issue Statements

Wildlife Habitat Management

Pine Warbler

WH1 There is not enough known about the wildlife or habitat of either refuge.

WH2 There is a need to monitor and manage habitat for endangered species, migratory birds and resident wildlife.

WH3 There is a need to manage the water flows and water quantity impacts on the habitat of the refuges.

WH4 There is a need to manage the impacts of human use on wildlife and habitat for the refuges.

WH5 There is a need to preserve and restore the ecosystems of the refuges.

Public Use

PU1-LS There is a need to provide public consumptive and non-consumptive use and access to Lower Suwannee refuge in a manner that minimizes conflicts between user groups and does not significantly impact habitat.

PU2-LS There is a need for better management and access for hunting activities on Lower Suwannee refuge.

PU3-LS There is a need for more opportunities for passive recreational uses on Lower Suwannee refuge.

PU4-CK There is a need to continue to only provide limited public uses on Cedar Keys refuge to protect sensitive wildlife habitat.

PU5 There is a need to expand the education and interpretation programs with increased involvement with public schools.

PU6 There is a need to provide adult education and outreach.

PU7 There is a need to increase staff and facilities, particularly for Cedar Keys refuge and the Dixie County portion of the Lower Suwannee refuge.

PU8 There is a need to recruit and train more student interns and volunteers.

Partnerships to Manage and Protect the Refuge

P1 There is a need to maintain and enhance partnerships with state, county and community agencies, universities and educational institutions, user groups, natural resource-based organizations and other entities.

P2 There is a need to protect refuge resources through additional acquisition and/or cooperative management agreements.

Lower Suwannee NWR Vision and Management Goals

The watershed and estuary of the Lower Suwannee National Wildlife Refuge contain valuable water resources and fish and wildlife habitat. The refuge will be managed for the conservation of fish and wildlife and their habitat, with special emphasis on the protection and restoration of wetland and upland communities. Educational, research, and wildlife-dependent recreational opportunities will be available, insofar as they are compatible with refuge health and preservation. Management will partner with local, state, and federal agencies, community organizations, and individuals to ensure the protection and conservation of the vast Suwannee River ecosystem for current and future generations.

Wild Turkey

- **Wildlife.** Expand scientifically-based monitoring and research to support management decisions on wildlife habitat and populations.
- **Habitat.** Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitats, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.
- **Protection of Resources.** Protect refuge natural and cultural resources to ensure their integrity and to fulfill the Mission of the National Wildlife Refuge System.
- **Public Use.** Provide opportunities for environmental education, interpretation and wildlife-dependent recreation in accordance with the National Wildlife Refuge System Act of 1997.
- **Landscape Management.** Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural resources within the Big Bend area of Florida, the Suwannee River Basin, and the North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

Cedar Keys NWR Vision and Management Goals

The Cedar Keys National Wildlife Refuge is a group of fragile coastal islands that contain significant natural and cultural resources. The refuge will be managed for the conservation of wildlife and wildlife habitat, with special concern for migratory and breeding birds and threatened and endangered species. Management will protect cultural resources and support environmental education, research and where appropriate, other compatible uses. Management will partner with local, state and federal agencies, community organizations and individuals to ensure the protection of these resources for present and future generations.

- **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 of Seahorse Key, Threatened and Endangered species, and Species of Special Concern in the State of Florida.
- **Protection of Resources.** Protect refuge natural, cultural and wilderness resources to ensure their integrity and to fulfill the Mission of the National Wildlife Refuge System.
- **Public Use.** Provide opportunities for environmental education, interpretation and wildlife-dependent recreation when compatible with the purpose, mission and vision of the refuge and that will not negatively impact critical or sensitive habitats.
- **Partnerships.** Promote collaboration and partnerships with private citizens and other agencies to increase research and environmental education opportunities and to protect the coastal ecosystem.

Credits: *Sandra Palfy, data entry, typing, distribution; Lyne Askins, design, layout, editing; Ken Litzenberger, Editor. All graphics: USFWS.*

MAILING REQUEST FORM

To place your name and address on our mailing list, we must have your written request. The reason for this is that federal government mailing lists must be released to the public upon request. If you wish to receive future information about Lower Suwannee and Cedar Keys National Wildlife Refuges Comprehensive Conservation Plan and Environmental Assessment, please complete the information below and return the form to:

Lower Suwannee National Wildlife Refuge
U.S. Fish and Wildlife Service
16450 NW 31st Place
Chiefland, FL 32626

First Name _____
Last Name _____

Mailing Address: _____
City _____
State _____ Zip _____

If you are acting in an official capacity as the representative of an organization, please compete the following two items:

Organization: _____
Title: _____

Yes, I wish to be on the mailing list to receive future information about the comprehensive conservation plan for Lower Suwannee and Cedar Keys National Wildlife Refuges. I understand that the names and addresses on federal government mailing lists must be released to the public upon request, under the provision of the Freedom of Information Act of 1974.

Signature _____ Date _____

US Fish and Wildlife Service
Lower Suwannee National Wildlife Refuge
16450 NW 31st Place
Chiefland, FL 32626

Attachment Six

Mailing List of Agencies and Indivduals

FEDERAL AGENCIES

Tall Timbers Research Station, Tallahassee, FL

USDI/Fish and Wildlife Service, Folkston, GA

U.S. Geological Survey, Gainesville/Tallahassee/St. Petersburg, FL

FEDERAL OFFICIALS

U.S. Representative F. Allen Boyd, Tallahassee, FL

U.S. Representative Karen Thurman, Inverness, FL

U.S. Senator Bob Graham, Tallahassee, FL

U.S. Senator Connie Mack, Tallahassee, FL

STATE OFFICIALS

Senator George Kirkpatrick, Gainesville, FL

Senator Richard Mitchell, Jasper, FL

Representative Janegale Boyd, Monticello, FL

Representative Dwight Stansel, Lake City, FL

STATE AGENCIES

Department of Environmental Protection/Big Bend Seagrass Aquatic Preserve, Crystal River, FL

Department of Environmental Protection/FL Park Service, Chiefland, FL

Department of Environmental Protection/Waccasassa Bay State Preserve, Cedar Key, FL

Department of State, Div. of Historical Resources, Tallahassee, FL

Florida Fish and Wildlife Conservation Commission, Chiefland, Newberry, Lake City, Cedar Key, Tallahassee, FL Suwannee River Water Management District, Live Oak, FL

CITY/COUNTY/LOCAL GOVERNMENTS

Chiefland City Council, Chiefland, FL

Cross City Council, Cross City, FL

Dixie County School Board, Cross City, FL

Fanning Springs City Council, Fanning Springs, FL

Levy County Development Authority, Bronson, FL

Levy County Planning Department, Bronson, FL

NATIVE AMERICAN TRIBES

Miccosukee Indian Tribe

Seminole Tribe of Florida

ORGANIZATIONS/BUSINESS/CIVIC GROUPS

Alachua County Audubon, Gainesville, FL
Animal Protection Institute, Sacramento, CA
Avian Research and Conservation Institute, Gainesville, FL
Bruce Collin Photography, New York, NY
Caribbean Conservation Corporation, Gainesville, FL
Cedar Key Chamber of Commerce, Cedar Key, FL
Cedar Key Garden Club, Cedar Key FL
Cedar Key Historical Society, Cedar Key, FL
Development Advisory Services, Inc., Bell, FL
Dixie County Chamber of Commerce, Cross City, FL
Dixie County Historical Society, Cross City, FL
Florida Defenders of the Environment, Gainesville, FL
Florida's Nature Coast Conservancy, Cedar Key, FL
Florida Lighthouse Association, Ponce Inlet, FL
Georgia Pacific Corporation, Gulf Hammock, FL
Greater Chiefland Chamber of Commerce, Chiefland, FL
Jones & Stokes, San Jose & Sacramento, CA
Nature Coast Canoe & Kayak, Cedar Key, FL
North Central Florida Regional Planning Council, Gainesville, FL
Sandfly Hunt Club, Trenton, FL
Save Our Suwannee, Bell, FL
Sierra Club, Lake City, FL
Sunset Meadows Country Animal Clinic, Gainesville, FL
Suwannee River Chamber of Commerce, Suwannee, FL
Suwannee Audubon Society, Old Town, FL
Suwannee Bicycle Association, High Springs, FL
Tennaco Packaging Co., Cross City, FL
The Nature Conservancy, Altamonte Springs, FL
Usher Land and Timber, Chiefland, FL
Wild Florida Adventures, Gainesville, FL

NEWSPAPERS

The Cedar Key Beacon, Cedar Key, FL
The Chiefland Citizen, Chiefland, FL
The Citrus County Chronicle, Crystal River, FL
The Dixie County Advocate, Cross City, FL
The Florida Times-Union, Jacksonville, FL
The Gainesville Sun, Gainesville, FL
The Gilchrist County Journal, Trenton, FL
The Levy County Journal, Bronson, FL
The Ocala Star Banner, Ocala, FL

The St. Petersburg Times, St. Petersburg, FL
The Tampa Tribune, Tampa, FL

UNIVERSITIES/COLLEGES/SCHOOLS

University of Florida, Department of Wildlife Ecology, Gainesville, FL
University of Florida, Department of Zoology, Gainesville, FL
University of Florida, Museum of Natural History, Gainesville, FL

INDIVIDUALS

Asbell, Gail
Barlow, Steve
Bennett, Dennis
Billie, James E.
Blitch, Seth
Burden, Lys
Busby, Larry
Cannon, Dana
Cardona, Lannie
Cline, Evonne
Clugston, Jim
Coffel, Ann
Collin, Bruce
Connors, Jane
Cooke, Betty Rose
Crane, Rob
Cypress, Billy
Dhonau, Patricia & Pete
DiMaggio, Jeff
Durst, Melanie
Ellis, Will & Jonie
Gaff, Michael
Galpin, Greg
Georges, Aloise
Gluckman, Mark
Gooding, Carol
Griffin, George
Hancock, Judy
Henderson, Dale
Higginbotham, Jr.,W.D.
Hines, James
Hitt, Terry
Hunt, George
Jerrel, Resa
Johnson, Judy
LaFlam, Melody
Langford, Charles
Leavens, Wendy
Leverette, Anne & Tom
Light, Helen
Lillywhite, Dr. Harvey
Lindsey, Kimberly
Lindskold, Svenn
Lunger, Sheila
Mattson, Rob
McQueen, Carol
McIntosh, Mike
McLeod, Grady
Moller, Jack
Moore, Andy & Barbara
Moser, Keith
Mullikin, Steven
Murrian, Jim
Nordlie, Frank
Papouchis, Christopher
Pate, Anthony
Poore, Garry
Probst, Kay & Chet
Reiss, Paul
Roof, Jayde
Roquemore, Susan & David
Rowan, Rex
Scardino, Mark
Smith, Harriet
Sowell, Leo
Spyker, Mark
Starnes, Earl
Straub, Leslie
Steadman, Dr. David
Stephens, Joan
Syrjala, Edward S.
Taylor, Nancy
Taylor, Tom
Wesbter, Kirk
Witman, Bob
Wineman, Warren
Zippin, David

DRAFT

The Public Involvement Process

APPENDIX D

Appendix E
References

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Borremans, Nina T. n.d. Prehistoric Human Settlement in the Cedar Keys: Maritime Adaptations and Environmental Responses. Reports of Investigations No. 6, Department of Anthropology, University of Florida.

Borremans, Nina T. 1992 North Peninsular Gulf Coast, 2500 B.P. - A. D. 1600. In, Florida's Cultural Heritage: A View of the Past (Draft), prepared by the Division of Historical Resources, Florida Department of State, pps. 58-64.

Brockman, Jane H., K. Bjorndal, D. Brazeau, C. Lanciani, and D. Levey. 1995. Seahorse Key Task Force Report: Recommendations and Fact-Finding on the University of Florida Marine Laboratory at Seahorse Key. University of Florida, Gainesville, Florida.

Bullen, Ripley P., and Edward M. Dolan. 1960 Shell Mound, Levy County, Florida. Florida Anthropologist 13(1): 17-23.

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Appendix F
Glossary of Terms

Alternative ..... A refuge management pattern designed to accomplish a desired end result. May be presented in the form of refuge objectives and strategies.

Biological Diversity..... The variety of life forms and processes, including the complete natural complex of species, communities, genes, and ecological functions.

Compatible Use..... A wildlife-dependent recreational use, or any other use on a refuge that will not materially interfere with or detract from the purposes(s) for which the refuge was established.

Comprehensive Conservation Plan ... A document that guides management decisions, and outlines management actions to be used to accomplish the mission of the System and the purposes of the refuge unit.

Conservation Easement..... A legal document that provides specific land-use rights to a secondary party.

Cultural Resources ..... The physical remains of human activity (e.g., artifacts, ruins and burial mounds) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, such as a sacred area of native peoples) of an area. It includes historically, archaeologically and/or architecturally significant resources.

Degradation..... A process of transition from a higher to a lower quality of fish and wildlife habitat.

Diversity ..... Variety; usually used in reference to the number of species or living organisms in a given area, including some reference to their abundance.

Ecosystem..... The sum of all interacting parts of plant and animal communities and their associated non-living environment.

Ecosystem Approach ..... A strategy or plan to manage the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated, as opposed to a strategy or plan for managing individual species.

Ecosystem Management ..... Management of an ecosystem that includes all ecological, social, and economic components which make up the whole of the system.

Endangered Species ..... Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.

Environment ..... The surroundings of a plant or animal.

Environmental Assessment ..... A systematic analysis of site-specific or programmatic activities used to determine whether such activities have a significant effect on the quality of the physical, biological, and human environment.

Estuary ..... An arm of the sea that extends inland to meet the mouth of a river.

Extinct ..... No longer existing.

Fauna ..... The animals of a particular region, taken collectively.

Flora ..... The plants of a particular region, taken collectively.

Fuel ..... Living and dead plant material that is capable of burning.

Habitat ..... A place where a plant or animal naturally or normally lives and grows.

Habitat Diversity ..... In reference to the variety in habitat; structural and compositional variety of habitat.

Habitat Management Plan ..... A written plan that outlines the management strategy of plant or animal species in the area where they naturally or normally live and grow.

Herbicide ..... A chemical agent used to kill plants or inhibit plant growth.

Issue ..... Any unsettled matter that requires a management decision.

Mitigation ..... Avoiding or minimizing impacts of an action by limiting the degree or magnitude of the action; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.

Mosaic ..... A variety of different habitats intermixed in a relatively small area. In the same manner, several successional stages intermixed within a vegetation type.

National Environmental Policy Act .. An act which encourages productive and enjoyable harmony between humans and their environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere, to stimulate the health and welfare of humans, to enrich our understanding of the ecological systems and natural resources important to our Nation, and to establish a council on environmental quality.

Native ..... This term describes plant and animal species, habitats, or communities that originated in a particular region or area, or those that have established in a particular region or area without the influence of humans.

National Wildlife Refuge System ..... All lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife, and plant resources.

Prescribed Burning ..... The intentional application of fire to vegetation under specific environmental conditions to accomplish specific management objectives in specific areas identified in approved prescribed fire plans.

Raptor ..... A bird of prey such as a hawk, eagle or owl.

Refuge Agreements ..... Refuge Agreements include those agreements between the refuge and other federal, state, and local entities for refuge operations (e.g., a multi-agency visitors' center, law enforcement, and wildfire suppression and prescribed burning).

Refuge Goals ..... Statements that describe a desired condition. Refuge goals are expressed in broad, general terms. They provide direction for developing objectives.

Refuge Objectives ..... Concise statements that describe, in measurable terms, desired conditions, and thus provide focal points for directing management activities. They describe desired conditions in greater detail than refuge goals. Refuge goals and core problems provide the basis from which objectives are developed.

Reintroduction ..... A plant or animal species that is introduced by humans to a range that it formerly occupied.

RONS ..... Refuge Operating Needs System - A refuge planning, budgeting, and communication tool.

Scoping ..... A process for determining the scope of issues to be addressed in the comprehensive conservation plan and for identifying the significant issues. It is a process whereby the public and federal, state, and local agencies are invited to participate.

Shrub ..... A plant usually with several woody stems; a bush. A shrub differs from a tree by its low height.

Species ..... A distinctive kind of plant or animal having distinguishable characteristics, and that can interbreed and produce young. A category of biological classification.

Stakeholder Group ..... A group of citizens representing a broad spectrum of interests offering business, tourism, conservation, recreation, and historical perspectives.

Strategies ..... Specific actions, tools and techniques that could be used to meet refuge goals and objectives, and provide direction for defining and coordinating operational tasks to effectively perform the refuge's purpose.

Threatened Species ..... Those plant or animal species likely to become

endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.

Vegetation ..... Plants in general, or the sum total of the plant life in an area.

Vegetation Type ..... A category of land based on potential or existing dominant plant species of a particular area.

Watershed ..... The entire land area that collects and drains water into a stream or stream system.

Wetland ..... Areas such as lakes, marshes, and streams that are inundated by surface or ground water for a long enough period of time each year to support, and do support under natural conditions, plants and animals that require saturated or seasonally saturated soils.

Wildlife Diversity ..... A measure of the number of wildlife species in an area and their relative abundance.

Wildlife Management ..... The art and science of producing, maintaining, benefitting, and/or enhancing wildlife populations and their associated habitats.

DRAFT
RONS
MMS

APPENDIX G

Appendix G

Refuge Operational Needs System

Maintenance Management System

The Refuge Operational Needs System (RONS) is the vehicle through which refuges identify unfunded operational needs. The Maintenance Management System (MMS) is the vehicle through which refuges identify deferred maintenance. The difference between the MMS system and RONS is that MMS is for repair or replacement of existing equipment and RONS if for new operational needs.

Not only are RONS and MMS updated annually to tract a refuge's needs, they are also used throughout the Service's budget justification process. The Department of The Interior, Office of Management and Budget, and Congress may scrutinize RONS and MMS lists before providing funding for a project. In this manner, they are also used to inform the Department and Congress what is accomplished on refuges with the funding that is provided. The RONS and MMS lists reflect the projects, objectives, and strategies identified in the draft comprehensive conservation plan.

Below is the current RONS list for Lower Suwannee and Cedar Keys National Wildlife Refuges.

	PROJECT NAME	NUMBER
1.	Wildlife surveys (biotech position)	97001
2.	Kiosk for Salt Creek area	97006
3.	Kiosk for Shell Mound area	97007
4.	Observation tower, loop trail	97011
5.	Closed equipment storage building	97012
6.	Visitor center	97015
7.	Improved maintenance (maintenance person)	98001
8.	Longleaf pine research	98006
9.	Amphibian research	98007
10.	Sea turtle survey	98009
11.	Maintenance shop, Dixie	99001
12.	Fire, pickup truck	99002
13.	Shop mechanic (maintenance person)	00002
14.	Outreach (person)	00003
15.	Comprehensive conservation planning	00005
16.	Hydrology (operations specialist)	00006
17.	Exotic plant survey/control	00007
18.	Gopher tortoise survey	00008
19.	Long term biological studies (biologist)	01001
20.	General administration (office clerk)	01002
21.	Refuge office	01003
22.	Geographic Information System	01004
23.	Refuge video	01005
24.	Fire ecology research	01006
25.	Archaeology inventory	01007

26.	Environmental education partnership	01008
27.	Dennis Creek tower and interpretation	01009

* number represents the year and order of entry and not the present priority.

MMS Needs for Lower Suwannee and Cedar Keys National Wildlife Refuges

	PROJECT NAME	NUMBER
1.	Replace Fiat Allis bulldozer	00001
2.	Pave office road	00002
3.	Shired island boat ramp parking lot	00003
4.	Cabin replacement	00005
5.	Mobil home replacement	00007
6.	Replace lowboy trailer	00009
7.	Replace Champion road grader	00010
8.	Replace Seawall at Seahorse Key	00011
9.	Replace river trail kiosk	00012
10.	Replace F150 pickup truck	01001
11.	Replace Ford Ranger pickup truck	01002

Appendix H Lower Suwannee *National Wildlife Refuge*

Table 7. Federal And State Listed Species That Occur Or May Potentially Occur *(Cont'd.)*

Scientific Name	Common Name	Federal Status +	State Status +	Occurence Status ++
Fish				
Acipenser oxyrichus desotoi	Gulf sturgeon	LT	LS	C
Micropterus notius	Suwannee bass	N	LS	C
Amphibians				
Ambystoma cingulatum	flatwoods salamander	LT	N	P
Notophthalmus perstriatus	striped newt	SC	N	P
Pseudobranchus striatus lustricolus	Gulf Hammock dwarf siren	SC	N	P
Rana capito	Gopher frog	N	LS	P
Reptiles				
Alligator mississippiensis	American alligator	T (s/a)	LS	C
Caretta caretta	loggerhead	LT	LT	P*
Chelonia myda	green turtle	LE	LE	P*
Dermochelys coriacea	leatherback	LE	LE	P*
Drymarchon corais couperi	eastern indigo snake	LT	LT	C
Goperus polyphemus	gopher tortoise	SC	LS	C
Lepidochelys kempii	Kemp's ridley	LE	LE	P*
Macroclemys temminckii	alligator snapping turtle	SC	N	P
Pituopis melanoleucus mugitus	Florida pine snake	SC	LS	P
Pseudemys concinna suwanniensis	Suwannee cooter	SC	LS	C
Stilosoma extenuatum	short-tailed snake	SC	LT	P
Mammals				
Microtus pennsylvanicus dukecampbelli	salt marsh vole	LE	LE	P
Plecotus rafinesquii	Rafinesque's big eared bat	SC	N	P
Podomys floridanus	Florida mouse	N	LS	P
Sciurus niger shermani	Sherman's fox squirrel	SC	LS	P
Trichechus manatus	manatee	LE	LE	C
Ursus americanus floridanus	Florida black bear	N	LT	P

DRAFT
Federal and State Listed Species

APPENDIX H

Lower Suwannee
National Wildlife Refuge

Table 7. Federal And State Listed Species That Occur Or May Potentially Occur *(Cont'd.)*

Scientific Name	Common Name	Federal Status +	State Status +	Occurence Status ++
Birds				
Aimophilia aestivalis	Bachman's sparrow	SC	N	P
Ajaia ajaja	roseate spoonbill	N	LS	P
Ammodramus maritimus peninsulae	Scott's seaside sparrow	N	LS	C
Aphelocoma coerulescens	Florida scrub jay	LT	LT	P
Aramus guarauna	limpkin	N	LS	P
Buteo brachyurus	short-tailed hawk	SC	N	C
Charadrius melodus	piping plover	LT	LT	P
Cistothrous palustris mariamae	Marian's marsh wren	N	LS	P
Egretta caerulea	little blue heron	N	LS	C
Egretta thula	snowy egret	N	LS	P
Egretta tricolor	tricolored heron	N	LS	P
Elanoides forficatus	swallow-tailed kite	SC	N	C
Eudocimus albus	white ibis	N	LS	P
Falco peregrinmus tundrius	pergrine falcon	E (s/a)	LE	P
Falco sparverius paulus	Southeastern American kestrel	SC	LT	P
Grus canadensis pratensis	Flrida sandhill crane	N	LT	P
Haliaeetus leucocephalus	bald eage	LT	LT	C
Mycteria americana	wood stork	LE	LE	C
Laterallus jamaicensis	black rail	SC	N	P
Pandion haliaetus	osprey	N	LS	P
Pelecanus occidentalis	brown pelican	N	LS	C
Picoides borealis	red-cockaded woodpecker	LE	LT	P
Rynchops niger	black skimmer	N	LS	P
Speotyto cunicularia floridana	Florida burrowing owl	N	LS	P
Sterna antillarum	least tern	N	LT	P

DRAFT
Federal and State Listed Species

APPENDIX H

Lower Suwannee
National Wildlife Refuge

Table 7. Federal And State Listed Species That Occur Or May Potentially Occur

Scientific Name	Common Name	Federal Status +	State Status +	Occurence Status ++
Vascular Plants				
Agrimonia incisa	incised groove-bur	SC	N	P
Asplenium heteroresiliens	Wagner's spleenwort	SC	N	P
Arnoglossum diversifolium	variable-leaved Indian-plantain	N	LT	P
Carex chapmanii	Chapman's sedge	SC	N	P
Drosera intermedia	spoon-leaved sundew	N	LT	P
Forestiera godfreyi	Godfrey's privet	N	LE	P
Glandularia tampensis	Tampa vervain	N	LE	P
Hasteola robertiorum	Florida hasteola	N	LE	P
Leitneria floridana	corkwood	SC	LT	P
Litsea aestivalis	pondspice	SC	LE	P
Lythrum curtissii	Curtiss' loosestrife	SC	LE	P
Matelea floridana	Florida spiny-pod	SC	LE	P
Persea humlis	scrub bay	SC	N	P
Physostegia leptophylla	sleander-leaved dragon-head	SC	N	P
Phyllanthus leibmannianus spp. platykpis	pinewood dainties	SC	LE	P
Pycnanthemum floridum	Florida mountain-mint	SC	N	P
Rhynchospora culixa	Georgia beakrush	SC	N	P
Rhynchospora decurrens	decurrent beakrush	SC	N	P
Schwalbea americana	chaffseed	LE	LE	P
Sium Floridanum	Florida water-parsnip	SC	N	P
Spigelia loganioides	pinkroot	SC	LE	P
Thelypteris reptans	creeping fern	N	LE	P
Zephyranthes simpsonii	rain lily	SC	LT	P

Status and Occurence Explanations

+ Federal Status

LE Listed as an Endangered Species under the provisions of the Endangered Species Act.

LT Listed as a Threatened Species under the provisions of the Endangered Species Act.

(s/a) Listed due to similarity of appearance

N Not currently listed nor being considered for listing.

SC Special Concern: While these species are not federally listed, the Fish and Wildlife Service considers them of management concern and encourages consideration during planning.

+ State Status

LE (Animals) Listed as Endangered Species by the Florida Fish and Wildlife Conservation Commission (FWCC).

LT (Animals) Listed as Threatened by the FWCC.

LS (Animals) Listed as a Species of Special Concern by FWCC.

LE (Plants) Listed as Endangered by the Florida Department of Agriculture and Consumer Services (FDACS) under the provisions of Preservation of Native Flora of Florida Act.

LT (Plants) Listed as Threatened by FDAC under the provisions of the Preservation of Preservation of Native Flora of Florida Act.

N Not currently listed nor being considered for listing.

++ Occurrence Status

C (Confirmed) Occurrence status derived from a documented record in Florida Natural Areas Inventory Database and/or observation by refuge personnel

C* (Fish) (Confirmed) to exist in offshore waters.

P (Potential) Refuge believed to contain habitat to support species and potential for species to occur exists on the Refuge.

P* (Sea turtles) Occurs in offshore waters, but no nesting has been known to occur on the refuge.

Cedar Keys
National Wildlife Refuge

Table 8. Federal And State Listed Species That Occur Or May Potentially Occur *(Cont'd.)*

Scientific Name	Common Name	Federal Status +	State Status +	Occurence Status ++
Vascular Plants				
Glandularia tampensis	Tampa vervain	N	LE	P
Leitneria floridana	corkwook	SC	LT	P
Fish				
Acipenser oxyrinchus desotoi	Gulf sturgeon	LT	LS	C*
Reptiles				
Caretta caretta	loggerhead	LT	LT	P*
Chelonia mydas	green turtle	LE	LE	P*
Dermochelys coriacea	leatherback	LE	LE	P*
Drymarchon corais couperi	eastern indigo snake	LT	LT	P
Eumeces egregius insularis	Cedar key mole skink	SC	N	P
Gopherus polyphemus	gopher tortoise	SC	LS	C
Lepidochelys kempii	Kemp's ridley	LE	LE	P*
Mammals				
Microtus pennsylvanicus dukecampbelli	salt marsh vole	LE	LE	P
Trichechus manatus	manatee	LE	LE	C

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Federal and State Listed Species

APPENDIX H

Cedar Keys
National Wildlife Refuge

Table 8. Federal And State Listed Species That Occur Or May Potentially Occur

Scientific Name	Common Name	Federal Status +	State Status +	Occurence Status ++
Birds				
Ajaia ajaja	roseate spoonbill	N	LS	P
Ammodramus maritimus peninsulae	Scott's seaside sparrow	N	LS	C
Charadrius melodus	piping plover	LT	LT	P
Cistothrous palustris mariamae	Marian's marsh wren	N	LS	P
Egretta caerulea	little blue heron	N	LS	C
Egretta thula	snowy egret	N	LS	P
Egretta tricolor	tricolored heron	N	LS	C
Elanoides forficatus	swallow-tailed kite	SC	N	C
Eudocimus albus	white ibis	N	LS	C
Falco peregrinus tundrius	peregrine falcon	E (s/a)	LE	P
Falco sparverius paulus	Southeastern American kestrel	N	LT	P
Haliaeetus leucocephalus	bald eagle	LT	LT	C
Laterallus jamaicensis	black rail	SC	N	P
Pandion haliaetus	osprey	N	LS	C
Pelecanus occidentalis	brown pelican	N	LS	C
Picoides borealis	red-cockaded woodpecker	LE	LT	P
Rynchops niger	black skimmer	N	LS	P
Sterna antillarum	least tern	N	LT	P

Table 9. Priority Bird Species for South Atlantic Coastal Plain *(Cont'd.)*

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
Ia.	Bewick's Wren	35	5	5		C	Nearly extinct
	Appalachian Kirtland's Warbler[5]	35	5	5		A	Mostly SC, GA
	Black-capped Petrel	32	5	5		P	Concentrations off NC
	Bermuda Petrel[5]	32	2	5		P	Increasingly regular off NC
	Red Knot	32	5	5		C	Mostly GA, FL
	South Atlantic Red-cockaded Woodpecker[5]	32	5	4	80.4*	R	
	Snowy Plover	31	3	5		D	St. Joseph Peninsula to Dog Island, FL Gulf
	Southeast Painted Bunting	31	5	5		B	GA, SC, n. FL, se NC
	Eastern Roseate Tern[5]	30	3	4		A	Highly Pelagic
	North American Black-throated Green Warbler	30	5	4	100.0*	B	VA, NC, SC
	Wayne's (Coastal) Bachman's Sparrow	30	5	5	36.6*	R	Primarily breeding
	Saltmarsh Sharp-tailed Sparrow	30	5	3		C	
	Wood Stork[5]	29	4	4	44.3?	D	FL, GA, se SC
	Southeast Henslow's Sparrow	29	5	4		D	Winters FL, GA, SC(?), local breeding ne NC, se VA
	Swallow-tailed Kite	28	4	3	10.8	B	SC, GA, FL
	North American American Kestrel	28	5	4		D	
	Southeastern Piping Plover[5]	28	4	4		D	Mostly winter, local breeding NC and possibly SC
	American Oystercatcher	28	5	3		D	

Table 9. Priority Bird Species for South Atlantic Coastal Plain *(Cont'd.)*

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
Ib.	Short-tailed Hawk	27	2	3		B	St. Marks to Lower Suwannee, FL
	Florida Black Rail	27	4	4		D	
	Sandhill Crane	27	3	3		R	FL, GA
	Florida Brown-headed Nuthatch	27	5	5	38.7*	R	
	Nelson's Sharp-tailed Sparrow	27	3	3		C	
	Audubon's Shearwater	26	5	3		P	
	Caribbean Yellow Rail	26	4	3		C	
	Wilson's Plover	26	4	3		D	Mostly breeds, irregular in winter in GA, FL
	Bicknell's Thrush	26	5	3		A	
	Swainson's Warbler	26	4	1	15.9	B	
	Seaside Sparrow	26	5	3		D	Atl. and Gulf pops. may represent different species
	Whimbrel	25	5	5		A	
	Buff-breasted Sandpiper	25	3	4		A	
	Black-throated Blue Warbler	25	5	3		A	
	Cerulean Warbler	25	2	3		B	Roanoke River, NC; elsewhere?
	Brown Pelican	24	5	1		R	
	Southeast						
	Marbled Godwit	24	3	4		C	
	Bobolink	24	5	5		A	
	Buff-breasted Sandpiper	24	3	3		A	
	Brant	23	3	5			C Mostly NC
	King Rail	23	5	4		D	
	Sandhill Crane	23	5	3		C	FL, GA

Table 9. Priority Bird Species for South Atlantic Coastal Plain *(Cont'd.)*

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
Ib (cont.).	Greater Stilt Sandpiper	23	4	5		A	
	Solitary Sandpiper	23	5	3		A	
	American Woodcock	23	5	4		D	Mostly winter, some breeding
	Wood Thrush	23	3	5	8.5*	B	
	Northern Parula	23	5	5	23.7*	B	
	Cape May Warbler	23	5	3		A	
	Worm-eating Warbler	23	3	2	14.7	B	
	Connecticut Warbler	23	5	3		A	
	Hooded Warbler	23	4	4	15.0*	B	
	Cory's Shearwater	22	5	3		P	
	White Ibis	22	4	4	15.7?	D	
	American Black Duck	22	3	5		D	Breeds VA, NC; formerly wintered to GA
	Clapper Rail	22	5	3		D	
	Semipalmated Sandpiper	22	5	5		A	
	Purple Sandpiper	22	4	2		C	
	Short-billed Dowitcher	22	5	5		A	Many winter
	Short-eared Owl	22	3	5		C	
	Black Tern	22	5	5		A	
	Sedge Wren	22	4	2		C	
	Veery	22	5	5		A	
	Yellow-throated Warbler	22	4	3	25.5*	D	Mostly breeding, some winter coastal GA, ne FL
	Prairie Warbler	22	3	4	17.9*	B	
	Bay-breasted Warbler	22	3	3		A	
	Louisiana Waterthrush	22	4	2	8.1	B	
	Field Sparrow	22	5	5		D	Primarily winter
	Le Conte's Sparrow	22	3	2		C	Mostly GA, SC

Table 9. Priority Bird Species for South Atlantic Coastal Plain *(Cont'd.)*

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
IIa.	American Bittern	21	4	5		D	Most wintering, local breeding
	Canvasback	21	4	4		C	
	Northern Bobwhite	21	4	5		R	
	Black-bellied Plover	21	4	5		A	Many winter
	Willet	21	5	3		D	
	Ruddy Turnstone	21	5	5		A	Many winter
	Sanderling	21	5	5		A	Many winter
	Western Sandpiper	21	5	3		A	Many winter
	Gull-billed Tern	21	5	4	11.5?	D	
	Least Tern	21	5	5		B	
	Black Skimmer	21	4	5		D	
	Yellow-billed Cuckoo	21	4	5		B	
	Black-throated Green Warbler all, including Wayne's)	21	5	3		A	
	Grasshopper Sparrow	21	5	5		D	Primarily migration, some breeding and wintering
	Least Bittern	20	5	3		B	
	Lesser Scaup	20	5	5		C	
	Black Scoter	20	4	5		C	
	Northern Harrier	20	4	4		C	
	American Avocet	20	3	3		C	
	Least Sandpiper	20	5	5		A	
	Dunlin	20	4	5		C	
	Sandwich Tern	20	5	3		B	
	Common Ground-Dove	20	3	5	17.6?	R	FL to se SC
	Palm Warbler	20	3	5		C	
	Eastern Towhee	20	5	5	24.5*	D	

Table 9. Priority Bird Species for South Atlantic Coastal Plain *(Cont'd.)*

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
IIb (cont.).	Red-throated Loon	19	5	4		C	Major concentrations from Back Bay, VA, to Cape Fear, NC, uncommon to rare elsewhere
	Common Loon	19	5	3		C	
	Greater Scaup	19	3	5		C	
	Greater Yellowlegs	19	5	3		A	Some winter
	Pectoral Sandpiper	19	5	3		A	
	Royal Tern	19	5	3	30.6?	D	
	Barn Owl	19	5	3		D	
	Least Flycatcher	19	3	5		A	
	Carolina Chickadee	19	4	4	11.4	R	
	Rusty Blackbird	19	3	5		C	
IIb.	Chuck-will's-widow	21	5	2	21.7*	B	
	Prothonotary Warbler	21	4	1	34.4*	B	
	Acadian Flycatcher	20	4	1	13.7	B	
	White-eyed Vireo	20	5	2	17.8	D	Primarily breeding
	Yellow-throated Vireo	19	4	1	10.8*	B	
	Pine Warbler	19	5	2	22.2*	D	
	Summer Tanager	19	5	2	18.6*	B	
	Orchard Oriole	19	5	2	12.9*	B	
IIIa.	Kentucky Warbler	19	2	1	2.5	B	
IIIb.	Bald Eagle[5]	17	3	2		D	

Table 9. Priority Bird Species for South Atlantic Coastal Plain *(Cont'd.)*

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
Regional Interest	Great Blue Heron	13	4	1		D	
	Great Egret	14	4	2		D	
	Snowy Egret	14	4	2		D	
	Little Blue Heron	15	4	2		D	
	Tricolored Heron	18	4	3		D	
	Black-crowned Night-Heron	17	4	5		D	
	Yellow-crowned Night-Heron	18	5	2		D	
	Glossy Ibis	17	4	3		D	
	Canada Goose	No Score				C	Mostly NC, SC
	Atlantic pops. Tundra Swan	20	4	1		C	Mostly ne NC
	Wood Duck	17	3	2		D	
	Mallard	15	5	3		D	Mostly winter
	Blue-winged Teal	17	5	3		A	Some winter
	Northern Pintail	16	3	5		C	
	Redhead		21	3	4	C	
	Ring-necked Duck	19	4	2		C	
	Surf Scoter		20	3	4	C	Mostly NC
	White-winged Scoter	17	3	4		C	Mostly NC
	Mississippi Kite	19	3	1		B	Most common FL to SC; Rare and local N
	Limpkin		16	2	2	R	Iso. pop. Apalachicola, FL
	Semipalmated Plover	17	5	3		A	Many winter
	Spotted Sandpiper	18	5	3		A	Many winter
	Lesser Yellowlegs	18	5	3		A	Many winter
	Common Tern	16	3	4		D	Of special concern VA, NC
	Forster's Tern	19	2	3		D	
	Whip-poor-will	18	3	1		B	
	Red-headed Woodpecker	19	4	2	4.8	D	Primarily breeding

Table 9. Priority Bird Species for South Atlantic Coastal Plain

Priority Entry Criteria	Species	Total PIF Priority Species Scores	Concern Score		Percent of BBS Population	Local Migratory Status[2]	Geographical or Historical Notes
			Area Importance	Population Trend			
Regional	Eastern Wood-Pewee	18	4	2		B	
Interest	Eastern Kingbird	18	4	4		B	
(cont.)	Loggerhead Shrike	19	3	4		D	Rare now in NC, VA
	Black-and-white Warbler	14	2	1		D	Primarily breeding, rare winter coastal GA, FL
	Eastern Meadowlark	16	2	5		D	

[1]*Entry criteria:*

Ia. Overall Highest Priority Species. Species with total score 28-35. Ordered by total score. Consider deleting species with AI < 2 confirmed to be of peripheral occurrence and not of local conservation interest, but retain species potentially undersampled by BBS or known to have greatly declined during this century.

Ib. Overall High Priority Species. Species with total score 22-27. Ordered by total score. Consider deleting species with AI < 2 confirmed to be of peripheral occurrence and not of local conservation interest, but retain species potentially undersampled by BBS or known to have greatly declined during this century.

IIa. Area Priority Species. Species with slightly lower score total 19-21 with PT+AI=8+. Ordered by total score. These are overall moderate priority species.

IIb. Species with High Percent of BBS Population. Species with score total 19-21 with percent of BBS population above a threshold established (based on relative size of physiographic area), not already listed above, ordered by total score (*signifies highest percentage among physiographic area). These are overall moderate priority species.

IIIa. Additional Species of Global Priority. Add WatchList species (Partners in Flight-National Audubon Society priority species at national level), not already listed in either I or II, with AI=2+. Order by total score. Consider deleting species with AI=2 if confirmed to be of peripheral occurrence and not of local conservation interest, but retain if a local population is viable and/or manageable. These are also overall moderate priority species.

IIIb. Additional Federally Listed Species. Federal listed species if not already included above. Overall low priority, but appropriate legal obligations ("legal priority species") to protect through appropriate management and monitoring still apply. Only Bald Eagle meets this criterion in some Southeast physiographic areas.

Other Local or Regional Interest Species. Includes game or nongame species identified by State Working Groups. Also, may include species often meeting criteria for I or II within other physiographic areas and therefore of regional interest for monitoring throughout the Southeast. Theses are overall low priority species within physiographic area, but may be more important within one or more States (especially where multiple states have designated some special protective status on the species).

[2]*Local Migratory Status, codes adapted from Texas Partners in Flight as follows:*

A = Breeds in temperate or tropical areas outside of region, and winters in temperate or tropics outside of region (*i.e.*, passage migrant).

B = Breeds in temperate or tropical areas including the region, and winters exclusively in temperate or tropics outside the region (*i.e.*, includes both breeding and transient populations).

C = Breeds in temperate or tropical areas outside of region, and winters in both the region and in temperate or tropical areas beyond area (*i.e.*, includes both transient and wintering populations).

D = Breeds and winters in the region, with perhaps different populations involved, including populations moving through to winter beyond the region in temperate or tropical areas (*i.e.*, populations may be present throughout year, but may include a large number of passage migrants).

E = Species reaching distributional limits within the region, either as short-distance or long-distance breeding migrants, but at population levels above peripheral status.

F = Same as E except for wintering (non-breeding) migrants.

R = Resident, generally non-migratory species (though there may be local movements).

RP= Resident, non-migratory species, reaching distributional limits within the region, but at population levels above peripheral status.

P = Pelagic, breeding grounds outside of region, but can occur during breeding season.

PB = Post-breeding dispersal or non-breeding resident; species present during breeding season, but not known to be breeding in the region proper.

[3]Highest percent of breeding population recorded in temperate North America indicated by "*"; ? indicates species widespread outside of temperate North America and/or waterbirds poorly sampled by Breeding Bird Survey within physio. area.

[4]AI or PT score revised from what was derived by BBS data, or lack thereof, based on better local information.

[5]Species listed as either Federal Endangered or Threatened.

Table 10. Species Suites for Lower Suwannee and Cedar Keys National Wildlife Refuges *(Cont'd.)*

Priority Level	Southern Pine/Grasslands	Shrub-scrub	Forested Wetlands/Hammocks	Mangroves-Maritime*	Transient Landbirds	Open Water/Colonial: Emergent Wetlands	Open Water/Colonial: Nesting Waterbirds*	Open Water/Colonial: Shorebirds*
Extremely High	Red-cockaded Woodpecker (?) Bachman's Sparrow Henslow's Sparrow Am. Kestrel (SE)	Florida Scrub-Jay*	Swallow-tailed Kite	Prairie Warbler (FL)		Wood Stork Piping Plover		Snowy Plover (SE) Am. Oystercatcher
High	Brown-headed Nuthatch Field Sparrow LeConte's Sparrow	Northern Parula	Short-tailed Hawk Swainson's Warbler American Woodcock Hooded Warbler Yellow-throated Warbler	Gray Kingbird Black-whiskered Vireo (?)	Black-thr. Blue Warbler Cerulean Warbler Bobolink Wood Thrush Cape May Warbler Worm-eating Warbler Connecticut Warbler Veery Bay-breasted Warbler Louisiana Waterthrush	Black Rail Nelson's Sharp-tailed Sparrow Yellow Rail Seaside Sparrow King Rail Clapper Rail Black Ter Sedge Wren	Brown Pelican Reddish Egret (?) White Ibis	Whimbrel Marbled Godwit Stilt Sandpiper Solitary Sandpiper Semipalmated Sandpiper Short-billed Dowitcher Short-eared Owl
Moderate	Northern Bobwhite Grasshopper Sparrow Palm Warbler Carolina Chickadee Chuck-will's-widow Pine Warbler Summer Tanager	Co. Ground-Dove Eastern Towhee White-eyed Vireo Orchard Oriole	Yellow-billed Cuckoo Rusty Blackbird Chuck-will's-widow Prothonotary Warbler Acadian Flycatcher Yellow-throated Vireo Summer Tanager Bald Eagle		Black-thr. Green Warbler Kentucky Warbler	American Bittern Canvasback Gull-billed Tern (?) Least Tern Black Skimmer Least Bittern Northern Harrier Common Loon Royal Tern Barn Owl Bald Eagle		Black-bellied Plover Willet Ruddy Turnstone Western Sandpiper American Avocet Least Sandpiper Dunlin Greater Yellowlegs Pectoral Sandpiper

Table 10. Species Suites for Lower Suwannee and Cedar Keys National Wildlife Refuges

Priority Level	Southern Pine/Grasslands	Shrub-scrub	Forested Wetlands/Hammocks	Mangroves-Maritime*	Transient Landbirds	Open Water/Colonial: Emergent Wetlands	Open Water/Colonial: Nesting Waterbirds*	Open Water/Colonial: Shorebirds*
Local or Regional Interest	**Red-headed Woodpecker**	**Loggerhead Shrike**	**Wood Duck**			**Mallard**	**Great Blue Heron**	**Semipalmated Plover**
	Eastern Kingbird	**Eastern Wood-Pewee**	**Limpkin**			**Blue-winged Teal**	**Great Egret**	**Spotted Sandpiper**
	Eastern Meadowlark		**Whip-poor-will**			**Northern Pintail**	**Snowy Egret**	**Lesser**
			Eastern Wood-Pewee			**Redhead**	**Little Blue Heron**	**Yellowlegs**
			Black-and-white Warbler			**Ring-necked Duck**	**Tricolored Heron**	
						Common Tern	**Black-crowned Night-Heron**	
						Forster's Tern	**Yellow-crowned Night-Heron**	

*Cedar Keys National Wildlife Refuge is in Peninsular Florida. Cedar Keys National Wildlife Refuge supports breeding mangrove species (principally Florida Prairie Warbler, possibly Black-whiskered Vireo), most transient shorebirds, and most breeding colonial nesting waterbirds.

DRAFT INTERIM
Compatibility
Determination

APPENDIX I

Appendix I
Lower Suwannee
National Wildlife Refuge
COMPATIBILITY DETERMINATION

Uses

The following uses were considered for compatibility determination review: environmental education and interpretation, fishing, hunting, forestry practices, refuge resource research studies, wildlife observation, and bicycling. A description and anticipated biological impacts for each use are addressed separately in this Compatibility Determination.

Station Name

Lower Suwannee National Wildlife Refuge

Date Established

April 10, 1979

Establishing and Acquisition Authorities

Lower Suwannee National Wildlife Refuge is located in Levy and Dixie Counties, Florida, and was established by the authority of the Fish and Wildlife Act of 1956.

Purposes For Which the Refuge Was Established

". . . for the development, advancement, management, conservation, and protection of fish and wildlife resources . . . ." 16 U.S.C. 742f(a)(4) ". . . for the benefit of the United States Fish and Wildlife Service in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant or condition of servitude . . . . " 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956, 16 USC 742(a)--754) as amended.

Management Goals

Wildlife. Expand scientifically based monitoring and research to support management decisions on wildlife habitat and populations.

Habitat. Restore, conserve, and enhance the natural diversity, abundance, and ecological function of refuge habitat, with an emphasis on managing habitat to benefit threatened and endangered species and species of special concern in the State of Florida.

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

Public Use. Provide opportunities for environmental education, interpretation, and wildlife-dependent recreation in accordance with the National Wildlife Refuge System Improvement Act of 1997.
Landscape Management. Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural resources within the Big Bend Area of Florida, the Suwannee River Basin, and North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

Landscape Management Promote interagency and private landowner cooperation and partnerships for the management and protection of natural and cultural resources within the Big Bend Region of Florida, the Suwannee River Basin, and the North Florida Ecosystem to benefit wildlife, water quality and quantity, and the American people.

Other Applicable Laws, Regulations, and Policies:

- Antiquities Act of 1906 (34 Stat. 225)
- Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755)
- Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222)
- Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451)
- Criminal Code Provisions of 1940 (18 U.S.C. 41)
- Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250)
- Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686)
- Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat.1119)
- Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653)
- Wilderness Act (16 U.S.C. 1131; 78 Stat. 890)
- Land and Water Conservation Fund Act of 1965
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470, et seq.; 80 Stat. 915)
- National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
- National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852)
- Use of Off-Road Vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989)
- Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
- Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319)
- National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3)
- Emergency Wetlands Resources Act of 1986 (S.B. 740)
- North American Wetlands Conservation Act of 1990
- Food Security Act (Farm Bill) of 1990 as amended (HR 2100)
- The Property Clause of The U.S. Constitution Article IV 3, Clause 2
- The Commerce Clause of The U.S. Constitution Article 1, Section 8
- The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd)
- Executive Order 12996, Management and General public Use of the National Wildlife Refuge System. March 25, 1996
- Title 50, Code of Federal Regulations, Parts 25-33
- Archaeological Resources Protection Act of 1979
- Native American Graves Protection and Repatriation Act of 1990

Description of Use

Environmental Education and Interpretation

Environmental education and interpretation are those activities which seek to increase the public's knowledge and understanding of wildlife, national wildlife refuges, ecology, and land management, as well as contribute to the conservation of natural resources. If this comprehensive conservation plan is enacted, interpretation and environmental education

programs for the refuge would be developed. A visitor center or visitor contact station would be constructed to serve as the hub for public outreach and education. Environmental education curriculum on refuge resources consistent with the Florida Department of Education (Sunshine State) standards would be provided to local schools. Interpretive information would be developed and a kiosk constructed to highlight the Dixie County portion of the refuge. Interpretive panels and a kiosk would be developed for the Shell Mound area. An observation tower and interpretive information would be erected on the Dennis Creek walking trail. Elevated boardwalks would be constructed along the Dennis Creek trail. An observation tower with interpretive panels would be constructed along the visitor loop road in Levy County. A native plants, wild flower, and butterfly garden would be established along with a brochure depicting the common wild flowers present on the refuge. Canoe tours, birding tours, and wild flower and butterfly walks would be conducted at least quarterly.

Anticipated Biological Impacts of the Use

Construction of facilities such as boardwalks, kiosks, and observation towers would alter small portions of the natural environment on the refuge. Proper planning and placement of the facilities would ensure that wetlands, threatened or endangered species, or species of special concern are not negatively impacted. Proper permits through the county, state, and federal regulatory agencies would be obtained prior to construction to ensure resource protection. The Dennis Creek boardwalk would reduce human impacts of trampling on the salt marsh. The use of on-site, hands-on, action-oriented activities to accomplish environmental education and interpretive tours may impose a low-level impact on the sites used for these activities. These low-level impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate area.

Educational activities held off-refuge would not create any biological impacts on the resource.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

Environmental Impact Statement ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Zoning of visitor activities by time and space, clustering public use facilities, proper monitoring, educating the visitor, and enforcement would ensure compatibility with the purpose of the refuge and the purpose of the National Wildlife Refuge System. Through periodic evaluation of trails and visitor contact points, the outreach program would assess resource impacts. If future human impacts are determined through evaluations to be detrimental to important natural resources, actions would be taken to reduce or eliminate those impacts. Portions of the refuge would remain undeveloped, without public interpretive facilities.

Justification

Interpretation and environmental education are identified in the 1996 Executive Order and the 1997 National Wildlife Refuge System Improvement Act as activities that should be provided and expanded on refuges. Educating and informing the public through structured

environmental education courses, interpretive materials, and guided tours about endangered species, wildlife management, and ecosystems would lead to improved support of the Service's mission to protect our natural resources. The alternatives of not providing public access, or providing public access and not planning to channel the uses and inform visitors, would be far more detrimental to the refuge and the Service mission.

Description of Use

Fishing

Most recreational fishing takes place in state-owned waters of the Suwannee River, its tributaries, or the Gulf of Mexico and its tidal creeks. Access to these waters is provided on the refuge at four launching ramps for boats and several other canoe access points. The refuge also has two fishing piers and several locations that provide good fishing from the bank. Refuge-owned waters are limited to small ponds and manmade borrow pits that were formed when previous land owners "borrowed" material from the earth to construct roads. Anglers may fish in accordance with State regulations under the following conditions: only rod and reels may be used when fishing in refuge waters; the taking of turtles and frogs is prohibited; and boats may not be left on the refuge overnight. If the comprehensive conservation plan is fully enacted, a handicap-accessible fishing platform would be constructed at Fishbone Creek. An event to support National Fishing Week would be conducted annually on the refuge. Present boat launching facilities would be repaired and better maintained, and additional ways to increase land based fishing opportunities by emphasizing access and facility improvements would be explored.

Anticipated Biological Impacts of the Use

Construction of fishing platforms or piers would alter small portions of the natural environment of the refuge. Proper permits through the county, state, and federal regulatory agencies would be obtained prior to construction to ensure protection of wetlands. The construction of these facilities and the repair and maintenance of boat launching facilities would reduce negative biological impacts. Poor boat launching facilities lead to destruction of the bank vegetation and erosion when fisherman create their own boat launch sites. Providing piers improves access but also reduces disturbance from people trampling the vegetation along the bank. Negative environmental impacts would occur through illegal activities such as fishermen taking species out of season, or under size fish. Litter, especially items such as monofilament line that can injure and kill wildlife, is also a negative impact. Providing information to refuge visitors about rules and regulations, along with increased law enforcement patrol, would keep these negative impacts to a minimum.

NEPA Compliance:

Categorical Exclusion ___

Environmental Assessment _X_

Environmental Impact Statement ___

FONSI _X_

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Conflicts between fisherman and hunters or visitors using the refuge for non-consumptive wildlife oriented recreation have not been a problem in the past and it should not be a problem in the future. Associated violations such as taking under size or illegal fish, open fires, and littering can be

minimized by a continued law enforcement presence.

Justification

The Gulf of Mexico, tidal creeks, and the Suwannee River and tributary creeks are open to fishing year-round under State regulations. There is no good reason to limit fishing in these waters beyond State regulations. Fishing is a public use activity that, according to the 1996 Executive Order and the 1997 National Wildlife Refuge System Improvement Act, should be provided and expanded where possible. Improved access facilities would reduce bank erosion and habitat disturbance. The few interior ponds on the refuge provide a modest increase in recreational opportunities without impacting refuge resources.

Description of Use

Forestry Practices

Forest habitat management is conducted to provide optimum habitat and protection for naturally occurring wildlife, with special emphasis placed on threatened and endangered species and migratory birds. The approved Forest Management Plan (1989-1999) for Lower Suwannee National Wildlife Refuge fully addresses the types of forest management activities that occur and continue to occur on the refuge. The Forest Management Plan is due to be revised; however, due to the lack of staff, the order of entry into forest compartments identified in the plan has not been completed. For this reason, the current plan will be followed until a new plan is completed in 2002.

The management of existing forest lands would be directed towards the establishment of mixed species and mixed age forest communities. Approved forest management activities for Lower Suwannee National Wildlife Refuge include prescribed fire and selective cutting and/or thinning of forested communities. Reproduction methods include group selection and shelterwood cuts, which encourage the establishment of mixed species composition, as well as planting of seedlings where past management practices have removed viable seed sources.

Forest habitat manipulations are carried out by commercial timber harvest. All harvesting would be conducted by Special Use Permit and be carried out in accordance with the Refuge Manual. The regulations are found in Section 5 RM 17 and 6 RM 3 and are strictly enforced. The sale and disposition of forest products are carried out by open market rules and formal bid solicitations.

Anticipated Biological Impacts of the Use

It is anticipated that forest habitat management, in accordance with the approved Fire Management Plan, would enhance the existing forested habitats and provide necessary and improved wildlife habitat quality. Habitat management is an inherent, long-term process in which careful consideration and planning of activities must be addressed. The approved Fire Management Plan is the first working document for forest management on the refuge and addresses the initial steps being conducted by refuge staff in order to reach the long-term goals of the refuge and the Service.

Commercial timber-harvest operations, if not tightly controlled and supervised, have the potential to cause adverse impacts on environmental quality. All harvesting operations are conducted in accordance with Service policy and under special harvesting guidelines, which are attached to and made a part of the Special Use Permit granted to the successful contractor. In addition to these controls, harvesting is also conducted in accordance with the guidelines found in the State of Florida's *Best Management Practices* manual and *Management Guidelines for Forested Wetlands*.

The controls placed on harvesting operations minimize possible adverse effects caused by logging equipment, such as excessive surface defacement and negative impacts to surface water quality. However, minimum short-term impacts do occur from harvesting operations such as actual mechanized operation disturbance to wildlife and trampling of the understory vegetation by equipment. The understory vegetation usually recovers in one growing season and most often is more beneficial to wildlife due to increased density and palatability caused by the harvest operation (i.e., decreased competition and increased sunlight reaching the forest floor).

NEPA Compliance:

Categorical Exclusion ___

Environmental Assessment _X_

Environmental Impact Statement ___

FONSI _X_

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Active forest management activities as directed by the Forest Management Plan for Lower Suwannee National Wildlife Refuge are necessary and fully compatible with the purpose for which the refuge was established. Conducting forest management activities within the scope of approved management plans, Service policy of the National Wildlife Refuge System, and all applicable federal and state laws and regulations ensures both present and future compatibility of use. An Environmental Assessment is on file at the refuge headquarters as part of the Forest Management Plan.

Justification

The forest management actions as set forth in the Forest Management Plan for Lower Suwannee National Wildlife Refuge are in accordance with Service guidelines for the protection, maintenance, and enhancement of habitats for wildlife populations on the refuge. Adherence to the Forest Management Plan promotes the enhancement of habitats for both threatened and endangered plants, migratory birds, and indigenous wildlife species; promotes habitat restoration; protects cultural resources; and provides opportunities for public recreation and environmental education.

Description of Use

Hunting

Hunting has been permitted since 1982, when the refuge was first approved to offer hunting of migratory birds, and big and small game. The administration as well as special regulations for hunting have changed over time but the majority of the program is the same. The comprehensive conservation plan calls for continued hunting of waterfowl, deer, feral hogs, turkey, and small game. All hunts fall within the framework of the State's open seasons and follow State regulations. There are additional refuge specific regulations to supplement State regulations. These refuge specific regulations are reviewed annually and incorporated into the refuge brochure and permit that hunters are required to have prior to hunting on the refuge. The comprehensive conservation plan, if enacted, would increase law enforcement presence during hunting; would evaluate the

hunt program annually and modify seasons or regulations if necessary; would modify deer hunting regulations to increase the number of doe harvests in an effort to better balance the sex ratio and improve overall deer herd health; would evaluate the possibility of conducting a youth-oriented deer hunt; would maintain the archery-only area and present closed areas; and, would designate additional non-hunting areas.

Anticipated Biological Impacts of the Use

If left uncontrolled, white-tailed deer can become so numerous that they adversely affect associated plant and animal communities, thus altering ecological diversity and succession. This has been well documented through research and accepted over a period of many years. Necropsy and abomasal parasite counts conducted by wildlife veterinarians from the Southeastern Cooperative Wildlife Disease Study Unit on refuge deer indicate a deer herd that does not need to expand beyond the present population. If the refuge did not have a hunting season there would be negative biological impacts from over population of deer.

Feral hogs are prolific and if not controlled can quickly over populate good habitat. They can cause negative biological impacts by destroying habitat and competing against native wildlife species for the same resources. Although it is not practically possible to remove all hogs from the refuge, hunting has been successful in keeping the population under control.

Environmental impacts from hunting deer, turkey, small game, and migratory birds would be limited to minimal vegetative disturbance and the remote possibility of negative effects on threatened, endangered, or non-target species by hunters through malice or mistake. The hunting program requires a great deal of staff time to administer and ensure visitor safety and hunter compliance.

NEPA Compliance:

Categorical Exclusion ___

Environmental Assessment _X_

Environmental Impact Statement ___

FONSI _X_

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

An active law enforcement program would ensure regulation compliance and protect refuge resources. All hunters would be required to obtain a refuge permit and read the refuge hunt regulations. An annual hunt evaluation would be prepared after each hunting season. Hunters would not be allowed to use all-terrain vehicles, off-road vehicles, or horses, and automobiles would be permitted only on roads open to the general public. Deer herd health checks would be conducted by the Southeastern Cooperative Wildlife Disease Study Unit every 3 or 4 years to evaluate effects of the refuge hunting program. An Environmental Assessment is on file at the refuge headquarters as part of the Hunting Plan.

Zoning of the refuge by time and space would help to reduce conflicts between hunters and non-hunting visitors. Areas of the refuge that support most of the wildlife observation and visitor interpretive facilities that are highly utilized by non-hunting visitors would be designated as "closed to hunting."

Justification

Hunting is compatible with the purposes for which the refuge was

established and the mission of the National Wildlife Refuge System. It is one of the public use recreational activities that is specifically identified in the 1996 Executive Order and the 1997 National Wildlife Refuge System Improvement Act to be allowed where possible on refuges. Refuge deer and hog hunts are used as management tools to protect the diverse ecosystem. It has been well documented that hunting mortality from small game or spring gobbler harvests is incidental to overall mortality.

Description of Use

Refuge Resource Research Studies

This activity would allow college students, university professors, and the scientific community access to the natural environment to conduct research. The outcome of this research would result in better knowledge of our natural resources and improved methods to manage, monitor, and protect refuge resources. If the comprehensive conservation plan is enacted, the identified research would include the following: effects of prescribed fire on amphibian and reptile populations, aquatic inventory of fishes and mussels in the lower reaches of the Suwannee River, and a study to determine if the refuge gopher tortoises harbor the respiratory disease which threatens this species. The refuge would support Fish and Wildlife Service and U.S. Geological Survey research of the threatened Gulf sturgeon in the Suwannee River, expand partnership with University of Florida to conduct research of trust resources on the refuge, and expand partnership with the Suwannee River Water Management District to document water quality and quantity needs.

Anticipated Biological Impacts of the Use

There should be no significant negative impacts from scientific research on the refuge. The knowledge gained from the research would provide information to improve management techniques and better meet the needs of trust resource species. Impacts such as trampling vegetation and temporary disturbance to wildlife would occur, but should not be significant. A small number of individual plants or animals may be collected for further study.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

Environmental Impact Statement ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Each request for use of the refuge for research would be examined on its individual merit. Questions of who, what, where, when, and why would be asked to determine if the requested research could best be conducted on the refuge without significantly affecting the resources. If so, the researcher would be issued a Special Use Permit. Progress would be monitored and the researcher would be required to annually submit progress and final reports.

Justification

The benefits derived from sound biological research provide a better understanding of species and the environmental communities present on the refuge. This far outweighs any short-term disturbance or loss of

individual organisms.

Description of Use

Wildlife Observation

The observation of wildlife in their natural environment, whether it is an animal as large as a white-tailed deer or as small as a beautiful butterfly, is the number one reason people visit national wildlife refuges. Visitors look for and hope to observe wildlife by driving on open roads, boating the waterways, walking on designated trails, or biking on secondary roads. There are 50 miles of refuge primary roads maintained for public vehicle travel. An additional 50 miles of refuge secondary roads are maintained for management purposes. Only official vehicles are permitted on these secondary roads, however, they are open to individuals wishing to walk or bike for the purpose of observing wildlife. Foot travel is generally allowed anywhere on the refuge but there are 4 trails designated only for walking. Motorized vehicles are restricted to primary roads, while bicycles are allowed on both primary and secondary roads. Boats are permitted in all navigable waters, including the Suwannee River and its tributaries and creeks, as well as the Gulf of Mexico with its many meandering estuarine creeks. If the comprehensive conservation plan is enacted, in addition to the mentioned facilities, a walking trail would be developed through the pine forest and salt marsh at Salt Creek, and wildlife observation towers would be constructed at Dennis Creek and the Wildlife Drive loop road. The observation platforms on the River Trail and Salt and Fishbone Creeks would be maintained.

Anticipated Biological Impacts of the Use

Construction of the walking trail and observation towers would alter small portions of the natural environment. Proper planning prior to construction of the public use facilities would reduce negative impacts to wetlands, threatened or endangered species, or species of special concern. Impacts such as trampling vegetation and wildlife disturbance by refuge visitors does occur, but presently is not significant. Other negative impacts are caused by visitors violating refuge regulations such as littering or illegally taking wildlife. Refuge roads are maintained for fire protection, law enforcement, and management programs. Use of the roads by the public does incur added maintenance costs.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Permits prior to construction would be obtained from local, state, and federal regulatory agencies to reduce the possibility of negatively impacting wetlands or protected species. Horseback riding would not be permitted. Law enforcement patrol of public use areas would continue to minimize violations of refuge regulations. Refuge roads would be closed to the public during extremely wet periods such as flooding or hurricanes to prevent road damage and for visitor safety. Public use for wildlife observation would be monitored to document any negative impacts. If any negative impacts become noticeable corrective action would be taken to reduce or eliminate the effects on wildlife.

Justification

Wildlife observation is the number one preferred public use of Lower Suwannee National Wildlife Refuge and the National Wildlife Refuge System. The 1996 Executive Order and the 1997 National Wildlife Refuge System Improvement Act identify wildlife observation as a priority public recreational use to be facilitated on refuges. It is through permitted, compatible uses such as this, that the public becomes aware of and provides support for our national wildlife refuges.

Description of Use

Bicycling

The primary refuge roads are surfaced with limerock and the secondary roads are dirt or grass. There are no paved roads on the refuge. Recreational bike riding is difficult to distinguish from riding a bike to observe wildlife. Presently, and under the guidelines outlined in the draft comprehensive conservation plan, bicycle riding is permitted on refuge primary and secondary roads. There are no plans to develop or designate refuge trails exclusively for bike riding.

Anticipated Biological Impacts of the Use

Recreational bicycle riding is allowed on refuge primary and secondary roads. Currently, average annual use is low with late fall through early spring being the preferred seasons. At the current rate of use, no known negative impacts occur from recreational bicycle riding. While there may be some disturbance to wildlife, it is of a short duration, probably not significant, and similar to disturbance by automobiles. It is not anticipated that the volume of bike riding on the refuge would reach levels to cause significant impacts. The unpaved roads are a deterrent to many bicyclists, especially people who are interested in long distance biking or bike racing. Another deterrent to heavy use is the hot, humid weather and the abundance of biting insects from May to October.

NEPA Compliance

Categorical Exclusion_____

Environmental Assessment__X__

Environmental Impact Statement____

FONSI__X__

Determination (check one)

This use is compatible __X__. This use is not compatible____.

Stipulation Necessary to Ensure Compatibility

Bicycle riding is not one of the six primary recreational uses on refuges that are identified in the 1997 Refuge Improvement Act. For this reason, and to ensure compatibility, bicycle riding would not take precedence over other public use or management activities. Organized bike races and off-road riding would not be permitted. Bicycles would not be allowed on designated walking trails such as the River Trail, Shell Mound Trail, and Dennis Creek Trail. No additional trails would be constructed strictly for the purpose of bicycle riding. If bicycle riding on the secondary roads becomes disruptive to wildlife, then refuge management would consider closing some roads to this activity.

Justification

There are abundant locations off-refuge that provide excellent opportunities for bicycle riding and the refuge should not have to provide

additional opportunities. However, the refuge has approximately 50 miles of primary roads that are open to the public for motorized traffic and another 50 miles of secondary roads that are maintained for forest and fire management. These secondary roads are for official motorized vehicles; however, walking and bicycling are permitted on these roads. These roads are used by visitors for better access to fishing and hunting areas or wildlife/wildlands observation all priority public uses. Some people walk these roads, while others leisurely ride bicycles to enjoy the vistas. This type of bike use on the refuge may or may not be considered a means to observe wildlife; however, it is a low impact, low maintenance use that generates good public and community relations.

Approval of Compatibility Determination

Project Leader: _____
(Signature/Title/Date)

Reviewed by: _____
(Signature/Title/Date)

Approved by: _____
(Signature/Title/Date)

DRAFT INTERIM
Compatibility
Determination

APPENDIX I

DRAFT INTERIM
Compatibility
Determination

APPENDIX J

Appendix J
Cedar Keys
National Wildlife Refuge
COMPATIBILITY DETERMINATION

Uses

The following uses were considered for compatibility determination review: environmental education and interpretation, fishing, refuge resource research studies, and wildlife observation. A description and the anticipated biological impacts for each use are addressed separately in this Compatibility Determination.

Station Name

Cedar Keys National Wildlife Refuge

Date Established

July 16, 1929

Establishing and Acquisition Authorities

Cedar Keys National Wildlife Refuge is located in Levy County, Florida, and was established by Presidential Executive Order 5158, dated July 16, 1929. Additional lands have been added since then with funding made available by the Refuge Recreation Act.

Purposes For Which the Refuge Was Established

". . . as a refuge and breeding ground for birds and wild animals, subject to valid existing rights." Executive Order 5158.

". . suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species." Refuge Recreation Act.

Management Goals

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 of Seahorse Key, threatened and endangered species, and species of special concern in the State of Florida.

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

Public Use. Provide opportunities for environmental education and interpretation and wildlife-dependent recreation when compatible with the purpose, mission, and vision of the refuge such that these activities will not negatively impact critical or sensitive habitats.

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

Other Applicable Laws, Regulations and Policies:

1. Antiquities Act of 1906 (34 Stat. 225).
2. Migratory Bird Treaty Act of 1918 (15 U.S.C. 703-711; 40 Stat. 755).
3. Migratory Bird Conservation Act of 1929 (16 U.S.C. 715r; 45 Stat. 1222).
4. Migratory Bird Hunting Stamp Act of 1934 (16 U.S.C. 718-178h; 48 Stat. 451).
5. Criminal Code Provisions of 1940 (18 U.S.C. 41).
6. Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d; 54 Stat. 250).
7. Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41; 62 Stat. 686).
8. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j; 70 Stat. 1119).
9. Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4; 76 Stat. 653).
10. Wilderness Act (16 U.S.C. 1131; 78 Stat. 890).
11. Land and Water Conservation Fund Act of 1965.
12. National Historic Preservation Act of 1966 (16 U.S.C. 470, et seq.; 80 Stat. 915).
13. National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd, 668ee; 80 Stat. 927)
14. The National Environmental Policy Act of 1969, NEPA (42 U.S.C. 4321, et seq; 83 Stat. 852).
15. Use of Off-Road vehicles on Public Lands (Executive Order 11644, as amended by Executive Order 10989).
16. Endangered Species Act of 1973 (16 U.S.C. 1531 et seq; 87 Stat. 884)
17. Refuge Revenue Sharing Act of 1935, as amended in 1978 (16 U.S.C. 715s; 92 Stat. 1319).
18. National Wildlife Refuge Regulations for the Most Recent Fiscal Year (50 CFR Subchapter C; 43 CFR 3101.3-3).
19. Emergency Wetlands Resources Act of 1986 (S.B. 740).
20. North American Wetlands Conservation Act of 1990.
21. Food Security Act (Farm Bill) of 1990 as amended (HR 2100).
22. The Property Clause of The U.S. Constitution Article IV 3, Clause 2.
23. The Commerce Clause of The U.S. Constitution Article 1, Section 8.
24. The National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, USC668dd).
25. Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System. March 25, 1996.
26. Title 50, Code of Federal Regulations, Parts 25-33.
27. Archaeological Resources Protection Act of 1979.
28. Native American Graves Protection and Repatriation Act of 1990.

Description of Use

Environmental Education

Environmental education activities seek to increase the public's knowledge and understanding of wildlife and to contribute to the conservation of natural resources. Most activities on Cedar Key Refuge will be associated with the University of Florida's Marine Laboratory on Seahorse Key. The lab is used primarily for college level science courses and is operated under a Special Use Permit. Other environmental education activities include workshops and class field trips for students of all ages, as well as teacher groups. If the comprehensive conservation plan is enacted, the Fish and

Wildlife Service would develop specific lesson plans on refuge resources for local school teachers, refuge projects and programs would be developed for the countywide high school Interdisciplinary Watershed Education Program, and the Service would host a teacher environmental education workshop on Seahorse Key.

Anticipated Biological Impacts of the Use

The use of the marine laboratory on Seahorse Key during the bird nesting season may impact some nesting success for brown pelicans. In the past, the pelicans that nested near the lighthouse seemed to be more tolerant of human presence then other birds. They would sit on their nests even when students were active nearby. The environmental education that takes place in classrooms and off refuge sites will not impact refuge resources. The use of on-site, hands-on, action-oriented activities to accomplish environmental education may have a low level impact on the sites used for these activities.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

Environmental Impact Statement ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

All use of Seahorse Key for Service led environmental education or by the University of Florida and its guests during the bird nesting season would be restricted to the 3-acre marine laboratory site. The rest of Seahorse Key is closed to all entry annually from March 1 through June 30, to protect nesting birds. During the remainder of the year the beaches are open to the public and may be used for environmental education. The interior of the island is closed all year to public entry. Requests for use of the interior of the island for educational purposes would be evaluated on a case-by-case basis. As part of the Special Use Permit to use the refuge for a marine laboratory, the University is required to keep the refuge informed of all use of the lab, and to adhere to the special closed season.

Justification

Environmental education is a preferred public use listed in the 1997 National Wildlife Refuge System Improvement Act. Most environmental education on Cedar Keys Refuge is conducted by non-refuge staff, which keeps expenses to a minimum. Environmental education provides students with an awareness and understanding on a variety of environmental and ecological subjects and will improve support for the Service's mission to protect our natural resources.

Description of Use

Recreational Fishing

Most fishing is from a boat in state waters around Cedar Keys Refuge. Fishing from the dock at Atsena Otie Key or island beaches is permitted 24 hours a day, year round. The exception to this is the closed period at Seahorse Key when all entry is prohibited. The only control the Service has on state waters is the 300-foot buffer zone around Seahorse Key that the Service closes to all entry from March 1 through June 30. Anglers on

the refuge may fish in accordance with State regulations.

Anticipated Biological Impacts of the Use

Boaters that trespass into the waters around Seahorse Key during the closed season to fish have the potential to disturb nesting colonial birds. Negative impacts associated with surf and fishing from the Atsena Otie Key dock will occur through illegal activities such as fishermen taking species out of season, or under size fish. Other violations noted that have been associated with fishing have been limited to refuge regulations pertaining to open fires and camping. Litter, especially items such as monofilament line that can injure and kill wildlife, is also a negative impact. Angler numbers on refuge property are relatively low but if use increased substantially, surf fishing could conflict with shorebird and wading bird loafing and feeding.

NEPA Compliance:

Categorical Exclusion ___

Environmental Assessment _X_

Environmental Impact Statement____

FONSI _X_

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Law enforcement patrols, especially around the Seahorse Key closed area would minimize disturbances to nesting birds. Surf fishing would be monitored to ensure compliance with state and federal fishing regulations and to ensure shorebird and wading bird use is not negatively impacted. Additional closed areas would be evaluated on an as needed basis.

Justification

Saltwater fishing in the Gulf of Mexico is regulated by the State of Florida. Fishing is a compatible, wildlife-oriented activity that is listed as a priority public use in the 1996 Presidential Executive Order and the1997 National Wildlife Refuge Improvement Act.

Description of Use

Interpretation

Interpretation activities seek to increase the public's knowledge and understanding of wildlife, national wildlife refuges, ecology and land management, as well as contribute to the conservation of natural resources. Activities would include brochures, kiosks, an interpretive walking trail, on-site interpretive tours and off-site programs. If the comprehensive conservation plan is enacted, the Service would partner with the Cedar Key Historical Society to identify historic features on Atsena Otie Key and develop outreach materials to interpret them. The existing kiosk, walking trail, and restroom would be maintained, additional interpretive materials on natural habitat of the islands would be developed, open house and lighthouse tours would be held at lease once annually, and an interpretive video about the refuge would be produced.

Anticipated Biological Impacts of the Use

Off-site programs would not cause biological impacts on the refuge. On-site visitors may disturb shorebirds and wading birds that utilize the beach, mud flats, and salt marsh for feeding and loafing. Beach users

may also trample vegetation. Wildlife may be negatively impacted from ingesting or becoming entangled in litter.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

Environmental Impact Statement ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

On-site interpretation would not be permitted on Seahorse Key during the closed period from March 1 through June 30, for the bird nesting season except within the 3-acre University of Florida Marine Research Laboratory. The interior of all islands, except Atsena Otie Key, would remain closed to public use to protect the fragile flora. The interpreted walking trail through the interior of Atsena Otie Key would be maintained and public use monitored.

Justification

Interpretation is identified in the 1996 Presidential Executive Order and the 1997 National Wildlife Refuge System Improvement Act as an activity that should be provided and expanded on refuges. Informing the public through interpretive materials, and guided tours about endangered species, wildlife management, ecosystems, and refuges would lead to improved support of the Service's mission to protect our natural resources.

Description of Use

Research Studies

This activity would allow college students, university professors, and the scientific community access to the natural environment to conduct research. The outcome of this research would result in better knowledge of our natural resources and improved methods to monitor and protect refuge resources. If the comprehensive conservation plan is enacted, the Service would negotiate a long-term archaeological research agreement with the Department of Anthropology at the University of Florida, identify and locate funding for research projects that would aid in the management of trust resources on Cedar Keys, and seek additional contacts with the University of Florida, Departments of Zoology and Wildlife Ecology, to expand refuge-based research.

Anticipated Biological Impacts of the Use

There should be no significant negative impacts from scientific research on the refuge. The knowledge learned from research would provide information to the refuge that would improve management techniques and help to better meet the needs of trust resource species. Impacts such as trampling vegetation and temporary wildlife disturbances would occur, but would not be significant.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

Environmental Impact Statement ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

Each request for use of the refuge for research would be examined on its individual merit. Questions of who, what, where, when, and why would be asked to determine if the requested research could best be conducted on the refuge without significantly affecting the resources. Special attention would be given to requests for access to Seahorse Key during the closed nesting season. If there were any anticipated disturbances, the research request would be denied until nesting season is completed. If the research were compatible, a Special Use Permit would be issued. All researchers would be required to submit annual progress and final reports.

Justification

The benefits derived from sound biological research would provide a better understanding of species and the communities present on the refuge. These benefits outweigh short-term disturbance or loss of individual organisms.

Description of Use

Wildlife Observation

Observation of wildlife, primarily the numerous shore and water birds that use the refuge, is the number one reason people visit the refuge. Cedar Keys Refuge is comprised of islands that are only accessible by boat. Visitors can observe wildlife and the beautiful, natural vistas by walking along the beaches or by boating around the islands. The one exception to this is Seahorse Key, which has a 300-foot buffer zone extending from Seahorse Key into state waters, which is closed annually to all entry from March 1 through June 30. A lease agreement between the Service and the State of Florida allows this closure of state waters for the protection of a significant colonial bird rookery.

The beaches of the other refuge islands are open year round to foot travel. Seahorse Key beaches are open from July 1 through February 28, each year. The interior of Atsena Otie Key is open to the public for foot travel.

Anticipated Biological Impacts of the Use

There are no structures built for the purpose of viewing wildlife. Impacts such as trampling vegetation and wildlife disturbance by refuge visitors does occur, but presently does not appear to be significant. The biggest concern is that public use of the beach areas would increase to the point of being disruptive to shore and wading birds. Other negative impacts are caused by visitors violating refuge regulations such as trespassing on the colonial rookery and camping or littering.

NEPA Compliance:

Categorical Exclusion _X_

Environmental Assessment ___

Environmental Impact Statement ___

FONSI ___

Determination: (Check one)

This use is compatible _X_ This use is not compatible ___

Stipulation Necessary to Ensure Compatibility

The current Lease/Memorandum of Understanding that closes waters around the rookery from March 1 through June 30, would be maintained. Law enforcement patrol of public use areas and extra patrols during the above-mentioned closed season would minimize violations of refuge regulations and protect the colonial bird nesting area. Public use of the beach areas would be monitored, and if negative impacts become noticeable, additional closed areas would be established or other corrective action taken.

Justification

Wildlife and wildlands observation is the number one preferred use of Cedar Keys Refuge and the National Wildlife Refuge System. The 1996 Presidential Executive Order and the 1997 National Wildlife Refuge System Improvement Act identify wildlife observation as a priority public recreational use to be facilitated on refuges.

Approval of Compatibility Determination

Project Leader: _____
(Signature/Title/Date)

Reviewed by: _____
(Signature/Title/Date)

_____
(Signature/Title/Date)

DRAFT INTERIM
Compatibility
Determination

APPENDIX J

Appendix K

Draft Region 4, Intra-Service Section 7 Biological Consultation

Originating Person: Refuge Manager

Telephone Number: (352) 493-0238Email: FWS4RWlowersuwannee@fws.gov

Date: March 24, 2000

Project Name: Comprehensive Conservation Plan

Service Program: National Wildlife Refuge

Station Name: Lower Suwannee and Cedar Keys National Wildlife Refuges

Description of Proposed Action:

Activities associated with the Comprehensive Conservation Plan for Lower Suwannee and Cedar Keys National Wildlife Refuges (2000) would increase access and public use, and would implement additional biological studies and monitoring programs. The Comprehensive Conservation Plans and associated Environmental Assessments provide the details for this action.

Pertinent Species and Habitat:

A. Maps of the refuges and surrounding areas are included in the Comprehensive Conservation Plans for Lower Suwannee and Cedar Keys National Wildlife Refuges.

B. Species Present and Their Status:

Bald Eagle	Threatened
Wood Stork	Endangered
American Alligator	Threatened
East Indian Manatee	Endangered
Kemp's Ridley Sea Turtle	Endangered
Loggerhead Sea Turtle	Threatened
Green Sea Turtle	Threatened
Eastern Indigo Snake	Threatened
Gulf Sturgeon	Threatened
Florida Saltmarsh vole	Endangered

Location:

A. Ecosystem Area: North Florida

B. County and State: Levy and Dixie Counties, Florida

Determination of Effects:

Explanation of impacts of the proposed action on species and/or critical habitat include direct, indirect, interdependent, interrelated and cumulative impacts.

Direct Effects **= those that are an immediate result of the action.**

Indirect Effects **= those that are caused by the action and are later in time but are still reasonably certain to occur. They include the effects of future activities that are induced by the action and that occur after the action is completed.**

Interdependent **= those that have no significant independent utility apart from the action that is under consideration.**

Interrelated **= those that are part of a larger action and depend on the larger action for their justification.**

Cumulative Effects **= those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area.**

Bald eagle: Wintering and nesting bald eagles use the refuges. There are active bald eagle nests on both Cedar Keys and Lower Suwannee National Wildlife Refuges. Comprehensive Conservation Plan actions 1.1.1, 1.2, 1.3.1, 1.3.3, 2.1.2, 3.3, and 3.5 for Lower Suwannee Refuge and actions 1.3.1, 1.3.2, 1.3.3, 2.2, and 2.3, for Cedar Keys Refuge will all benefit bald eagle protection. Nest protection is addressed in the Fire Management Plan and Annual Prescribed Fire Prescriptions. Increased visitation projects 4.4 for Lower Suwannee Refuge, and 3.1, and 3.4 for Cedar Keys Refuge are not planned where there are active nests. When additional nests are located, their protection will be incorporated into management actions.

Woodstork: The woodstork is observed periodically throughout the year on and around both refuges but is not known to nest on refuge lands. Actions 1.7.1, 1.7.2, and 2.3 for Cedar Keys Refuge and actions 1.1.5, and 1.2 for Lower Suwannee Refuge will benefit the woodstork through better monitoring activities. The species should not be impacted by an increase in wildlife-oriented public use activities.

Manatee and Gulf sturgeon: Both of these species use the estuary and Suwannee River. Actions 1.1.3, 1.1.4, 1.1.12, 1.2, 1.2.1, and 2.4.1 for Lower Suwannee Refuge will benefit these species. Maintaining refuge habitat will contribute to water quality. Increased use of the waters could impact manatee and sturgeon, but the waters are controlled by the State of Florida.

Kemp's ridley sea turtle, loggerhead sea turtle, and green sea turtle: These turtles use the Gulf waters around both refuges. There is no sea turtle nesting on the refuges. Expanded research and partnerships to protect water quality should benefit all three sea turtle species. Increased use of the Gulf waters by boaters could impact sea turtles but the waters are controlled by the State of Florida.

American alligator: The alligator is found on the refuges throughout the year. The public visitation projects outlined in the comprehensive conservation plans and subsequent increased numbers of visitors are not assumed to have any impact on the alligators.

Florida saltmarsh vole and eastern indigo snake: The saltmarsh vole has been identified in only one location in Levy County, Florida, just south of refuge lands. Limited searches on and around the refuge have not documented that voles use the refuge. The last sighting of an eastern indigo snake has been years ago. They should be present given that they are secondary burrow users of gopher tortoises, which are well

represented on the refuge. Increased visitation and public use should not affect these species. Actions 1.1, 1.1.7, 1.3.1, 1.3.2, 2.2.1, 2.2.2, 2.2.3, 2,3.4 and 5.3.1 for Lower Suwannee Refuge should directly or indirectly benefit one or both of these species.

Determination of Effects:

Species or Habitat	Determination NE	NA	AA	Response Requested
Bald eagle		NA		Concurrence
Wood stork	NE			Concurrence
American alligator		NA		Concurrence
Manatee		NA		Concurrence
Kemp's ridley sea turtle	NE			Concurrence
Loggerhead sea turtle	NE			Concurrence
Green sea turtle	NE			Concurrence
Eastern indigo snake		NA		Concurrence
Gulf sturgeon		NA		Concurrence
Florida saltmarsh vole	NE			Concurrence

NE = **no effect. This determination is appropriate when the proposed action will not directly,, indirectly, or cumulatively impact, either positively, or negatively any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested is optional but a "Concurrence" is recommended for a complete Administrative Record.**

NA = **not likely to adversely affect. This determination is appropriate when the proposed action is not likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources. Response Requested is a "Concurrence".**

AA = **likely to adversely affect. This determination is appropriate when the proposed action is likely to adversely impact any listed, proposed, candidate species or designated/proposed critical habitat. Response Requested for listed species is "Formal Consultation". Response requested for proposed and candidate species is "Conference".**

Enter the Species, Determination and the Response Requested: May affect, but is not likely to adversely affect species/adversely modify critical habitat. This conclusion is appropriate when effects to the species or critical habitat are expected to be beneficial, discountable, or insignificant.

_____ _____
Signature (originating station) Date

_____
Title

Reviewing Ecological Service Office Evaluation:

A. Concurrence_____ Nonconcurrence____

B. Formal consultation required_____

C. Conference required _____

D. Informal conference required

E. Remarks (attach additional pages as needed)

_____ _____
Signature Date

_____ _____
Title Office

Appendix L
List of Preparers

Kenneth Litzenberger	Chapter IV; Appendices B, G, I, J, K; and editing all sections.
Allyne H. Askins	Chapters I, II, III; Appendices A, D, L; Figure 4; and editing all sections.
Kendall A. Smith	Appendix E and Figures 2, 3, 5, 6, 7, 8.
Stan Simpkins	Appendix H (Flora and Fauna).
Chuck Hunter	Appendix H (Priority Bird List and Species Suites).
Regional Office	Appendices C, F and Figure 1.

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