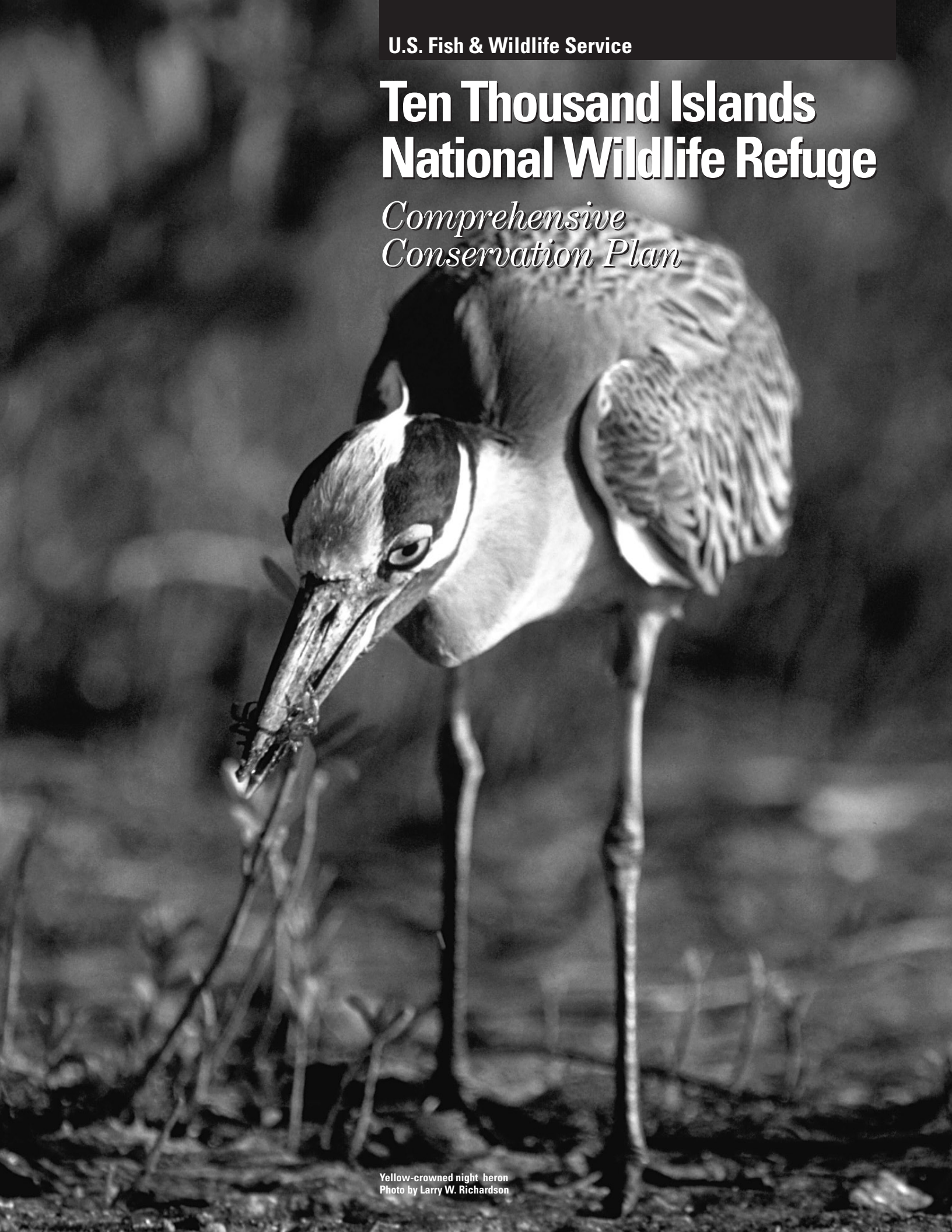
U.S. Fish & Wildlife Service

Ten Thousand Islands National Wildlife Refuge

Comprehensive Conservation Plan



Yellow-crowned night heron
Photo by Larry W. Richardson

Ten Thousand Islands
National Wildlife Refuge
3860 Tollgate Blvd, Suite 300
Naples, FL 34114
Telephone: 941/353 8442
Fax: 941/353 8640

U.S. Fish & Wildlife Service
1 800/344 WILD
http://www.fws.gov

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List of Preparers

U.S. Fish and Wildlife Service Personnel
Roger Beckham
James Clark
Terry Doyle
Andy Eller
Jennifer Harris
Rick Kanaski
Jim Krakowski
Wendell Metzen
Evelyn Nelson
Ben Nottingham
Larry Richardson

Alabama A&M University Student Interns:
Berrien Barks
Frederick Gardenier
Fesaaha Grebremikal
Phillip West

Research Management Consultants, Inc.
Louis J. Bridges

Introduction

Purpose of and Need for the Comprehensive Conservation Plan

Under the provisions of the National Wildlife Refuge System Improvement Act of 1997, the 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 the Comprehensive Conservation Plan.

This Comprehensive Conservation Plan and appended Environmental Assessment has been prepared for the Ten Thousand Islands National Wildlife Refuge, Collier County, Florida. Its purpose is to identify the role the refuge will play in support of the mission of the National Wildlife Refuge System and the South Florida Ecosystem, and how it will address public concerns for compatible commercial and recreational uses.

The plan outlines issues, concerns, and opportunities expressed to the Service during a series of public meetings. It also provides a description of desired future conditions and long-range guidance to accomplish the purpose of the refuge. This guidance is presented in a listing of refuge goals, objectives, and strategies resulting from an analysis of various management alternatives. An environmental assessment of management alternatives may be found in Appendix A.

The plan will serve as an operational guide for the Refuge Manager over the next ten to fifteen years.

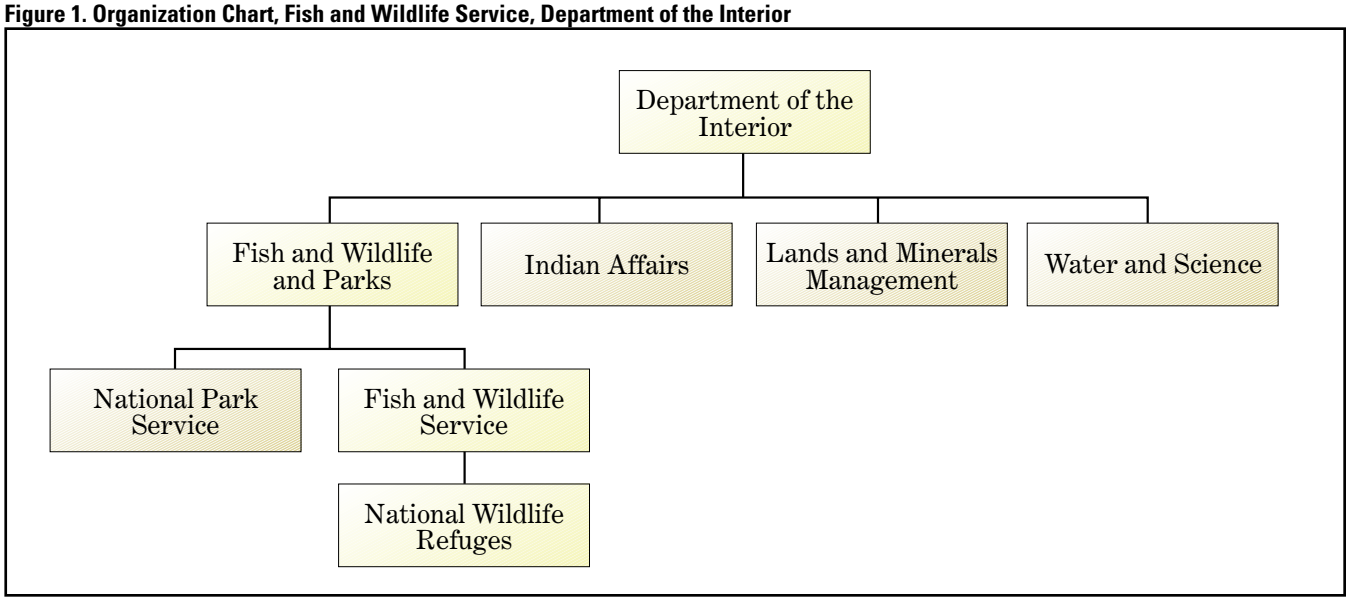
The plan is also needed to:

- 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 and around the refuge;
- ensure that management of the refuge reflects policies and goals of the National Wildlife Refuge System;
- ensure that 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 Fish and Wildlife Service

The Fish and Wildlife Service is a federal bureau operated under the Department of the Interior, the Nation's principal conservation agency. The Department has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes 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, and providing for the enjoyment of life through outdoor recreation.

Figure 1. Organization Chart, Fish and Wildlife Service, Department of the Interior



"...to conserve, protect, and enhance the Nation's fish and wildlife and their habitats for the continuing benefit of people."

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 has major responsibility for migratory birds, endangered species, anadromous and inter-jurisdictional fish, and certain marine mammals.

"...world's largest collection of lands set aside specifically for the protection of fish and wildlife populations and habitats."

Description and Mission of the National Wildlife Refuge System

The Service also manages the National Wildlife Refuge System, the world's largest collection of lands set aside specifically for the protection of fish and wildlife populations and habitats. More than 510 national wildlife refuges 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 offer a wide variety of recreational opportunities. Many have visitor centers, wildlife trails, and environmental education programs. Nationwide, more than 25 million visitors annually hunt, fish, observe and photograph wildlife, or participate in interpretive activities on national wildlife refuges.

...conserve, manage, and restore... fish, wildlife and plant resources and their habitats within the United States...

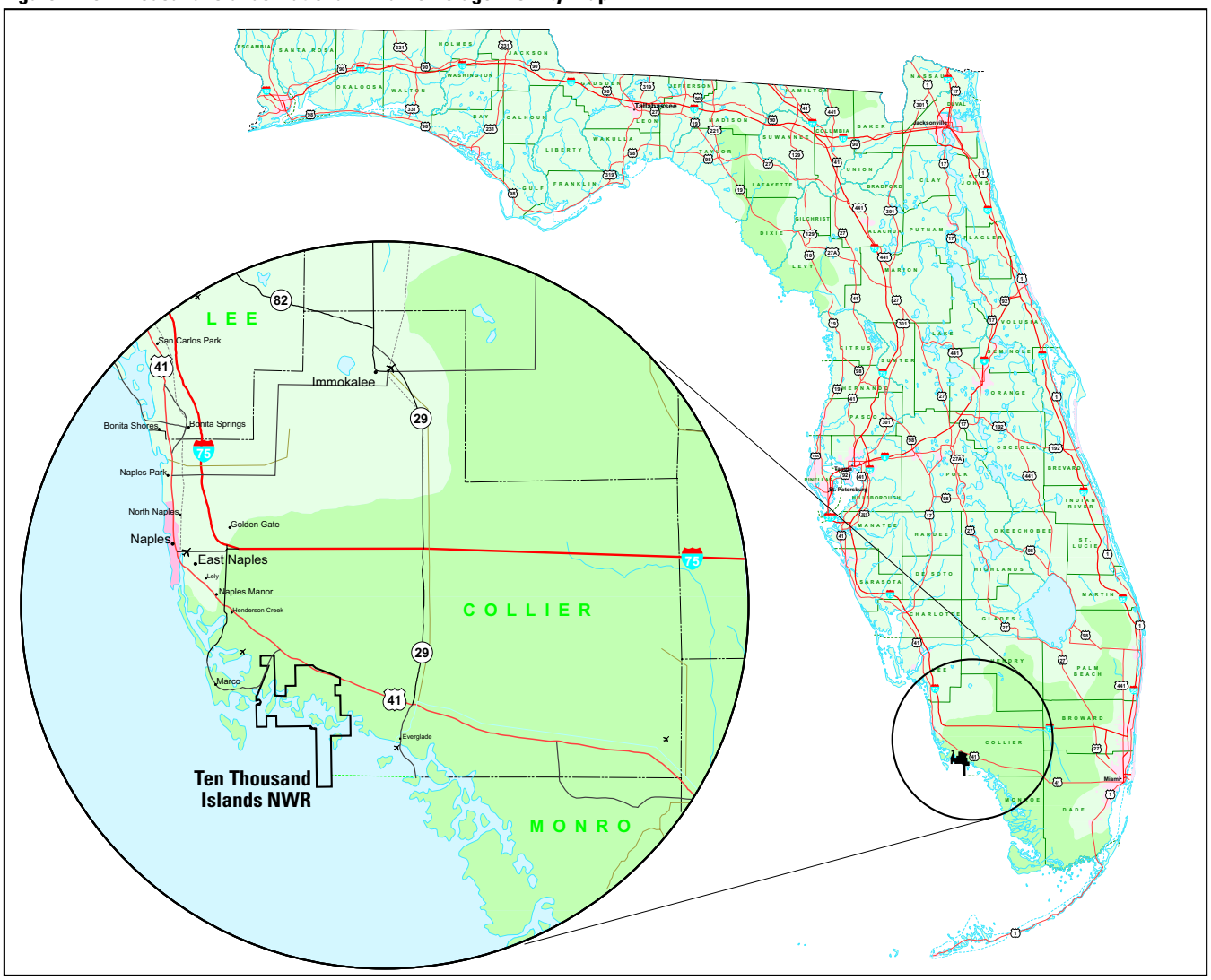
The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations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

The Ten Thousand Islands National Wildlife Refuge

Refuge Location

The refuge is located approximately 20 miles southeast of Naples, Florida, south of U.S. Highway 41 (Fig 2). The western boundary lies along County Road 92. The Gulf of Mexico borders the southern boundary, and the eastern boundary lies just west of Everglades National Park and the Faka Union Canal at the northern portion of that boundary. A 5-mile long, 1 1/2-mile wide extension into the Gulf of Mexico is present in the southeastern portion of the refuge. The Collier-Seminole State Park extends into the northwestern portion of the refuge from U.S. 41 south to Blackwater Bay, and encompasses the Royal Palm Hammock Creek and upper portion of Palm Bay, the upper portion of Blackwater River, and all of Mud Bay.

Figure 2. Ten Thousand Islands National Wildlife Refuge Vicinity Map



History of the Refuge

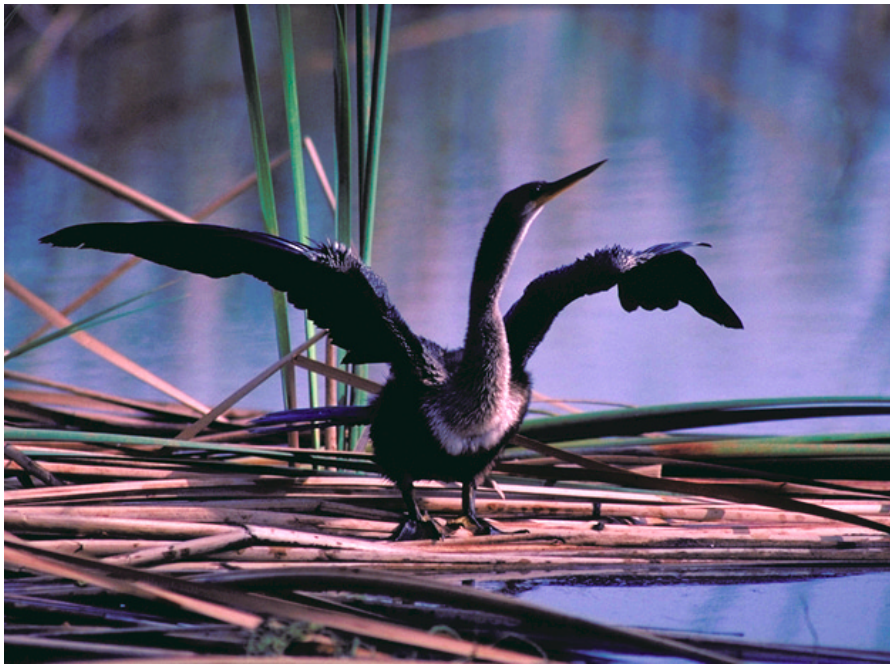
The Ten Thousand Islands National Wildlife Refuge was established under the provisions of the "Arizona-Florida Land Exchange Act of 1988," authorized by Public Law 100-696. The Act authorized the Department of the Interior to convey 68 acres of the Department of the Interior Indian School property in Phoenix, Arizona, to Collier interests in exchange for 108,000 acres in Collier County, Florida. In addition, the Department received $34.9 million to establish Indian education trust funds. Approximately 35,000 acres were conveyed to the Service to establish Ten Thousand Islands National Wildlife Refuge and the remaining acreage was added largely to Big Cypress National Preserve and Florida Panther National Wildlife Refuge. An additional 33.6 acres of land are under lease with the Florida Department of Transportation and lies adjacent to U.S. 41.

American alligator
Photo by Larry W. Richardson

The initial authorization designated December 11, 1991, as the deadline to consummate the deal. The properties were expected to be transferred in 1992, however, unresolved issues involving Native American interests in Phoenix and other problems delayed the transfer. An agreement with new terms and conditions for closing in December 1992, was established. The new terms allowed the Collier interests to delay the initiation of $34.9 million in payments into an Indian Education Trust Fund for four years. This amount, plus interest, will be paid in the form of annual payments over a period of thirty years. These funds will be used to supplement educational and child welfare programs, activities, and services for the benefit of Navajo and Arizona Tribes that were members of the Intertribal Council of Arizona in 1988. The conveyance of title on all lands was delayed until December 18, 1996.

Role of the Ten Thousand Islands National Wildlife Refuge

The refuge provides habitat for a wide range of invertebrates, fishes, amphibians, reptiles, birds, and mammals. The refuge and the adjacent Ten Thousand Islands area provide important habitat for several notable threatened and endangered species, including the Atlantic loggerhead, green, Kemp's ridley, and Hawksbill sea turtles, American crocodile, wood stork, bald eagle, and West Indian manatee. More than 189 species of birds, 196 species of fish, 45 species of reptiles and amphibians, and 22 species of mammals use the refuge. The refuge also plays an important role in the restoration of the South Florida Ecosystem. Lands and waters of the ecosystem have been critically altered due to environmental and economic impacts of urbanization, agriculture, and other human activities. Also important are the recreational uses of the refuge. The public uses the mangrove ecosystem and greater area of the refuge in a variety of pursuits, including sportfishing, birdwatching, camping, boating, and enjoying the aesthetics of the area.



Anhinga
Photo by Larry W. Richardson

Refuge Function within the Ecosystem, and Ecosystem Priorities

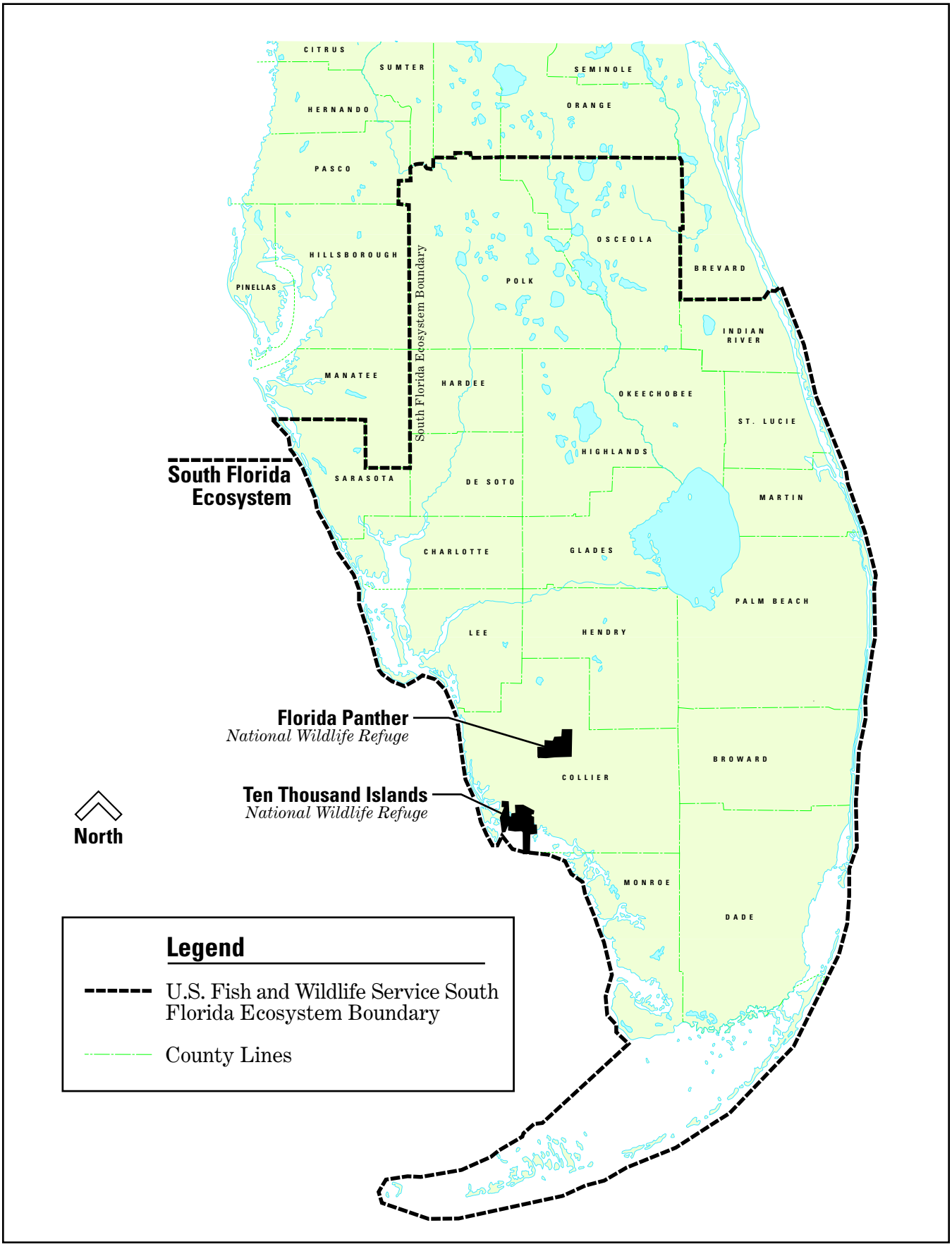
The South Florida Ecosystem encompasses 16.5 million acres of richly diverse habitats covering the 19 southernmost counties in Florida (Fig. 3). It is a subtropical region that lies between the Caribbean and temperate North America. Environmental and economic impacts of urbanization, agriculture, and other human activities have altered the critical natural balance between land and water, and the region's endemic flora and fauna. Today, the South Florida Ecosystem faces substantial habitat loss and fragmentation.

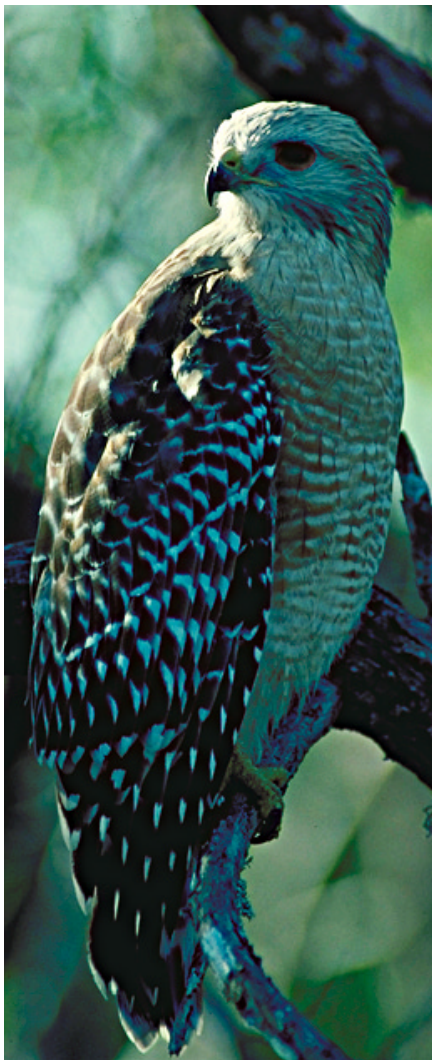
The Departments of Interior, Commerce, Army, Justice, and Agriculture, and the Environmental Protection Agency created the South Florida Ecosystem Restoration Task Force for the purpose of halting or reversing ecological degradation. The task force has now expanded to include the State, Native American Tribes, and the Governor's Commission for a Sustainable South Florida. The refuge plays an important role in integrating the requirements of the Interagency Agreement on South Florida Ecosystem Restoration and the mission of the National Wildlife Refuge System.

The following priorities have been determined by the Service for the South Florida Ecosystem, which includes the Ten Thousand Islands National Wildlife Refuge:

- Protect and manage units of the National Wildlife Refuge System and other national interest lands.
- Protect, restore, and manage migratory birds and their habitats.
- Protect, restore, and manage candidate, threatened, and endangered species and their habitats.
- Protect, restore, and manage wetlands and other freshwater habitats.
- Protect, restore, and manage fish and other aquatic species and their habitats.
- Protect, restore, and enhance coastal and estuarine habitats.
- Protect, restore, and manage for biodiversity.

Figure 3. South Florida Ecosystem Map





Red-shouldered hawk
Photo by Larry W. Richardson

Legal Policy, Administrative Guidelines, and Federal and State Mandates

Administration of the Department of the Interior, the Fish and Wildlife Service, and the National Wildlife Refuge System is guided by International treaties, Federal laws, and Presidential Executive Orders. Management options of 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.

Treaties, laws, administrative guidelines, and policy guidelines assist the Refuge Manager in making decisions pertaining to soil, water, air, flora, fauna, and other natural resources, historical and cultural resources, research, and recreation on refuge lands. They also serve as a framework for cooperation between the refuge and other South Florida Ecosystem partners. These partners include the National Park Service, National Resource Conservation Service, Indian Tribes, Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, South Florida Water Management District, Florida Division of Forestry, Collier County, and private landowners and organizations.

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

Refuge Agreements

The refuge also operates under the following agreements with state and local entities:

- Interagency Agreement between the Department of the Interior, Big Cypress National Preserve, and the Ten Thousand Islands National Wildlife Refuge for law enforcement;
- Local Operational Agreement between the Big Cypress National Preserve and Florida Panther and Ten Thousand Islands National Wildlife Refuges for wildfire suppression and prescribed burning;
- Memorandum of Understanding between the Department of the Interior and the State of Florida, Department of Environmental Protection for wildfire suppression and prescribed burning;
- Memorandum of Understanding between the Department of the Interior and the State of Florida, Department of Agricultural and Consumer Services, Florida Division of Forestry for wildfire suppression and prescribed burning;
- Management Agreement and Memorandum of Understanding with the State of Florida for co-management of refuge waters below mean high tide (pending);
- Memorandum of Understanding between the Florida Panther and Ten Thousand Islands National Wildlife Refuges and Collier County Sheriff's Office for law enforcement;
- Lease Agreement between the State of Florida Department of Transportation and the Fish and Wildlife Service along U.S. 41; and
- Endangered Species Cooperative Agreement between the State of Florida and the Fish and Wildlife Service to coordinate recovery activities for federally listed species in Florida.

Planning Issues and Opportunities

Overview of the Public Involvement Process

Issue identification provides a basis for initiating the development of some management objectives and strategies. To ensure that the future management of the refuge is reflective of the issues, concerns, and opportunities expressed by the public, a variety of scoping mechanisms was used.

Photo by Larry W. Richardson

A survey was used to gather general information on current and potential refuge operations. This survey was distributed to participants of the initial scoping meeting, and mailed to other interested and affected parties.

Personal interviews were conducted during several public scoping meetings and letters were mailed to affected and interested parties to inform them of the planning process and invite their participation.

A series of stakeholder meetings and community forums were held to develop components of the draft plan. The meetings and forums also allowed for consensus testing of the draft plan components. All stakeholder meetings and community forums held by the Service were advertised and opened to the public.

Details of the scoping and public involvement process are provided in Appendix C.

Scope of Issues and Opportunities

The following key issues that require management decisions were identified during the scoping process:

- Commercial and recreational uses on the refuge
- Use of personal watercraft and airboats on the refuge
- Habitat protection and wildlife management
- Partnerships and cooperative management of resources
- Education and public outreach
- Research and monitoring
- Protection of archaeological resources
- Staffing needs

A detailed discussion of the issues, concerns, and opportunities can be found on pages 104 - 112.

All issues and opportunities posed by the public regarding refuge management have been addressed in Appendix C, Part 2; and through the development of comprehensive goals, objectives, and strategies found on pages 20 - 27.

Management Direction

...to develop, advance, manage, conserve and protect the refuge's unique estuarine ecosystem and its fish and wildlife resources

Refuge Purpose

The Ten Thousand Islands National Wildlife Refuge was established under the authority of the Florida/Arizona Land Exchange Act in order to develop, advance, manage, conserve and protect the refuge's unique (subtropical) estuarine ecosystem and its fish and wildlife resources (Fish and Wildlife Act of 1956). The refuge represents a variety of coastal habitats, including mangrove forests (the most dominant habitat on the refuge), both freshwater and saltwater marsh systems, interspersed brackish ponds, and small islands or hammocks of upland habitat.

...conserve, protect, and manage the refuge's unique subtropical estuarine ecosystem,

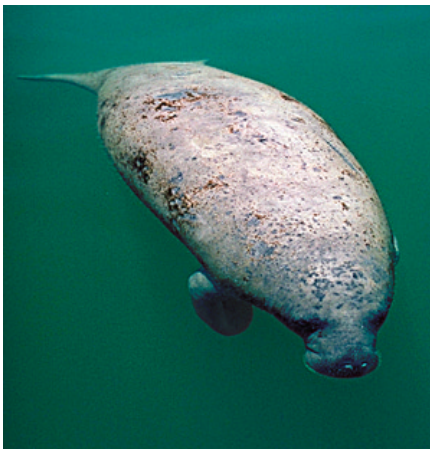
Refuge Mission

To conserve, protect, and manage the refuge's unique subtropical estuarine ecosystem, especially its endangered species, its natural biological diversity, and its rich cultural resources for the continuing, sustained benefit of the American people.

...essential habitat for threatened and endangered species ... noted for its cultural resources.

Refuge Vision Statement

The Ten Thousand Islands National Wildlife Refuge will be a model for natural systems management, featuring unique coastal marshes, islands, and subtropical estuarine mangrove ecosystems. The refuge will provide essential habitat for threatened and endangered species and be an area noted for its cultural resources. Through effective management and partnering, the refuge will provide outstanding recreational opportunities for present and future generations.



West Indian manatee
Photo by Larry W. Richardson

The Management Action

The management action for the refuge is discussed in the following pages. This approach recognizes the importance of the refuge within the Big Cypress Watershed of southwest Florida. It also considers actions taken outside the refuge that may affect the refuge environment, as well as how refuge programs affect adjacent lands and waters. The alternatives considered and their impacts, along with the impacts of the management action, are described in Appendix A.

An ecosystem approach to manage the refuge was chosen due to its proactive nature of allowing for management of all biological systems. This results in fewer conflicts between refuge resources and users of the refuge by identifying potential conflicts early on and resolving them before they become crises. In the long run, this approach is less disruptive to the users of the refuge and less costly than a crisis-oriented approach. This approach primarily meets the needs of the resources, allows for many of the expressed commercial needs of the public, and allows for public access to hunting, fishing, wildlife observation, photography, interpretation and environmental education. The basis of this action stems from desired future conditions of the refuge, and was developed from stakeholder consensus and as a result of public forums held during the planning process. The end result is a set of goals, objectives, and strategies related to key issues which will guide the management of the refuge.

The following pages address how key issues, identified during the scoping process, will be addressed utilizing an ecosystem approach.

Waterfowl in flight
Photo by Larry W. Richardson

Commercial and Recreational Uses on the Refuge:

The refuge was established to protect the important mangrove and marsh habitats, the rich diversity of native wildlife, and the threatened and endangered species of the area. Utilizing an ecosystem approach, the day-to-day management of the refuge will not change significantly. However, commercial and recreational use will be reviewed and evaluated by the Service at the end of a 5-year period. The Service cannot predict whether or not studies will be funded; if they will occur in a timely manner; or, if research will produce the results needed to make decisions.

A variety of commercial uses occurs on the refuge. Blue and stone crabs are caught with traditional underwater cage traps. Netting for mullet, as well as hook and line for other species of fish, occurs on a seasonal and less frequent basis. Charter fishing is the predominant use with probably more than thirty fishing guides taking clients to the refuge. Tour businesses include canoe/camp trips, boat cruises, and shell collection trips. The Service, in consultation with the State of Florida, will allow all commercial activities to continue. These activities will be monitored with the Florida Department of Environmental Protection in order to make future decisions on whether to continue, discontinue, expand, or reduce their practices.

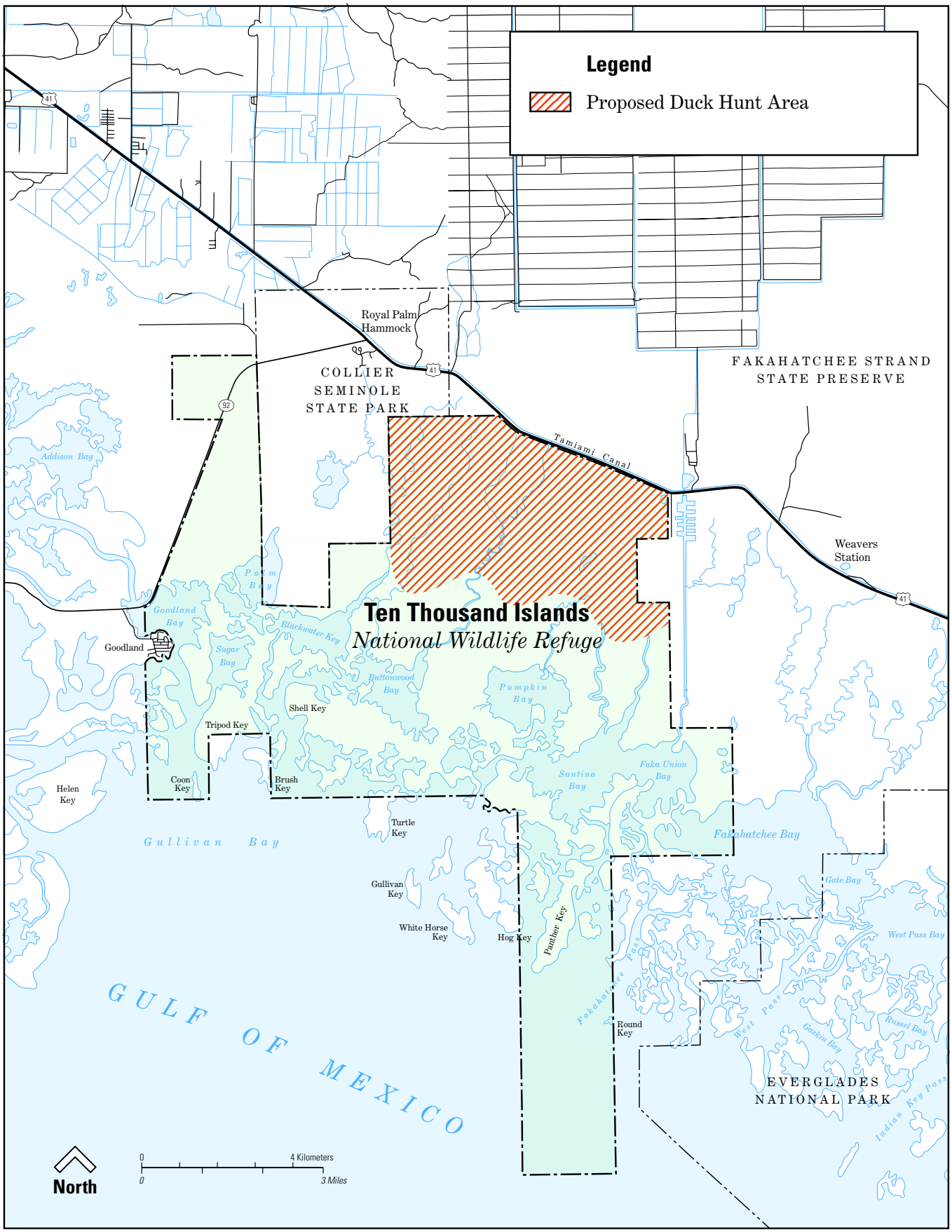
The refuge is well known to residents and visitors alike who enjoy a variety of recreational pursuits in its remote waters. Throughout the year, thousands of sport fishermen pursue a multitude of game fish. Canoe and kayak float trips and motorized watercraft are common during the winter months. Overnight stays (camping) at Panther, Hog, and Round Keys also occur during the winter by boaters mentioned above and by recreational fishermen. Prior to the refuge's establishment, duck hunting occurred in refuge marshes south of U.S. 41 (Fig. 4).

West Indian manatees use refuge waters throughout the year. Collier County is the third highest area of watercraft-related manatee mortality in the state. With the predicted boat traffic increase in county waters, it will be important for the refuge to monitor the impacts of this traffic and enforce manatee protection areas.

Camping typically is not a preferred use within the National Wildlife Refuge System. Refuge camping is limited, for the most part, to the coastal beaches of the Keys mentioned above during the winter months, when the mosquitoes and flies are limited in number. This use does not conflict with sea turtle nesting, which occurs in the summer months. Currently, the number of campers does not appear to have an adverse affect on the environment of the Keys. Camping has been a long standing tradition and the area is nationally advertised for this experience. Refuge camping is directly associated with the primary purposes for which boaters visit the refuge, which are wildlife observation, fishing, and aesthetic apreciation of the natural wonders of the Ten Thousand Islands. Camping will continue to be allowed at present levels on the coastal islands of the refuge. Refuge usage, including camping, will increase as our recreating population increases. The impacts of this usage will be continually monitored, and camping will be addressed in a long-term Public Use Plan to be coordinated with the Florida Department of Environmental Protection (Strategy 2.1.4). The Public Use Plan may regulate or restrict the camping that does occur.

Sport fishing, wildlife observation, and limited, high quality duck hunting complement the mission and goals of this refuge and will continue to be allowed and promoted, coupled with monitoring and research to further evaluate their uses.

Figure 4. Duck Hunting Areas



Use of Personal Watercraft and Airboats on the Refuge:

Presently, personal watercraft and airboats occur infrequently on the submerged lands of the refuge due to its remoteness. However, these uses are expected to grow with Collier County's predicted increase in population. Both of these access modes are characteristically loud, fast, and capable of cruising in extremely shallow water. The Service has consulted with the Florida Department of Environmental Protection, which is a co-manager of the adjoining submerged lands (Fig. 5), and has determined that airboat and personal watercraft use will be allowed to continue. However, these uses will be studied to better determine whether they produce negative effects on wildlife, vegetation, and the aesthetics of the refuge, and to make informed decisions on whether to continue, discontinue, expand or reduce their practices in the future.

White ibis
USFWS Photo by Sue Wall

Airboat, swamp buggy, personal watercraft, and other off-road vehicles will not be allowed in shallow freshwater marshes of the refuge, south of U.S. 41 (Fig.6). Historical uses of this nature have been found to disturb vegetation, wildlife, and drainage of the wetland marshes in the northern portion of the refuge.

Habitat Protection and Wildlife Management:

Routine field work will include monitoring sea turtle nesting and manatee activity, collecting baseline information on refuge resources, managing public use, and monitoring the effects of secondary uses. Habitat management will focus on the coastal, estuarine, and freshwater marsh habitats for the protection and enhancement of native wildlife populations; migratory bird habitats; and threatened, endangered, or candidate species that rely on these systems. This management approach will also help to facilitate the restoration of the South Florida Ecosystem, and work to mitigate the region's impacts resulting from urbanization, agriculture, and other human activities. Utilization of an ecosystem approach will help to provide a haven for threatened and endangered species which permanently and/or temporarily utilize the area, and maintain a quality recreational area for compatible public uses of the refuge.

Perhaps the most significant long- and short-term impacts to the refuge's habitat and wildlife resources concern the proposed South Golden Gate Estates Hydrologic Restoration Plan. During the period from 1963-71, the Gulf American Corporation excavated a series of canals that drastically drained the area and changed its ecology (Fig. 7). The canal system drained the South Golden Gate Estates and increased freshwater flows into the Faka Union Canal and consequently, that portion of the Ten Thousand Islands National Wildlife Refuge area. State biologists, working for the Florida Department of Environmental Protection, have concluded that the increased freshwater flows have severely impacted the Ten Thousand Islands estuary. The estuary now has problems with water turbidity, lack of sea grass growth, and a reduction in fish numbers and sizes. Local fishing guides claim the same and blame the increased freshwater flow. Those who fished the area before the construction of the canals talk of clear water, more grass, and more fish.

Figure 5. Co-Managed Lands and Submerged Lands

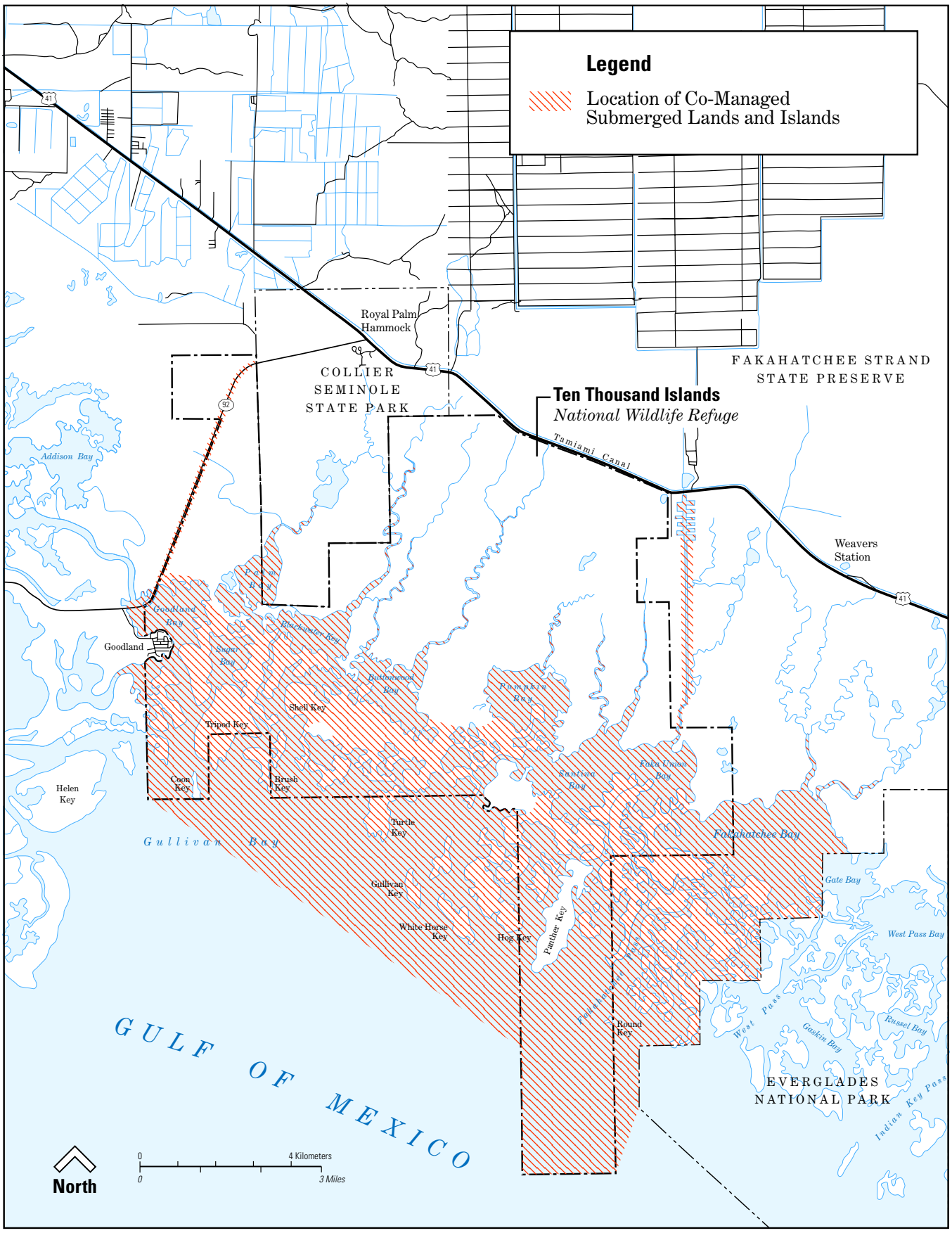


Figure 6. Non-Navigable Waters

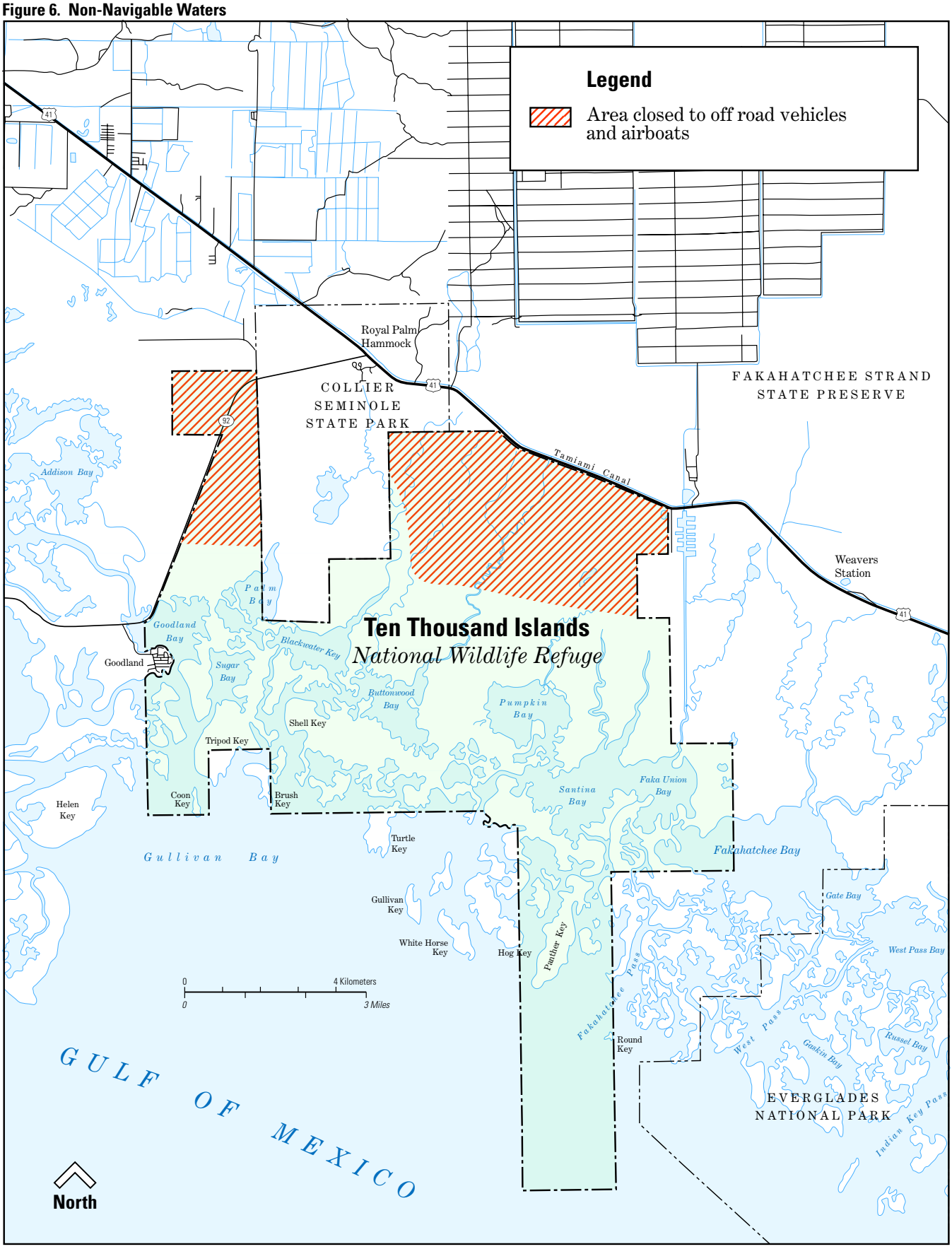
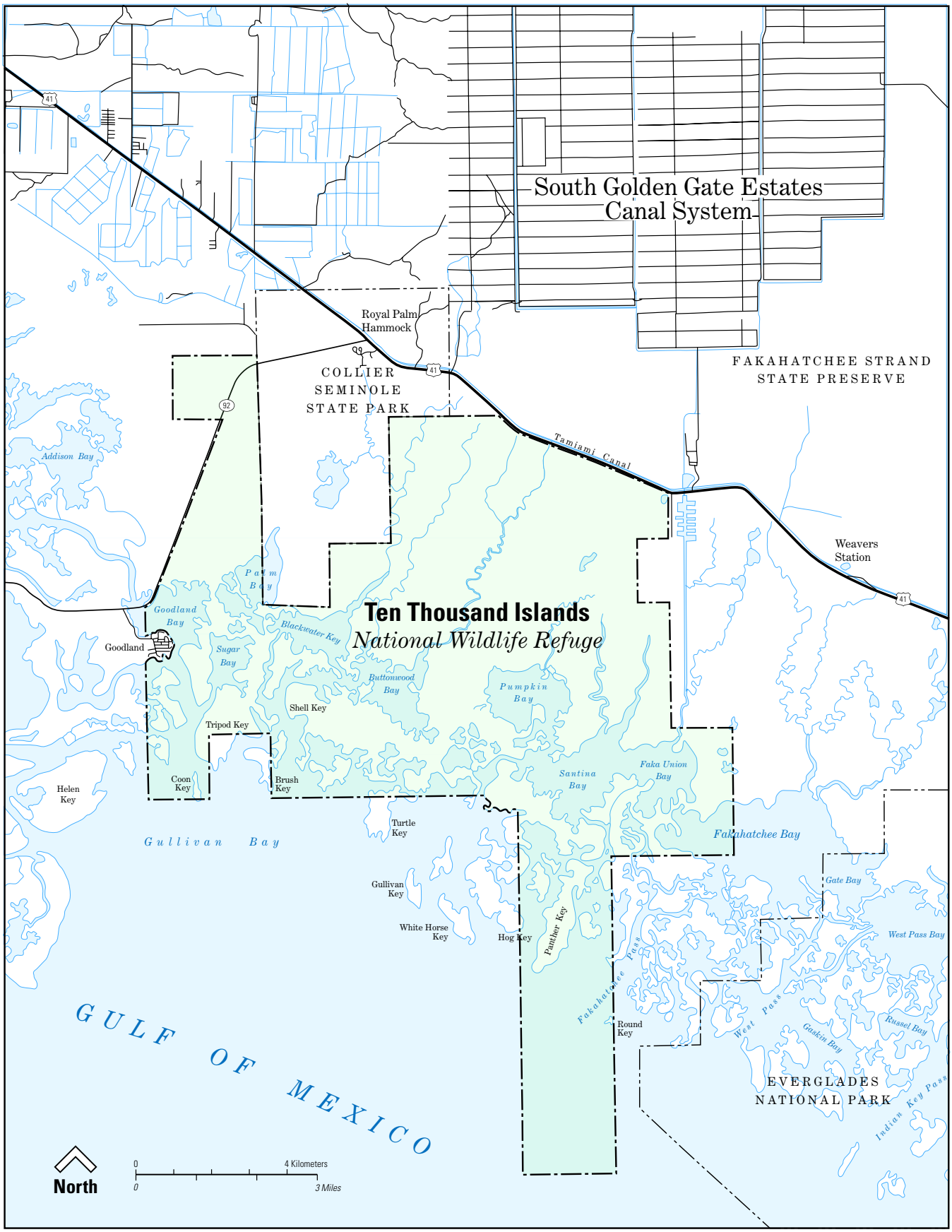


Figure 7. The South Golden Gate Estates Canal System



Through Florida's "Save our Everglades Program" and funding from the Department of the Interior, the state is buying thousands of 5-,10- and 20-acre lots from individual landowners to preserve the area as part of the Picayune Strand State Forest. The South Golden Gate Estates Hydrologic Restoration Plan (Fig. 8) proposes to restore the hydrology and sheetwater flow to the area by blocking canals, removing roads, and pumping water out of canals. The plan will not take effect until all of the private lots are acquired by the State of Florida. The refuge is in favor of restoring the South Golden Gate Estates area to its historic flow, but concerns remain about whether sufficient culverts exist along U.S. 41 to handle the sheetwater flow and whether pumping excess water from the North Golden Gate Estates area would flood the South Golden Gate Estates area with more water than historically occurred prior to the canals. The refuge also receives fresh water in the form of rainfall and runoff from Fakahatchee and Picayune Strands.

Fishing from canoe
USFWS Photo

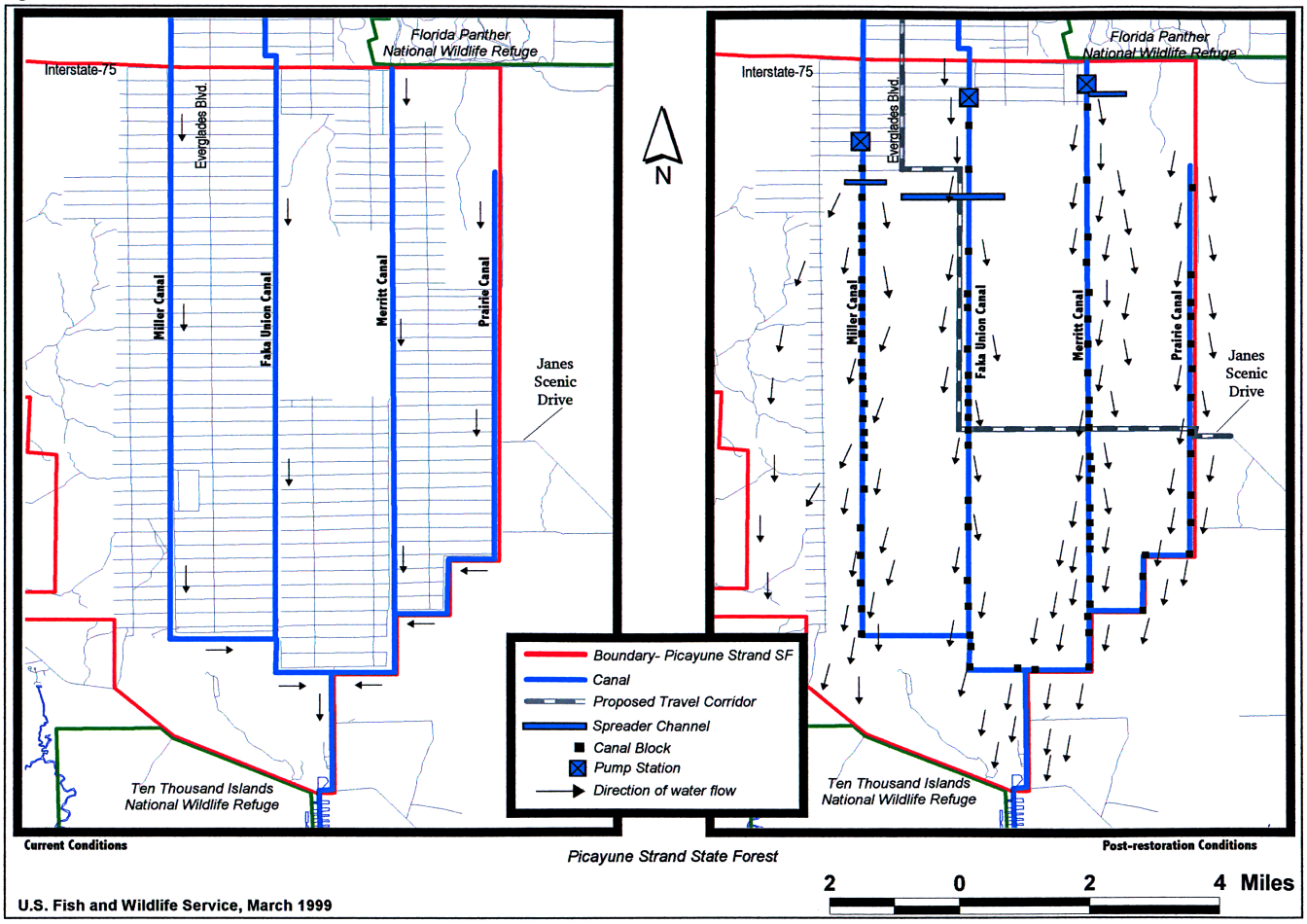
The refuge will carefully review and minimize impacts of oil and gas exploration plans and operations, moreover, it will make every effort to gain mineral rights to oil and gas resources found on the refuge.

Partnerships and Cooperative Management of Resources:
The refuge overlaps and is surrounded by other protected state and federal lands (Fig. 9). These areas have different mandates and regulations for protection of this important coastal area. The agencies will need to work together to share information and resources to facilitate natural resource protection and quality public use. An ecosystem approach emphasizes working with the local community, private land owners, and other jurisdictions to ensure coordinated efforts toward comprehensive watershed and coastal management as well as cultural resource protection. This approach will also help maximize the use of applied research to help partners manage for the rich diversity of habitats and fish and wildlife resources.

Developing partnerships with entities that lead to overall land and watershed protection and stewardship of the resources will be a primary focus. Management and research on the refuge will focus on public use, fish and wildlife monitoring, habitat and water quality assessments, partnerships, and watershed restoration. The refuge will distribute management and applied science information to other agencies and private land owners.

The Florida Department of Environmental Protection's Cape Romano-Ten Thousand Islands and Rookery Bay Aquatic Preserves (Fig. 9) overlay much of refuge's submerged lands. A cooperative agreement between the Service and the State of Florida will be needed for the management of these submerged lands (Appendix E). The proposed South Golden Gate Estates Hydrologic Restoration Plan will likely have a major impact on the refuge. The Service will participate in the planning of this project to ensure that the resources of the refuge are not compromised.

Figure 8. South Golden Gate Estates Restoration



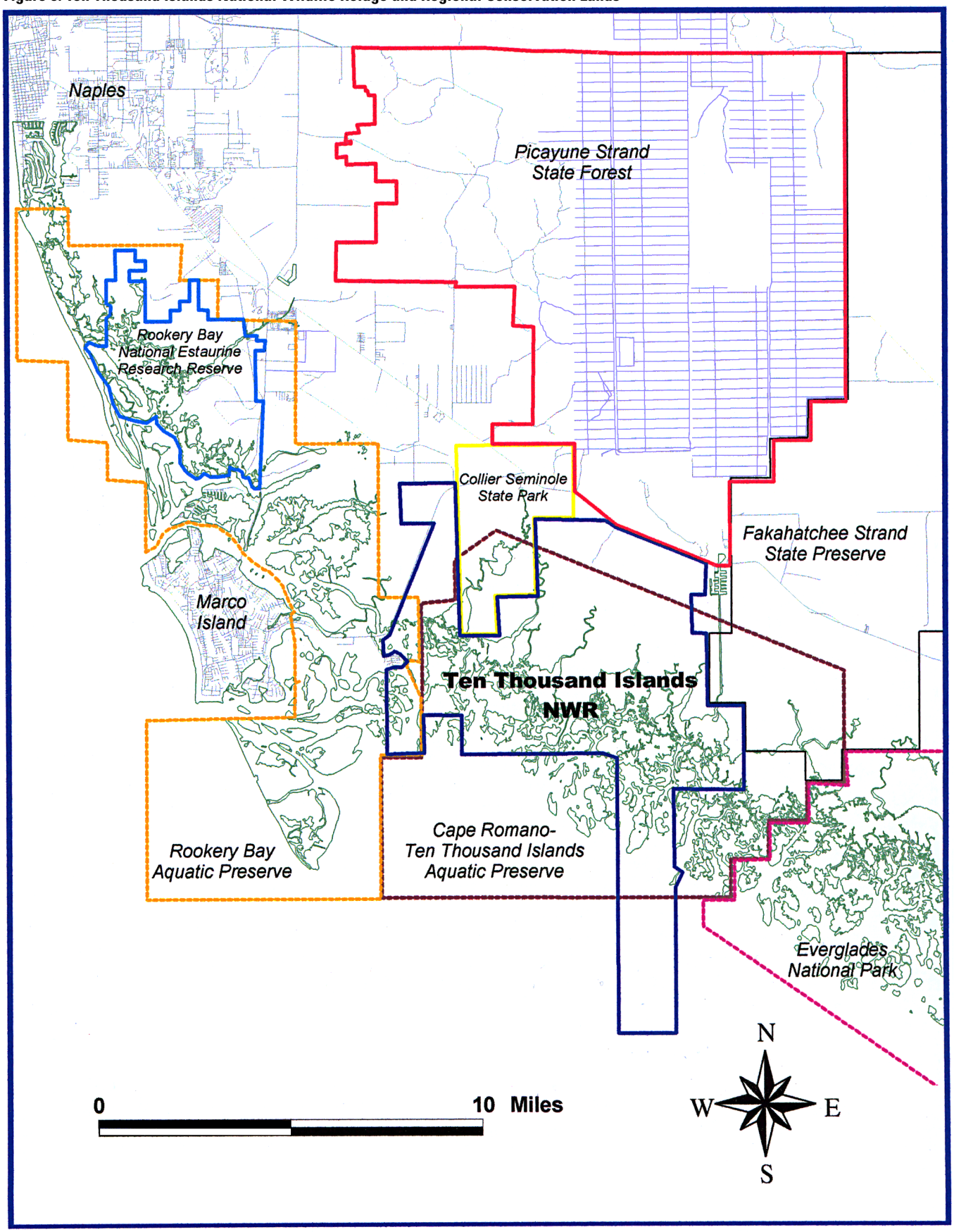
The Florida Fish and Wildlife Conservation Commission will have an increased role in the cooperative management of this refuge. Coordinated efforts will include law enforcement, protected species management, and other conservation activities.

Through periodic meetings, communication and coordination with land managers within the watershed will also occur to effectively conserve the diverse resources of the ecosystem. In order to protect the natural resources of the refuge and the South Florida Ecosystem, the public will be informed of current issues and protection efforts that are needed by way of news releases to media outlets, along with public meetings and workshops for major issues. The development of an environmental education program at Ten Thousand Islands National Wildlife Refuge will be actively pursued.

Education and Public Outreach:

Opportunities for increased environmental education and outreach will be increased with the ecosystem approach. An Outdoor Recreation Planner will work with the Rookery Bay National Estuarine Research Reserve, Collier County Environmental Education Consortium, school groups, volunteers, and local agencies to educate youth and adults of southwest Florida on the plight of threatened and endangered species and about refuge activities. An Information Specialist will ensure the same message is delivered to the public by way of the media. Outreach efforts off the refuge will be supplemented with the assistance of volunteers and other agencies.

Figure 9. Ten Thousand Islands National Wildlife Refuge and Regional Conservation Lands



Research and Monitoring:

Priority will be placed on monitoring, applied research, and studies that will provide information on the management of coastal systems and endangered species. This will include monitoring the status and trends of plant and animal communities, the effect that the proposed South Golden Gate Estates Hydrologic Restoration Plan will have on refuge resources, water quality monitoring, conducting fire effects studies, and studies on the impacts of airboat and personal watercraft use on refuge resources. The refuge will distribute management and applied science information to other agencies and private landowners.

Prairie warbler
Photo by S. Maslowski

Protection of Archaeological Resources:

There are several documented archaeological sites on the refuge, primarily ancient Calusa Indian shell middens. The Archaeological and Public Use Management Plans will include an assessment of the impacts of public visitation to these sites and determine how best to protect them as prescribed by law. The refuge will work in close association with state officials to ensure their protection. Interpretation and educational programs will be developed to incorporate these cultural resources. In addition, funding will be pursued to conduct additional investigation of these sites.

Staffing Needs:

The Ten Thousand Islands National Wildlife Refuge was established in 1996, and has a staff consisting of a seasonal Park Ranger and a Wildlife Biologist. This is a young refuge without an adequate budget or staff. New initiatives are needed to successfully address Service responsibilities for the refuge and the South Florida Ecosystem over the next 15 years. These initiatives include an enhanced biological and habitat monitoring program, a public use management and public education program, increased coordination with land managers off the refuge, and an expanded management program for flora and fauna. This action identifies seven new positions for the refuge (in addition to converting the temporary Park Ranger to permanent status), and an additional four new positions to be shared with Florida Panther National Wildlife Refuge to carry out Service responsibilities. New positions for Ten Thousand Islands National Wildlife Refuge include an Assistant Refuge Manager, Biological Science Technician (Wildlife), Fishery Biologist, Outdoor Recreation Planner, Mechanic, Maintenance Worker and an Administrative Assistant. Shared positions with Florida Panther National Wildlife Refuge include a Hydrologist, Botanist, Computer Specialist, and Information Specialist.

Goals, Objectives, and Strategies to Support the Management Action

The following list of goals, objectives, and strategies will be used to implement the management action. It was developed to reflect the needs of both the Service and the public (i.e., issues, concerns, and opportunities). The list of goals, objectives, and strategies specifies not only what the Refuge Manager will do if funding requirements are met, but also specifies activities to produce the desired results. Thus, the breakdown of activities forms a hierarchy for refuge management that encompasses the mission of the Service, the refuge system, ecosystem priorities, the refuge's purpose, and the expressed needs of the public.

Wildlife and Habitat Conservation

Goal

1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Objective

1.1 Identify and determine the status of imperiled species and their use of the refuge and its habitats.

Strategies

1.1.1 By the year 2001, compile a comprehensive literature review of past research, monitoring records, and incidental observations of listed species to document historical use of the area.

1.1.2 By 2003, conduct a comprehensive inventory of refuge habitats for listed species, to include, but not limited to, the following: plants, Florida tree snail, sea turtles, American crocodile, wood stork, and other wading birds, bald eagle, white-crowned pigeon, and West Indian manatee.

Objective

1.2 Establish baseline inventory and monitoring procedures for other refuge species and habitats.

Strategies

1.2.1 By 2002, develop a Wildlife Inventory Plan for the refuge. Employ a permanent Biological Science Technician (Wildlife) to assist with inventory projects. (Special Project 1)

1.2.2 By 2005, develop a comprehensive inventory of refuge wildlife and habitats, to include, but not limited to, mammals, migratory and resident birds, fish, reptiles and amphibians, aquatic insects, and habitat delineations including submerged grass bed areas.

1.2.3 By 2005, complete a water elevation (surface and ground) and water quality (salinity and contaminants) monitoring program on the refuge. (Special Projects 3 and 4)

1.2.4 By 2005, initiate a fisheries inventory program to establish baseline data. The program would include creel census, commercial monitoring, and independent sampling conducted by the refuge or cooperator. (Special Project 5)

1.2.5 By 2007, develop a Geographic Information System for the refuge to include vegetation cover, hydrology, resource locations, soils, and archaeological and historic sites. (Special Project 2)

1.2.6 Monitor the impacts of sea level rise on refuge habitats. (Special Project 4)

Objective

1.3 Develop and implement management strategies to protect or enhance endangered species, other wildlife, and their habitats.

Strategies

1.3.1 Enforce boat speed regulations established by the State to protect manatees and manatee critical habitat.

1.3.2 Initiate a law enforcement program to protect refuge resources from poaching and over-harvest. (Special Project 6)

1.3.3 By 2000, develop a plan, with other agencies, to restore natural sheetwater flows to the refuge in conjunction with the proposed South Golden Gate Estates Hydrologic Restoration Plan. By 2001, establish an initial monitoring protocol to evaluate the restoration effort. (Special Project 4)

1.3.4 By 2002, develop a Fire Management Plan, incorporating a fire effects study, for the upper freshwater marsh system to enhance habitat for wintering waterfowl and other wildlife. (Special Project 7)

1.3.5 By 2003, reduce the incidence of raccoon depredation on sea turtle nests on Panther Key and adjacent coastal islands to ensure greater than 60 percent hatchling success.

1.3.6 Initiate a cooperative program with Collier County to remove derelict boats from refuge waters that are potential navigation and contamination threats. By 2005, have all derelict boats removed from refuge waters. (Special Project 9)

1.3.7 By 2006, develop a Fisheries Management Plan in coordination with Florida Fish and Wildlife Conservation Commission to maintain and/or enhance fishery resources and their habitats. (Special Project 5)

1.3.8 Using funds from the sale of Federal duck stamps, the Federal Land and Water Conservation Fund, and Everglades funding initiatives, acquire approximately 1,640 acres adjacent to the refuge boundary. (Special Project 8)

1.3.9 Minimize the impacts of oil and gas exploration and extraction on the refuge by acquiring mineral rights.

1.3.10 Review oil exploration plans to ensure that adverse impacts to refuge natural and cultural resources are minimized.

Objective

1.4 Implement an invasive exotic species inventory, monitoring, and control program.

Strategies

1.4.1 By 2000, further identify and quantify the acreage of invasive exotic plants on the refuge coastal keys. (Special Project 10)

1.4.2 By 2004, develop and implement an invasive exotic plant control program aimed at eradicating 50 percent of the combined total acreage of the most prolific and/or difficult to control species on the coastal Keys including lather leaf, Australian pine, and Brazilian pepper. (Special Project 10)

1.4.3 Identify and quantify acreage of invasive exotic plants in the area north of the mangrove system. (Special Project 9)

1.4.4 Continue to organize and host an annual invasive exotic plant workshop for southwest Florida area land managers. Workshops would continue to focus on new invaders to the area, control techniques, opportunities for control equipment and labor cooperation, and other exotic plant issues. (Special Project 10)

1.4.5 Assess the status of fire ants on sea turtle nesting beaches and their impact on turtle nest success. If necessary, implement control measures including the feasibility of using pesticides during non-nesting months.

1.4.6 Assess the status of other exotic animals on the refuge through literature review, unpublished data, and direct observations. By 2007, provide a GIS-based inventory of species, status, and location.

Public Use

Goal

2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Objective

2.1 Manage recreational activities that affect wildlife and native habitats.

Strategies

2.1.1 Employ an Assistant Refuge Manager to assess and manage public use and resource management activities. (Special Project 11)

2.1.2 By 2000, develop and implement a Waterfowl Hunt Plan. Use input from local hunters to help develop a quality hunt plan.

2.1.3 By 2000, develop a cooperative management agreement with the State covering the submerged lands of the refuge (area of overlapping state/federal jurisdiction) to manage recreational and other activities.

2.1.4 By 2001, design and implement a study to assess the impacts of powered watercraft operating in shallow water environments within the Ten Thousand Islands region on wildlife and submerged land resources. The study would occur on and off the refuge within this area. Results would be used to assist the Service and the Florida Department of Environmental Protection/Rookery Bay National Estuarine Research Reserve in determining future site management options. Incorporate findings into the Public Use Management Plan. (Special Project 12)

2.1.5 By 2003, develop a Public Use Management Plan that addresses the needs of wildlife and their habitat, protects significant cultural resources, and provides quality visitor opportunities for present and future visitors. (Special Project 11)

2.1.6 By 2003, develop two brochures; a general brochure containing a map and information on resources and management, and a back country use brochure to help visitors navigate and recreate in the refuge. (Special Project 13)

2.1.7 By 2004, develop a designated non-motorized boat trail for the refuge. Incorporate within the trail a wide variety of habitat types and wildlife observation opportunities. (Special Project 14)

2.1.8 Provide limited signs and markers at strategic locations within the refuge to assist visitor navigation.

Commercial Use

Goal

3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Objective

3.1 By 2002, establish a special use permit process to regulate commercial activities including co-managed lands and waters.

Strategies

3.1.1 Gather information on current uses within the co-managed area and assess compatibility.

3.1.2 Explore the feasibility of a common charter fishing guide permit with Everglades National Park. The permit would allow a guide who fishes both areas to be covered by one permit.

3.1.3 Establish application procedures for a refuge special use permit.

3.1.4 Gather new biological information on commercial uses to facilitate compatibility determinations as needed.

Objective

3.2 By 2006, develop a program to assess commercially harvested resources within the refuge.

Strategies

3.2.1 Obtain biennial data by species from the Florida Marine Research Institute on harvested quantities of finfish, sport fish, and shellfish from the town of Goodland and Everglades City. Assess the utility of these data to determine whether the refuge needs additional information. (Special Project 5)

3.2.2 Promote, establish, and evaluate commercial monitoring surveys of finfish, sport fish, and shellfish with state agencies and local and private entities. Collaborate with the Florida Department of Environmental Protection and Florida Fish and Wildlife Conservation Commission on their periodic stock assessments of sport fish and finfish in the Ten Thousand Islands area. Enlist fishing guides and fishing club members to report creel statistics and establish a database. (Special Project 5)

3.2.3 On an annual basis, evaluate harvest and survey information, along with other environmental data, to determine population trends of harvested species. Consult with Florida Department of Environmental Protection and Florida Fish and Wildlife Conservation Commission biologists to jointly assess whether refuge stocks are in danger of depletion. (Special Project 5)

Environmental Education

Goal

4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

Objective

4.1 By 2008, increase local awareness of south Florida ecosystems, the Rookery Bay National Estuarine Research Reserve, and the refuge through the development and implementation of an outreach program. (Special Project 16)

Strategies

4.1.1 Establish partnerships with support groups and the Rookery Bay National Estuarine Research Reserve to assist with outreach, events, and environmental education. Work with partners to participate in at least two outreach events each year that feature refuge resources (e.g., National Wildlife Refuge Week, International Migratory Bird Day, Earth Day, Estuary Day, Fishing Tournaments, etc.).

4.1.2 Become an active member of the Collier Environmental Education Consortium. Work to increase the Consortium's involvement and collaboration in refuge outreach efforts.

4.1.3 By 2008, collaborate with refuge eco-tour concessionaires to disseminate refuge and state aquatic preserve resources and management information to the public. Encourage permitted eco-tour vendors to attend orientation programs hosted by Rookery Bay National Estuarine Research Reserve that promote responsible and informed commercial use of the area.

4.1.4 By 2008, develop at least four lesson plans with Rookery Bay National Estuarine Research Reserve for school teachers and/or environmental organizations. Subjects may include, but not limited to, endangered species, mangrove ecology, responsible public use (i.e., fishing, boating, camping, etc.), and migratory birds. (Special Project 15)

4.1.5 Add two new personnel to the Ten Thousand Islands and Florida Panther National Wildlife Refuge Complex staff. A Visual Information Specialist is needed to coordinate news events, press releases, and information transfer to local, state, and national news outlets. An Outdoor Recreation Planner is needed to coordinate activities for the proposed Southwest Florida Environmental Information Center and Goodland visitor contact station, to develop refuge interpretive displays, outreach programs for schools and the general public, and to coordinate refuge volunteer activities. (Special Project 16)

Objective

4.2 By the year 2010, develop facilities and associated amenities to promote public education of the ecosystem and refuge program.

Strategies

4.2.1 Enhance interpretive facilities at a proposed U.S. 41 multi-agency Southwest Florida Environmental Information Center. Seek cooperative grants to upgrade exhibits and maintain the center. (Special Project 17)

4.2.2 Establish a visitor contact station and a small office and dock facility in Goodland to educate visitors on refuge management and resources, promote appropriate visitor use, and facilitate refuge operations. Enlist a partner to acquire the building site by 2002, and establish other partners to construct facilities by 2004. (Special Project 17)

4.2.3 By 2009, develop the U.S. 41 Oil Pad road into a walking interpretive trail. Construct trailhead parking and a wildlife observation tower along the road. Pursue cost share opportunities with the Florida Department of Transportation to construct roadside parking. (Special Project 19)

Cooperative Management

Goal

5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Objective

5.1 By 2000, implement a Cooperative Agreement with the Florida Department of Environmental Protection concerning management of submerged lands and state islands. The agreement would allow cooperative designation of law enforcement authority, resource management responsibilities, research and monitoring activities, and management of public use.

5.2 Develop agreements and Memorandums of Understanding with other state, federal, and private entities on management of resources and human activities. Develop a Memorandum of Understanding with the Florida Department of Environmental Protection and The Florida Fish and Wildlife Conservation Commission that would address cooperative resource management responsibilities, research and monitoring activities, and management of public use.

Strategies

5.2.1 Continue to maintain the established prescribed and wildfire agreements with the state, including refuge neighbors such as Collier Seminole State Park, Fakahatchee Strand State Preserve, and Picayune Strand State Forest.

5.2.2 Establish a Memorandum of Understanding with Everglades National Park for emergency services to include, but not limited to, law enforcement, search and rescue, fire management, and collaborative resource management (e.g., general permit for fishing guides, turtle surveys, and raccoon control on turtle beaches).

5.2.3 Develop challenge cost share agreements to offset cost of refuge educational/interpretive materials and facilities.

5.2.4 By 2001, establish a plan with Rookery Bay National Estuarine Research Reserve to coordinate search activities conducted on the refuge and surrounding areas.

5.2.5 Collaborate with other agencies and universities to conduct water quality and hydrologic studies on the refuge to assess rehydration efforts and pollutant runoff from upper reaches of the watershed. (Special Projects 3 and 4)

Objective

5.3 Establish a citizens' group to promote private and governmental cooperation and information exchange.

Strategies

5.3.1 Encourage stakeholders involved in the comprehensive conservation planning process and others to become involved with this group.

5.3.2 Solicit community involvement and group membership through local media outlets.

5.3.3 Develop rules and protocols for the citizens' group to ensure it does not violate regulations established under the Federal Advisory Committee Act of 1972.

Archaeological Resources

Goal

6.0 Protect refuge cultural resources, encourage archaeological investigations, and promote interpretation and appreciation of the area's history.

Objective

6.1 Comply with federal and state historic preservation legislation and regulations to protect refuge archaeological resources. The Regional Archaeologist will be responsible for the following strategies, with the exception of Strategy 6.1.9.

Strategies

6.1.1 Develop a scope of work for a comprehensive archaeological survey, including a cost estimate and ranking factors for contractor selection by September 2001.

6.1.2 Secure funding to conduct a comprehensive refuge-wide survey which evaluates the status of recorded archaeological sites, develops a site predictive model, and identifies research potential.

6.1.3 Develop and implement a site protection plan in consultation with the State Historic Preservation Office, federally recognized Native American Nations, and the professional archaeological community.

6.1.4 Approach the Miccosukee and Seminole Nations for information on and input into the management of significant cultural and sacred sites located within the refuge.

6.1.5 Work with the State Historic Preservation Office to ensure confidentiality of cultural resource data within the refuge and the State of Florida.

6.1.6 By 2000, work with the State Historic Preservation Office to formally establish which refuge management actions require its review and comment.

6.1.7 Develop a GIS layer for refuge archaeological and historic sites. The archaeological/historic layer would mesh with existing layers for habitat types and vegetative cover, hydrology, resource locations, and soils being developed by the refuge staff. The cultural parameters would be defined by 2000.

6.1.8 Assess the impact of camping and other related activities on significant cultural resources of the refuge.

6.1.9 By 2000, ensure that all refuge law enforcement officers take the Archaeological Resources Protection Act training course.

6.1.10 By 2001, negotiate an agreement with the Florida State Museum, or other appropriate facilities, for the permanent curation of archaeological collections and associated documentation derived from archaeological investigations on the refuge.

Objective

6.2 By 2008, develop a cultural resources interpretation and education program.

Strategies

6.2.1 By 2002, compile a comprehensive literature review of past archaeological, anthropological, and historical investigations within and near the refuge. Produce an annotated bibliography to document the region's history and the utility of the scientific methodology. (Regional Archaeologist)

6.2.2 By 2002, work with local Native American communities to develop an education program regarding their cultural heritage. (Regional Archaeologist)

6.2.3 By 2008, develop an interpretive exhibit on refuge cultural resources and history for use in refuge's visitor center.

Objective

6.3 Promote and secure funding for additional scientific investigations of refuge cultural resources.

Strategies

6.3.1 Identify potential avenues of archaeological and historic investigations and promote interdisciplinary research such as the Southwest Florida Project directed by Dr. Marquardt of the University of Florida, Gainesville. (Regional Archaeologist)

Plan Implementation

The future of this refuge, like most national wildlife refuges, is dependent upon a public constituency that is aware of refuge resources, mandates, and environmental issues, and is willing to work towards resolving them. The expanded educational, recreational, and partnership opportunities outlined in this plan will help build and maintain this needed constituency. Promoting the refuge as a natural and recreational asset of Collier County will enhance the refuge's image and help expand local support.

Partnerships

Implementation of this plan will rely on partnerships formed with landowners in the watershed, volunteers and interested citizens, farm and conservation organizations, and appropriate governmental agencies. Cooperating landowners within the refuge watershed will be offered incentives and/or compensation through cost-sharing agreements for applying conservation and environmental friendly farming practices, and for creating, maintaining, or enhancing habitat for wildlife.

Yellow-crowned night heron
Photo by Larry W. Richardson

Annual Work Plans

Future annual work plans will be written to reflect the priorities and intent of the plan. When discretionary funding and staff resources are available, they will be used to implement components of the plan.

Step-Down Plans

This plan provides conceptual guidance for future expansion, management, and development of the refuge. Additional plans will be needed in order to implement some of the strategies. These range from wildlife inventory and site development plans to a fire management plan. Refuge staff will need to look for innovative partnerships with local professional and business groups to assist in preparing and implementing some of the step-down plans.

Future step-down plans for the refuge include:

- Wildlife Inventory Plan
- Vegetation Inventory Plan
- Biological Research Plan
- Habitat Management Plan
    - Fire Management Plan
    - Pest and Invasive Exotic Plant Control Plan
- Public Use Management Plan
    - Waterfowl Hunt Plan
    - Sign/Exhibit Plan
    - Visitor Contact Station Site Plan
- Fishery Management Plan
- Archaeological Plan

Green Treefrog
Photo by Larry W. Richardson

The following goals along with their related objectives and strategies will form the basis of individual management plans:

Archaeological Plan

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Goal 6.0 Protect refuge cultural resources, encourage archaeological investigations, and promote interpretation and appreciation of the area's history.

Biological Research Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Goal 3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Fire Management Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Fishery Management Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Habitat Management Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Pest and Invasive Exotic Plant Control Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Public Use Management Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Goal 3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Goal 4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Goal 6.0 Protect refuge cultural resources, encourage archaeological investigations, and promote interpretation and appreciation of the area's history.

Sign/Exhibit Plan

Goal 2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Goal 4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Vegetation Inventory Plan

Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Visitor Contact Station Site Plan
Goal 4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

Waterfowl Hunt Plan
Goal 2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Goal 5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Wildlife Inventory Plan
Goal 1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Goal 3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Funding

While the Ten Thousand Islands National Wildlife Refuge was formally established on December 18, 1996, it has received no organizational funding to date. Rather, a portion of the budget allocated to Florida Panther National Wildlife Refuge has been used for funding projects on the refuge. Limited funding has been available to conduct some sea turtle nest monitoring since 1991 and aerial manatee surveys since 1997.

In 1993, $75,000 of no-year money was allocated to fund a "Hurricane Andrew Damage Assessment" of the Ten Thousand Islands area. This study assessed the impacts of Hurricane Andrew to nesting sea turtle habitat and to evaluate flora and fauna within the Ten Thousand Islands. In 1994, the Rookery Bay National Estuarine Research Reserve was contracted to conduct the flora and fauna surveys. A final report entitled, "Resource Damage Assessment of the Ten Thousand Islands National Wildlife Refuge Following Hurricane Andrew" was completed in March 1997. In 1995, the Fish and Wildlife Cooperative Unit of the University of Florida in Gainesville was contracted to conduct a sea turtle study. In 1997, Graduate Student Ahjond S. Garmestani completed his masters thesis on the study entitled, "Sea Turtle Nesting in the Ten Thousand Islands of Florida."

In addition, Everglades funding was used in 1996 to purchase a shallow draft boat and motor to conduct research and law enforcement on the new refuge. An additional boat was purchased in 1998.

The first staffing for the refuge occurred in 1997 when a temporary Park Ranger (GS-7) was employed. A permanent Wildlife Biologist (GS-11) was employed in 1998.

The following summary provides a list of refuge projects as identified in the goals, objectives, and strategies for Ten Thousand Islands National Wildlife Refuge:

Project 1. Enhance Biological Assessment

Baseline resource assessment will be a high priority task for this new refuge. A Biological Science Technician (Wildlife) is needed to assist with the actual collection and processing of field data. Initial equipment requirements include a vehicle ($20,000); a boat and motor ($20,000); and computer hardware ($3,000) for a subtotal of $43,000. The recurring base funds including salary, employee benefits, training needs, and survey flight time are estimated at $110,000/year. Total startup costs for this project total $153,000.

Project 2. Establish a Geographic Information System (GIS)

To meet the refuge goal of assessing wildlife, habitat, and the impacts of management, a Computer Specialist with experience in geographic information systems is needed. This person will digitize wildlife use and habitat type on and off the refuge. This system type analysis will also be used to evaluate the impacts of the proposed South Golden Gate Estates Hydrologic Restoration Plan that will likely have a major impact on this refuge. This person will also assist other staff members and cooperating agencies with their GIS needs. This position will be shared with Florida Panther National Wildlife Refuge. New hardware will also be required including digitizing equipment, computer, printer, and plotter. The estimated initial startup for hardware, software, and training costs are $30,000 and the recurring base funds including salary, employee benefits, and administrative and equipment needs are estimated at $100,000/year.

Project 3. Water Contaminants Monitoring and Evaluation Program

Freshwater flows from sources north of the refuge are suspected to contain compounds from agricultural and urban influences. A water quality monitoring program is needed to document these potential contaminants and to establish a baseline water quality index for the refuge. An outside contractor will be employed to collect the samples and test for levels of heavy metals, organo-phosphates, mercury, and other suspected contaminants. A 2-year sampling protocol will begin by 2002, with a report furnished by 2004. The cost of the study is estimated at $120,000.

Project 4. Enhance Watershed Assessment Capabilities

A Hydrologist is needed to fully assess the impacts of various surface projects planned on and off the refuge within the watershed. One such project is the re-hydration of the South Golden Gate Estates, which will affect both Ten Thousand Islands and Florida Panther National Wildlife Refuges. In addition, there is a need to monitor surface and ground water elevations, salinity, and sea level rise on the refuge, especially as it relates to refuge habitats. The Hydrologist will also provide information to adjacent land managers, as well as county, state, and federal land planning efforts for south Florida. This position will be shared with Florida Panther National Wildlife Refuge. The recurring base funds including salary, employee benefits, and administrative and equipment needs are estimated at $100,000/year.

Project 5. Enhance Fishery Management Capabilities

A Fishery Biologist is needed to fully assess the impacts of various recreational and commercial fishing activities, and to evaluate the effects of the South Golden Gate Estates Hydrologic Restoration Plan on refuge fisheries. This person will work closely with adjacent land management agencies to ensure proper management of the fishery resource in the area. Initial equipment requirements include a vehicle ($20,000), collection and monitoring apparatus such as nets, seines, etc., ($15,000), and computer hardware ($3,000) for a subtotal of $38,000. The recurring base funds including salary, employee benefits, and administrative and equipment needs are estimated at $100,000/year. Total startup costs for this project total $138,000.

Project 6. Increase Law Enforcement Assistance

The refuge receives a large amount of public use, both recreational and commercial, while providing essential habitat for a number of endangered species. A permanent Park Ranger position is needed to ensure that secondary use activities remain compatible with refuge resources. In addition, since drug trafficking has been documented to occur in the area, this position will also help protect the safety of refuge visitors. The refuge already has a temporary Park Ranger on staff. This temporary position will be converted to a permanent position. The recurring base funds including salary, employee benefits, and equipment and training needs are estimated at $70,000 year.

Project 7. Develop a Fire Effects Study For the Coastal Marsh

The coastal marshes within the northern portions of the refuge contain grasses, sedges, rushes, and other wetland species that require occasional burns to maintain healthy communities. These marshes also contain animal species that require these habitats for food and cover. A fire effects study is needed to ascertain the timing, frequency, and required fuel and weather conditions for prescribed burning of these areas. The study will also focus on timing the fires to promote healthy plant and animal communities. This study will be contracted out to a university for research under the direction of refuge staff. The 3-year study will be initiated by the year 2002 and will cost approximately $20,000 per year, for a total of $60,000.

Project 8. Acquire 1,640 Acres Adjacent To The Refuge Boundary

Several private land parcels exist adjacent to the refuge that, if acquired (under the condition of willing sellers), will facilitate the administration and management of the refuge and the ecosystem (Fig. 10). The proposed lands for acquisition are as follows:

Area 1. Section 32, Township 52 South, Range 27 East: 640 acres (lands and waters associated with Tripod Key);

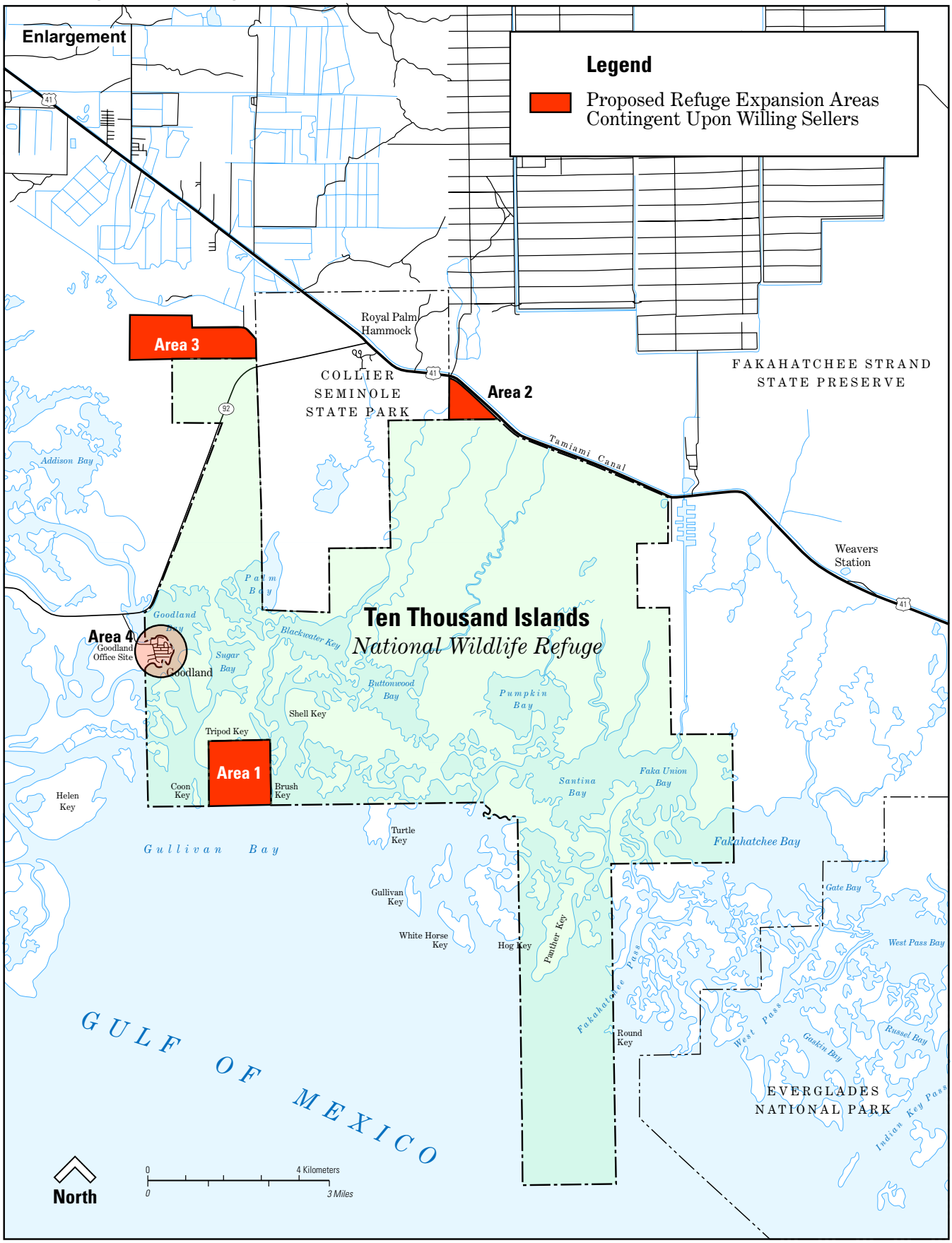
Area 2. Southwest quarter of Section 36, Township 51 South, Range 27 East: 194 acres (wetlands surrounded by state and federal holdings);

Area 3. Portions of Sections 29 and 30, Township 51 South, Range 27 East: approximately 800 acres (lands that could provide additional recreational possibilities, but will need some restoration); and

Area 4. One-to-two acres within the town of Goodland. The Service will rent or purchase a site on the water. The site will serve as a visitor contact station, office site for staff, boat and equipment storage, and a ready launch area for Service activities. Alternatively, the Service may work toward enhancing the existing Rookery Bay National Estuarine Research Reserve-Goodland Bay Research Facility for use by both agencies.

The estimated funds needed for these acquisitions total $1.6 million.

Figure10. Proposed Lands for Acquisition



Project 9. Remove Derelict Boats From Refuge Waters

Several derelict (abandoned, dumped) boats occur on the refuge which are potential navigation hazards and sources of contamination. Many of the vessels are located in a narrow bay between Goodland and Palm Bay, however, other vessels are scattered throughout the refuge. The Service will work cooperatively with Collier County and the State of Florida to remove these vessels. An estimated $25,000 is needed in cost share funds to safely remove these vessels.

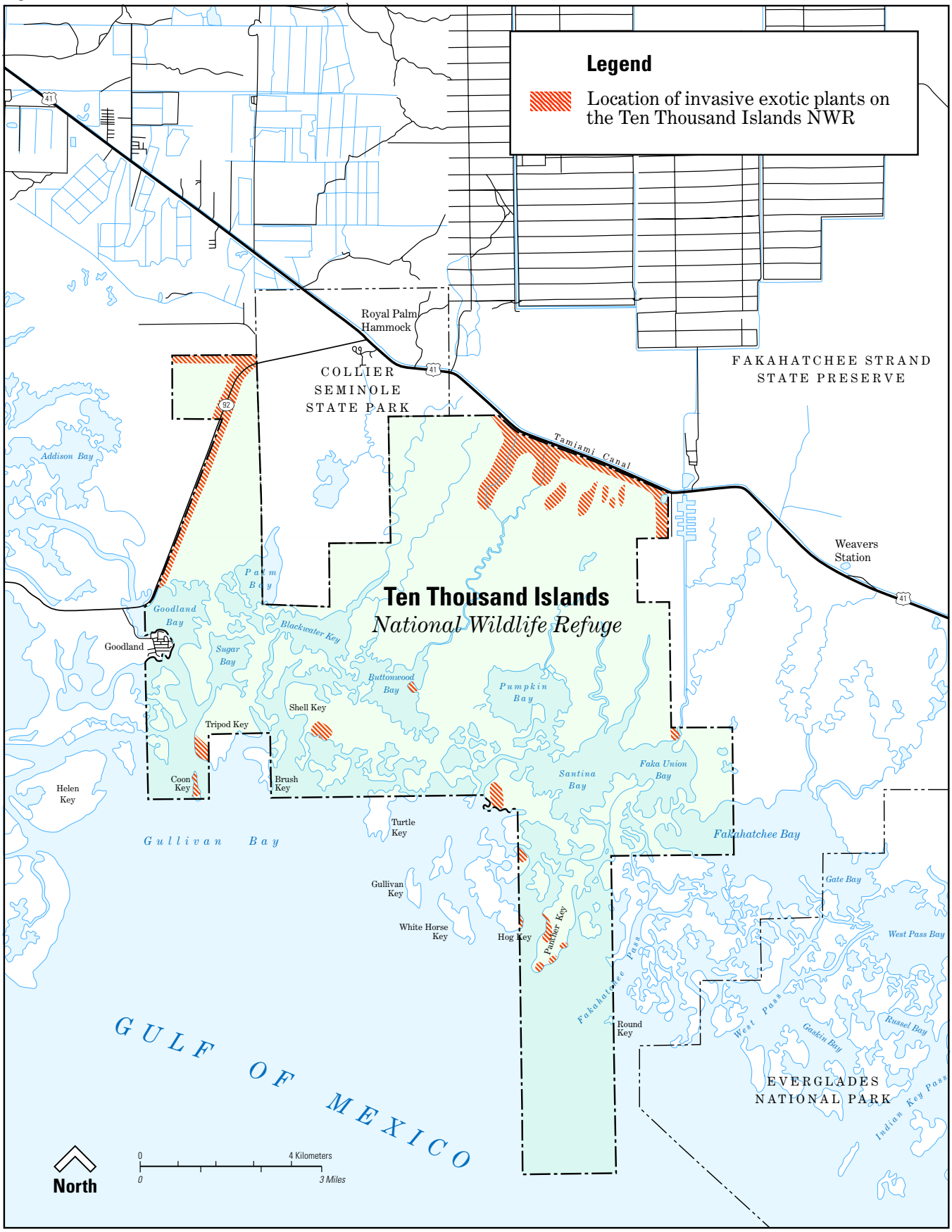
Project 10. Enhance Refuge Habitats

A Botanist is needed to conduct plant surveys, develop a Vegetative Inventory Plan, and coordinate invasive exotic plant control on the refuge. This position will be shared with Florida Panther National Wildlife Refuge. At least seven invasive exotic species of plants occur on the refuge. Lather leaf, Australian pine, and Brazilian pepper are found along coastal areas and Brazilian pepper is commonly found inland (Fig. 11). These species typically grow in dense stands that crowd out the native species. In addition, Australian pine interferes with sea turtle nesting as the extensive root system prohibits turtles from digging nests. This project will assist in stopping the encroachment of these invasive plants by supporting a control program including a seasonal plant control crew consisting of two seasonal workers ($20,000), spray equipment ($5,000), and herbicide costs ($5,000). In addition, the Service will sponsor an annual Invasive Exotic Plant Workshop. The workshop will provide a forum where state, federal, and private land managers of southwest Florida can meet and discuss problem plants, successful control techniques, equipment and project partnerships, and network on the invasive exotic plant problem. The estimated cost for this project is $30,000 annually for four consecutive years and additional recurring base funds including salary, employee benefits, administrative and equipment needs of $110,000.

Project 11. Enhance Refuge Administrative and Public Use Programs

Additional staff are required to manage the recreational and commercial activities on the refuge. An Assistant Manager will be hired to develop a Public Use Management Plan, Waterfowl Hunt Plan, and cooperative agreements for management of submerged lands. One of the first tasks of this assistant will be to conduct a survey of commercial and recreational uses of the refuge, and administer special use permits for commercial uses and other activities that require a permit. This position will be stationed at the proposed Goodland Visitor Contact Station. In addition, a permanent Administrative Assistant is needed to handle the increased administrative workload associated with this and other new positions. The Assistant Manager's salary, benefits, training, and annual equipment needs are estimated at $70,000/year and those for the Administrative Assistant are estimated at $30,000/year.

Figure 11. Exotic Plant Control Areas



USFWS Photo

Project 12. Assessment of Watercraft Impacts on Wildlife and Shallow Water Estuarine Resources in the Ten Thousand Islands

This cooperative study, in conjunction with the Rookery Bay National Estuarine Research Reserve, will assess the impacts of powered watercraft operating in shallow water environments within the Ten Thousand Islands region on wildlife and submerged land resources. The study area will include coastal areas from Rookery Bay to Everglades National Park including the submerged lands of the refuge. Potential parameters for impact assessment include wildlife/bird populations, seagrass, non-vegetated substrate, and user conflict. Results of this study will assist state and federal managers in determining future site management options. The cost for this project will be cooperatively secured through state and federal funding and is estimated at $170,000 per year for a total of $510,000.

Project 13. Develop Refuge Brochures

Along with the expected increase in public use on the refuge will come a need to provide more information to users. This project will include the development of two refuge brochures for general distribution to the public. The first brochure will contain a map of the refuge with printed information on natural resources and management activities. The second brochure will contain a more detailed map of the back country areas of the refuge. The map will display navigational aids, deep water channels, and other aids to help visitors navigate and recreate on the refuge. Partnerships will be sought to assist in the production of these informational brochures. The estimated cost is $15,000.

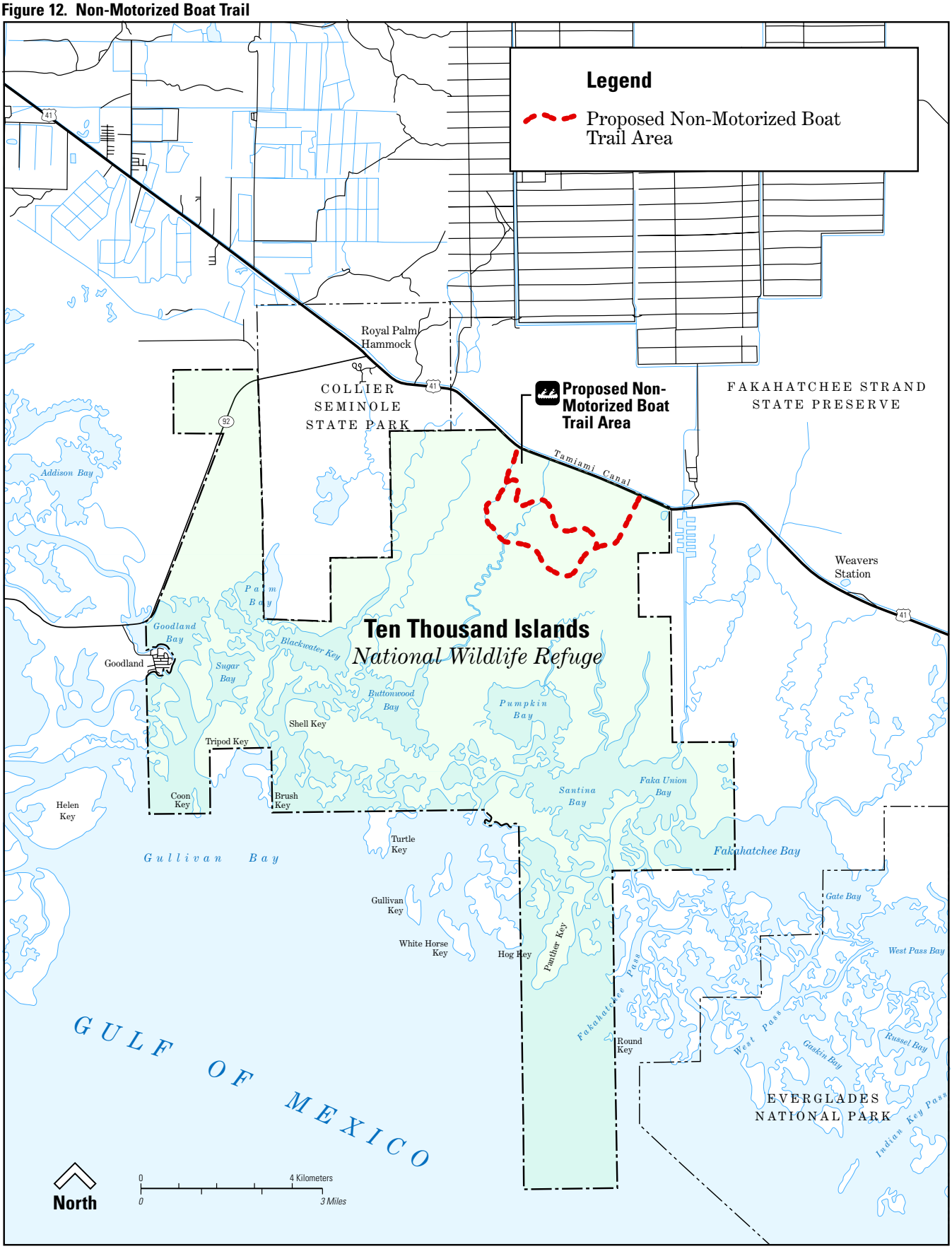
Project 14. Develop a Non-motorized Boat Trail

The refuge coastal marsh south of U.S. 41 contains abundant wildlife resources which are largely inaccessible to the public. A non-motorized boat trail through this area will provide additional compatible wildlife observation opportunities. The trail will originate from the oil pad road in Section 1 of Township 52 South, Range 27 East, and will be designed to loop back to this starting point (Fig. 12). An extension of the trail may terminate at a take out point close to the Port of the Islands Hotel. The trail can only be used during high water periods. Post markers will be installed along the route to guide those unfamiliar with the area. The estimated cost for the project is $5,000.

Project 15. Develop Lesson Plans On Refuge Natural Resources For Collier County Schools

Education of the public is the key to the protection and sustainability of our natural resources. In cooperation with Rookery Bay National Estuarine Research Reserve and the Collier County Environmental Education Consortium, the refuge will develop at least four lesson plans for area schools and environmental organizations by 2003. The lesson plans will target the unique resources of the refuge and how responsible public use is important to their health. The estimated cost for the plan development, illustrations, and printing is $5,000.

Figure 12. Non-Motorized Boat Trail



Project 16. Address Additional Staffing Needs of the Refuge

The Ten Thousand Islands National Wildlife Refuge was established with neither funding nor staff. This project addresses staffing needs not included in other Special Projects. An Outdoor Recreation Planner is needed to coordinate activities at a multi-agency visitor center along U.S. 41 and the Goodland Visitor Contact Station. In addition, the Planner will develop interpretive displays, educational outreach material for schools and the public, and coordinate refuge volunteer activity. This planner will be stationed at the Proposed Goodland Visitor Contact Station. A Mechanic and Maintenance Worker are needed to maintain boats, equipment, and facilities. An Information Specialist is needed to coordinate news events, press releases, and information transfer to local, state, and national news outlets. This position will be shared with the Florida Panther National Wildlife Refuge. The estimated annual cost to maintain these four positions including salary, benefits, equipment, and training is $280,000.

Project 17. Contribute to a Multi-Agency Visitor Center Along U.S. 41

In December 1997, a multi-agency environmental information center was established at the Port of the Islands Hotel adjacent to the refuge. In September 1998, the agreement with the hotel was terminated when the hotel closed. The Service plans to continue this effort at this hotel or at another site along U.S. 41. Exhibits used during the first year of operation were quickly designed, constructed, and installed by refuge staff. There is a need for exhibits that are more interactive and professional, and that display the central water theme agreed upon by center cooperators. Service cooperative funding will be needed for this project in the amount of $25,000. An additional $2000/year is needed in recurring base funds to maintain exhibits.

Project 18. Establish a Goodland Visitor Contact Station

The town of Goodland is the nearest community with access to the refuge. The Service will rent or purchase a small lot, on the water, with ready access to the refuge (Fig. 13). This project includes funds needed to convert a house or building into an office center to house an Assistant Refuge Manager, Wildlife Biologist, Park Ranger, and Outdoor Recreation Planner, and to serve as a visitor contact station for the refuge. A small portion of the center will be supplied with interpretive and educational exhibits on refuge resources and management. The center will need a storage building for boats, equipment, and maintenance supplies. The estimated cost for the construction of the visitor contact station is $500,000. Recurring annual maintenance costs are $20,000.

Project 19. Develop a Walking Interpretive Trail Along the Oil Pad Road

The only reasonable access to the refuge's northern marshes is along the oil pad road within Section 1 of Township 52 South, Range 27 East (Fig. 14). This road is approximately 1mile in length and terminates at an abandoned oil pad location. The ditches and marshes along the road are used by a variety of wildlife species throughout the year. This interpretive trail will originate at U.S. 41, where a gravel parking area and a waterless restroom facility will be installed. The parking area location and highway ingress/egress will be coordinated with the Florida Department of Transportation. This will be a foot-access only trail. Interpretive exhibits will be placed in strategic areas along the road. A wildlife observation tower will be installed along the trail to overlook the marsh system and the variety of habitats. Costs for this project include $80,000 for a parking area and restrooms, $20,000 for exhibits, and $20,000 for an observation tower for a total of $120,000. Recurring annual maintenance costs are $5,000.

Volunteers

Volunteer assistance to the refuge has grown appreciably since 1995, due, in part, to substantial contributions of AmeriCorps volunteers. Most assistance is in resource management, primarily in completing sea turtle nest surveys. Volunteers will continue to play a critical role in assisting staff with fulfilling the future vision of the refuge.

Staff

A staff of thirteen permanent and six temporary/seasonal positions has been approved for the Florida Panther and Ten Thousand Islands National Wildlife Refuge Complex, three of which work exclusively on the Florida Panther National Wildlife Refuge. Eleven additional positions are needed to implement this plan (Fig. 16), in addition to converting one current temporary position to permanent status (Park Ranger). Four of the eleven proposed positions would be shared between Ten Thousand Islands and Florida Panther National Wildlife Refuges (Hydrologist, Botanist, Computer Specialist, and Information Specialist), and seven would work exclusively on the Ten Thousand Islands National Wildlife Refuge (Assistant Refuge Manager, Biological Science Technician, Fishery Biologist, Outdoor Recreation Planner, Administrative Assistant, Mechanic, and Maintenance Worker).

Monitoring and Evaluation

The organization of the goals, objectives, and strategies in this plan provide a ready means of monitoring and evaluating its success, since it flows from the Refuge Purpose, Mission, and Vision Statement. Each completed strategy will be one step closer to completion of this plan. Ultimately, completion of all strategies will result in completion of all objectives, consequently, meeting all goals.

This plan will be augmented by detailed step-down plans to address completion of specific strategies that support the refuge goals and objectives as identified in this plan. Establishing clearly defined goals, objectives, and strategies in each of these step-down plans will assist in evaluating the success of those plans and consequently this plan.

Figure 13. Proposed Location of Visitor Contact Station

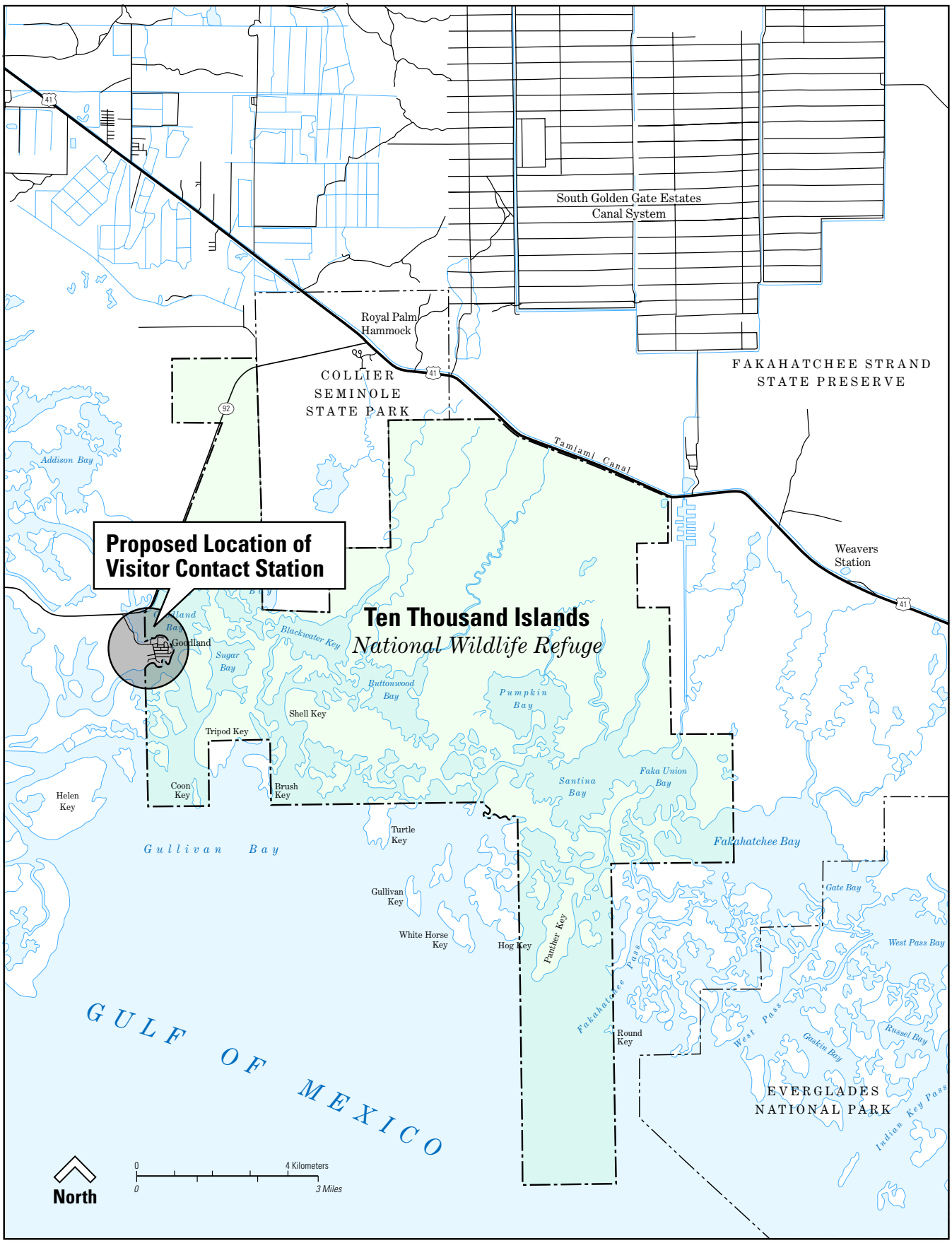


Figure 14. Interpretive Trail and Observation Tower along Oil Pad Road

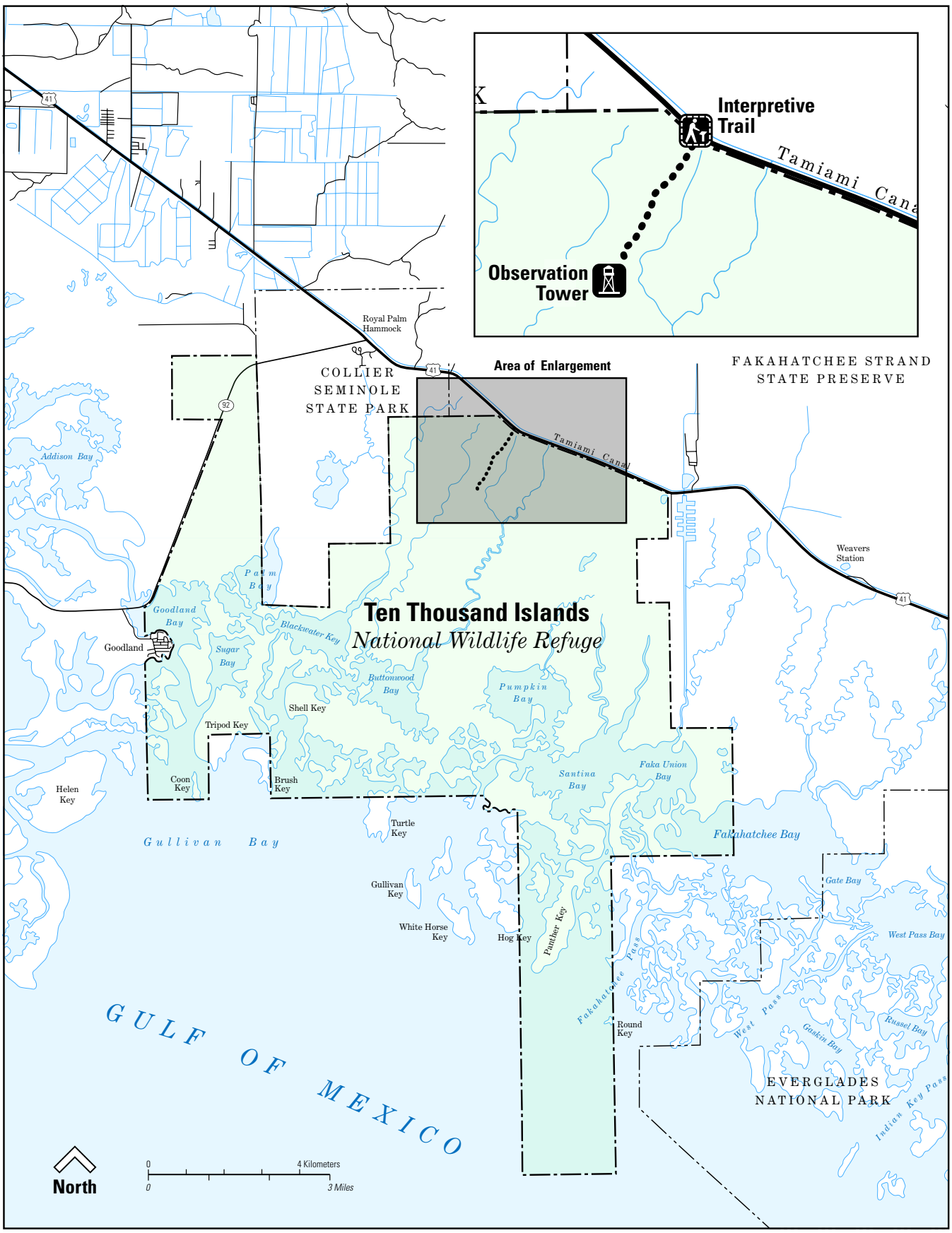
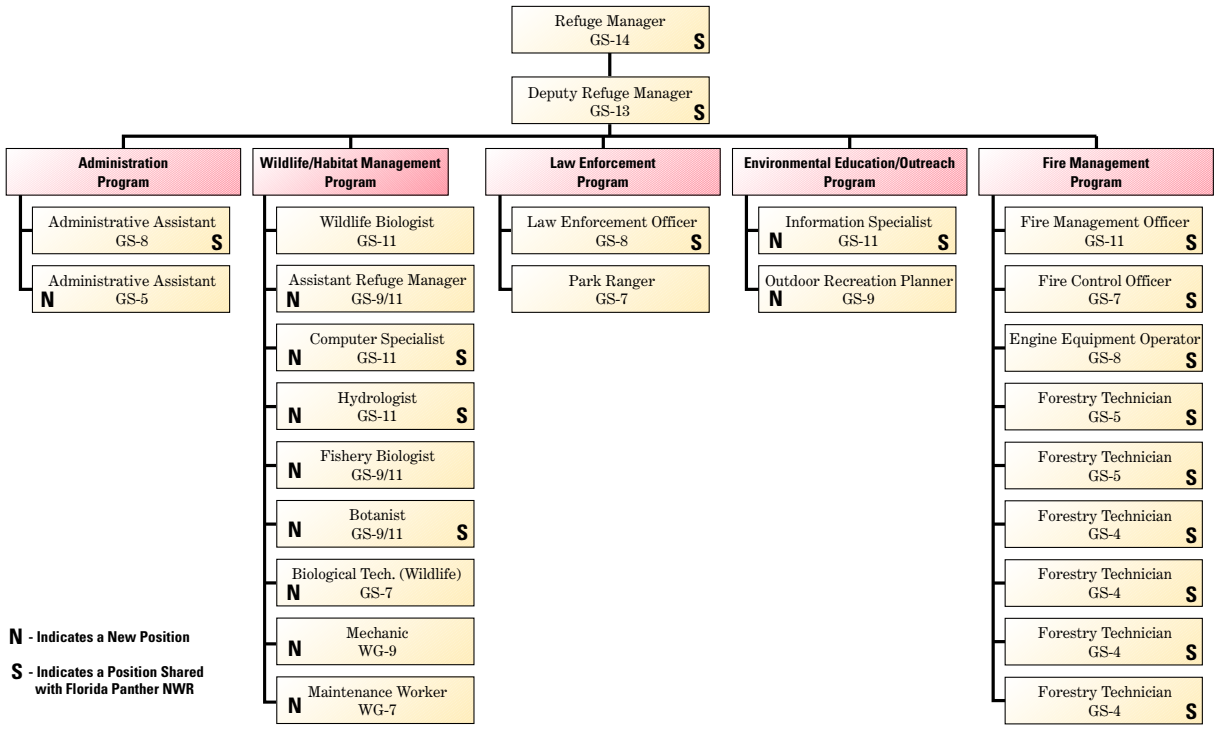


Figure 15. Project Cost Summary

Project	*One Time Cost*	*Recurring Base*	*First-Year Need*
1. Enhance Biological Assessment	43,000	110,000	153,000
2. Establish GIS	30,000	100,000	130,000
3. Initiate Water Monitoring Program	120,000	0	120,000
4. Assess Watershed Impacts	0	100,000	100,000
5. Fishery Biologist	38,000	100,000	138,000
6. Enhance Law Enforcement	0	70,000	70,000
7. Initiate Fire Effects Study	60,000	0	60,000
8. Acquire Additional Lands	1,600,000	0	1,600,000
9. Remove Derelict Boats	25,000	0	25,000
10. Enhance Refuge Habitat	120,000	110,000	230,000
11. Enhance Administrative Program	0	100,000	100,000
12. Assess Watercraft Impacts	510,000	0	510,000
13. Produce Refuge Brochures	15,000	0	15,000
14. Develop Non-motorized Boat Trail	5,000	0	5,000
15. Develop Lesson Plans	5,000	0	5,000
16. Provide Additional Staff	0	280,000	280,000
17. Enhance Interpretive Facilities	25,000	2,000	27,000
18. Establish Goodland Office	500,000	20,000	520,000
19. Develop Interpretive Trail	125,000	5,000	125,000
Total Costs	3,216,000	997,000	4,213,000

Figure 16. Organizational Structure for Management of Ten Thousand Islands National Wildlife Refuge.



Finding of No Significant Impact

Ten Thousand Islands National Wildlife Refuge Comprehensive Conservation Plan Collier County, Florida

The U.S. Fish and Wildlife Service proposes to publicly disclose the possible environmental consequences that implementation of the Ten Thousand Islands National Wildlife Refuge Comprehensive Conservation Plan could have on the quality of the physical, biological, and human environment, as required by the National Environmental Policy Act of 1969.

The Service has analyzed the following alternatives to the proposal in an Environmental Assessment.

1. Alternative A (No Action) advocates that the refuge be managed with minimal monitoring and management direction. Public and commercial uses would continue with no assessment of adverse effects. Airboat, swamp buggy, and other off-road vehicles would not be allowed in the refuge shallow water marshes south of U.S. Highway 41. The refuge would establish a Management Agreement with the State of Florida, however, other partnerships and off-refuge environmental assessments would be limited.

2. Alternative B (Ecosystem Approach) would allow recreational and commercial activities to continue coupled with extensive monitoring programs to assess the quality of the environment. Recreational uses would be assessed to determine what impacts they may be having on refuge resources. Environmental education would be increased. Refuge monitoring and interest would extend beyond the refuge boundaries and into the watershed to further protect refuge resources. Partnerships and cooperative efforts would be emphasized to accomplish refuge goals and watershed protection.

3. Alternative C (Maximum Public Use) emphasizes fishing as well as many other recreational pursuits for the refuge. Airboat and personal watercraft use would continue with study to determine their impacts to the natural resources. Environmental education would be promoted, however, biological monitoring would only emphasize listed species as it pertains to recreational uses. The refuge would establish a Management Agreement with the State of Florida, however, other partnerships and off-refuge environmental assessments would be limited.

For all three alternatives, airboats, swamp buggies, and other off-road vehicles would not be allowed in the refuge shallow water marshes south of U.S. Highway 41. The Refuge Manager has determined that these uses have a deleterious impact on the marshes of this area. All three alternatives would also establish a Management Agreement with the State of Florida over adjacent submerged lands.

The preferred alternative selected for implementation is Alternative B which will implement the Comprehensive Conservation Plan for Ten Thousand Islands National Wildlife Refuge. This alternative was selected because it best meets the primary purposes for which the refuge was established – protecting and enhancing the refuge's unique estuarine ecosystem. This alternative recognizes the importance of the refuge within the Big Cypress Watershed and defines refuge actions to protect and enhance the natural features of this ecosystem. This alternative would continue to provide the public with access to the refuge. Visitation

would be monitored for its impacts on flora and fauna of the refuge. Environmental education and partnership efforts would increase with this alternative. Development of new refuge facilities would cause minimal disturbance to refuge lands. It would not adversely impact threatened or endangered species or adversely impact wetlands, neither would it harm nor cause the loss or destruction of archaeological or historical resources. The preferred alternative would aid in the restoration of sheetwater flow within the South Golden Gate Estates area, the immediate headwaters for the refuge. This alternative would have a positive effect on visitor use, environmental education, conservation of natural resources, and the local communities. The program should prove to be a major step in the conservation of critical resources within the South Florida Ecosystem.

Measures to mitigate and/or minimize adverse effects have been incorporated into the proposal. Where site development activities will be proposed during the next 15 years, each activity would be given the appropriate NEPA consideration. At that time, any required mitigation activities would be designed into the specific project to reduce any significant adverse impacts to the environment. Long-term monitoring would help in determining actual effects and how the Service should respond.

The proposal is not expected to have any significant adverse effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988.

The preferred alternative has been thoroughly coordinated with all interested and/or affected parties. A list of parties contacted may be found in Appendix C.

It is my determination that the preferred alternative would not have a significant impact on the human environment in accordance with Section 102 (2)(c) of the National Environmental Policy Act, and in accordance with the Service's Administrative Manual (30 AM.913(2)(d), and further conclude that an Environmental Impact Statement is not necessary. This determination is based on the following factors (40 CFR 1508.27):

1. Both beneficial and adverse effects have been considered and this action would not have a significant effect on the human environment. (Environmental Assessment, pages 77-80.)
2. The actions would not have a significant effect on public health and safety. (Environmental Assessment, pages 77-80.)
3. The project would not significantly affect any unique characteristics of the geographic area such as proximity to historical or cultural resources, wild and scenic rivers, or ecologically critical areas. (Environmental Assessment, pages 77-80.)
4. The effects on the quality of the human environment are not likely to be highly controversial. (Environmental Assessment, pages 77-80.)
5. The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment. (Environmental Assessment, pages 77-80.)
6. The actions would not establish a precedent for future actions with significant effects nor would they represent a decision in principle about a future consideration. (Environmental Assessment, pages 77-80.)

7. There would be no cumulatively significant impacts on the environment. Cumulative impacts have been analyzed with consideration for other similar activities on adjacent lands, in past action, and in foreseeable future actions. (Environmental Assessment, pages 77-80.)
8. The actions would not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor would they cause loss or destruction of significant scientific, cultural, or historic resources. (Environmental Assessment, page 80)
9. The actions are not likely to adversely affect threatened or endangered species, or their habitats. (Environmental Assessment, page 78.)
10. The actions would not lead to a violation of federal, state, or local laws imposed for the protection of the environment. (Environmental Assessment, pages 92-98.)

Supporting References:
Comprehensive Conservation Plan
Environmental Assessment

Environmental Assessment
Introduction

Ten Thousand Islands
National Wildlife Refuge
U. S. Department of the Interior
Fish and Wildlife Service
3860 Tollgate Blvd., Suite 300
Naples, Florida 34114

June 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 Ten Thousand Islands National Wildlife Refuge, Collier County, Florida, over the next ten to fifteen years.

The purpose of this Environmental Assessment is to analyze and evaluate the environmental effects of implementing a range of management alternatives for the refuge.

The proposed action is to implement Alternative B: Ecosystem Approach, as described in the Management Direction of the Comprehensive Conservation Plan.

Formal consultation for this Environmental Assessment did not occur. However, this planning effort and the Refuge Manager's ongoing dialogue with various federal and state jurisdictions, interest groups, and private landowners has provided important elements in the synthesis of the goals, objectives, and strategies found in the plan. Implementation of the plan will necessitate further coordination and cooperation with these entities.

Royal terns
Photo by Larry W. Richardson

Alternatives

The following alternatives address the major issues regarding Ten Thousand Islands National Wildlife Refuge. Each alternative is analyzed for its appropriateness in meeting the needs of the public and the purpose and mission of the refuge. The end result is a set of goals, objectives, and strategies related to each issue which will assist in making management decisions.

Alternative A: No Action

Habitat Protection and Wildlife Management

Day-to-day activities would include some field work on threatened and endangered species. Routine field work would include monitoring sea turtle nesting activity and ecosystem impacts resulting from commercial activities. Baseline inventory and monitoring of other species, participation in the South Golden Gate Estates Hydrologic Restoration Plan, water quality monitoring, and control of exotic plants and animals on the refuge, including prescribed burning, would be limited due to staffing constraints. Proposed oil and gas plans would be reviewed to minimize impacts to habitat and wildlife.

Commercial and Recreational Uses on the Refuge Including the Use of Personal Watercraft and Airboats

Although the refuge is in its infancy, this management alternative would advocate that the refuge be managed in the same manner as it is managed today, that is, with minimal staff and management direction. Current management guidance is undertaken by allowing many of the existing commercial and recreational practices to continue on the refuge without monitoring to assess the potential adverse affects to refuge resources. Subject to constraints by the State of Florida, co-manager of refuge submerged lands, airboat and personal watercraft use would continue on the refuge. Airboat, swamp buggy, personal watercraft, and other off-road vehicles would not be allowed in shallow water marshes on the refuge south of U.S. 41 (Fig. 6, Comprehensive Conservation Plan).

Partnerships and Cooperative Management of Resources

Management coordination would occur between the refuge and the Florida Department of Environmental Protection-Rookery Bay National Estuarine Research Reserve. However, it would be limited due to staffing constraints. The public use program would not be improved. Opportunities for increased environmental education and interpretation would not be promoted. Partnering for improved watershed management and habitat conservation would be limited to issues involving only threatened and endangered species.

Education and Public Outreach

Opportunities for increased environmental education would not be promoted. Exhibits for a Southwest Florida Environmental Information Center would not be upgraded, facilities along the oil pad road and in Goodland would not be constructed, and refuge brochures and lesson plans would not be developed. Outreach efforts off the refuge would be pursued solely through the assistance of volunteers and other agencies.

Research and Monitoring

Monitoring of threatened and endangered species would continue, but research opportunities would be limited to providing support for others interested in conducting studies on the refuge. Monitoring the population status of other species, monitoring the affect that the South Golden Gate Estates Hydrologic Restoration Plan would have on refuge resources, and water quality monitoring would be limited due to staffing constraints. The initiation of a fire effects study and a study on the impacts of airboat and personal watercraft use on refuge resources would most likely not occur.

Protection of Archaeological Resources

Archaeological sites within the refuge would have limited accessability to the public due to lack of an improved public use program. In addition, these sites would not be as widely protected as prescribed by law, due to lack of staff and training. Opportunities for further investigation of these sites would be dependent upon interest from outside parties.

Staffing Needs

The refuge staff currently consist of a seasonal Park Ranger and a Wildlife Biologist. Without additional funding and staffing, the refuge would be unable to implement programs to address its responsibilities for the refuge and the South Florida Ecosystem over the next 15 years.

Wildlife and Habitat Conservation

Management Goals, Objectives, and Strategies under Alternative A

Goal

1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Objective

1.1 Identify and determine the status of imperiled species and their use of the refuge and its habitats.

1.2 Establish baseline inventory and minitoring procedures for other refuge species and habitats.

Strategy

1.2.2 By 2010, develop a comprehensive inventory of refuge wildlife and habitats, to include, but not limited to, mammals, migratory and resident birds, fish, reptiles and amphibians, aquatic insects, and habitat delineations including submerged grass bed areas.

Objective

1.3 Develop and implement management strategies to protect or enhance endangered species, other wildlife, and their habitats.

Strategies

1.3.1 Enforce boat speed regulations established by the State to protect manatees and manatee critical habitat.

1.3.3 By 2000, develop a plan, with other agencies, to restore natural sheetwater flows to the refuge in conjunction with the proposed South Golden Gate Estates Hydrologic Restoration Plan. By 2001, establish an initial monitoring protocol to evaluate the restoration effort. (Special Project 4)

1.3.10 Review oil exploration plans to ensure that adverse impacts to refuge natural and cultural resources are minimized.

Objective

1.4 Implement an invasive exotic species inventory, monitoring, and control program.

Strategies

1.4.1 By 2010, further identify and quantify the acreage of invasive exotic plants on the refuge coastal keys. (Special Project 10)

1.4.3 Identify and quantify acreage of invasive exotic plants in the area north of the mangrove system. (Special Project 9)

1.4.5 Assess the status of fire ants on sea turtle nesting beaches and their impact on turtle nest success. If necessary, implement control measures including the feasibility of using pesticides during non-nesting months.

Public Use

Goal

2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Objective

2.1 Manage recreational activities that affect wildlife and native habitats.

Strategy

2.1.8 Provide limited signs and markers at strategic locations within the refuge to assist visitor navigation.

Commercial Use

Goal

3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Objective

3.1 In 2002, establish a special use permit process to regulate commercial activities including co-managed lands and waters.

Strategies

3.1.1 Gather information on current uses within the co-managed area and assess compatibility.

3.1.3 Establish application procedures for a refuge special use permit.

Environmental Education

Goal

4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

Objective

4.1 By 2008, increase local awareness of south Florida ecosystems, the Rookery Bay National Estuarine Research Reserve, and the refuge through the development and implementation of an outreach program.

Strategies

4.1.1 Establish partnerships with support groups and Rookery Bay National Estuarine Research Reserve to assist with outreach, events, and environmental education. Work with partners to participate in at least two outreach events each year that feature refuge resources (e.g., National Wildlife Refuge Week, International Migratory Bird Day, Earth Day, Estuary Day, Fishing Tournament, etc.).

4.1.3 By 2008, collaborate with refuge eco-tour concessionaires to disseminate refuge and state aquatic preserve resources and management information to the public. Encourage permitted eco-tour vendors to attend orientation programs hosted by Rookery Bay National Estuarine Research Reserve that promote responsible and informed commercial use of the area.

Cooperative Management

Goal

5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources with the Big Cypress Watershed.

Objective

5.1 By 2000, implement a Cooperative Agreement with the State of Florida concerning management of submerged lands and state islands. The agreement would allow cooperative designation of law enforcement authority, resource management responsibilities, research and monitoring activities, and management of public use.

5.2 Develop agreements and Memorandums of Understanding with other state, federal, and private entitites on management of resources and human activities. Develop a Memorandum of Understanding with the Florida Department of Environmental Protection, and the Fish and Wildlife Conservation Commission that would address cooperative resource management responsibilities, research and monitoring activities, and management of public use.

Strategies

5.2.1 Continue to maintain the established prescribed and wildfire agreements with the state, including refuge neighbors such as Collier Seminole State Park, Fakahatchee Strand State Preserve, and Picayune Strand State Forest.

5.2.2 Establish a Memorandum of Understanding with Everglades National Park for emergency services to include, but not limited to, law enforcement, search and rescue, fire management, and collaborative resource management (e.g., general permit for fishing guides, turtle surveys, and raccoon control on turtle beaches).

5.2.4 By 2001, establish a plan with Rookery Bay National Estuarine Research Reserve to coordinate search activities conducted on the refuge and surrounding areas.

5.2.5 Collaborate with other agencies and universities to conduct water quality and hydrologic studies on the refuge to assess rehydration efforts and pollutant runoff from upper reaches of the watershed.

Archeological Resources

Goal

6.0 Protect refuge cultural resources, encourage archaeological investigations, and promote interpretation and appreciation of the area's history.

Objective

6.1 Comply with federal and state historic preservation legislation and regulations to protect refuge archaeological resources. The Regional Archaeologist will be responsible for the following strategies:

Strategies

6.1.3 Develop and implement a site protection plan in consultation with the State Historic Preservation Office, federally recognized Native American nations, and the professional archaeological community.

6.1.5 Work with the State Historic Preservation Office to ensure confidentiality of cultural resource data within the refuge and the State of Florida.

6.1.6 By 2000, work with the State Historic Preservation Office to formally establish which refuge management actions require its review and comment.

Objective

6.2 By 2008, develop a cultural resources interpretation and education program.

Strategy

6.2.1 By 2002, compile a comprehensive literature review of past archaeological, anthropological, and historical investigations within and near the refuge. Produce an annotated bibliography to document the region's history and the utility of the scientific methodology.

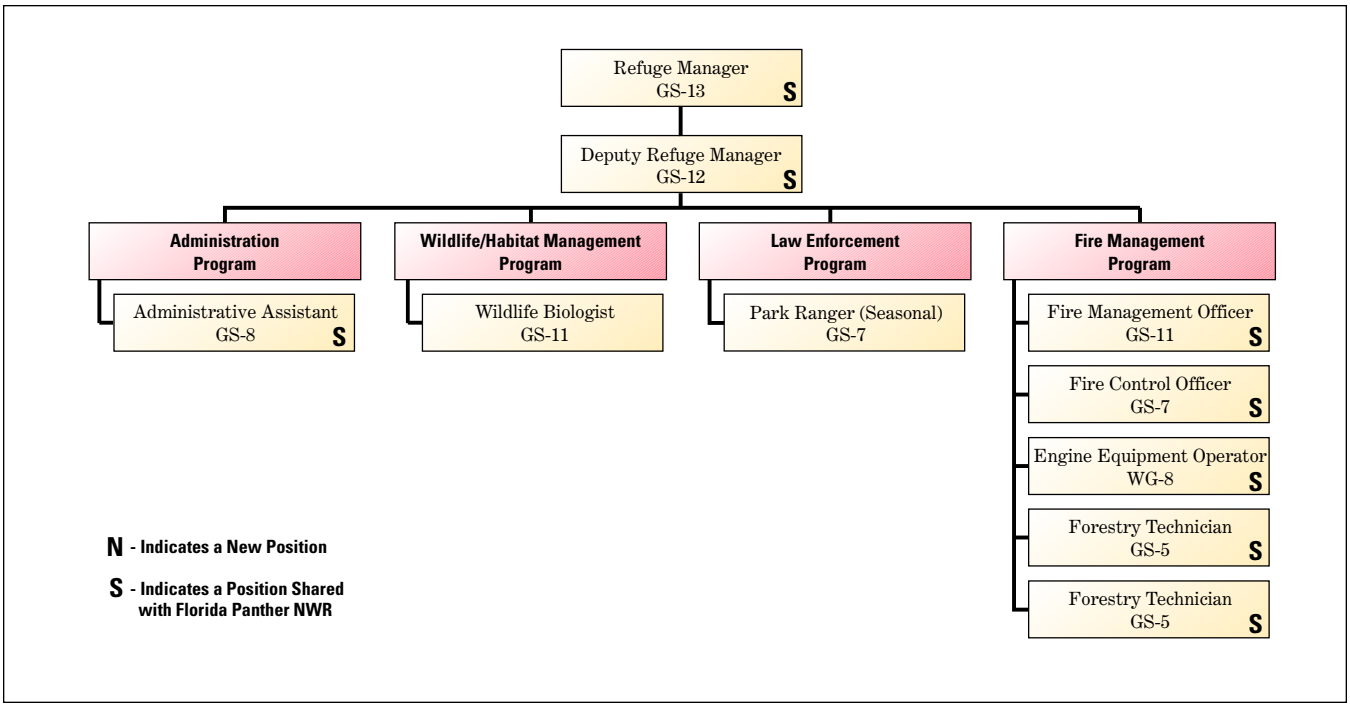
Funding Under Alternative A

A total of $75,000 was allocated for the Biologist and seasonal Park Ranger positions in FY 1999. This figure would not change under the "no action" alternative. The Refuge Managers, along with limited support from fire personnel and administration, would be shared with Florida Panther National Wildlife Refuge.

Project Cost Summary under Alternative A

There are no projects to support Alternative A

Figure 17. Organizational Structure for Management of Ten Thousand Islands National Wildlife Refuge under Alternative A.



Alternative B: Ecosystem Approach (Alternative to be Implemented)

A description of the Ecosystem Approach may be found in the Comprehensive Conservation Plan, pages 9-43.

Alternative C: Maximize Public Use Programs on the Refuge

Commercial and Recreational Uses on the Refuge Including the Use of Personal Watercraft and Airboats

Under this alternative, commercial fishing and recreational activities such as sport fishing, hunting, boating, camping, and wildlife observation would be promoted without further investigation, except as they relate to impacts to threatened and endangered species. In consultation with the State of Florida, co-manager of refuge submerged lands, airboat and personal watercraft use would continue on the refuge (Fig. 5, Comprehensive Conservation Plan). These activities would be coupled with research to better determine whether they produce negative effects on listed species found within the refuge, and to make future decisions on whether to continue, expand, reduce, or discontinue their practices. Airboat, swamp buggy, and other off-road vehicles would not be allowed in shallow water marshes on the refuge south of U.S. 41 (Fig. 6).

Public use and environmental education programs would be stepped up considerably. Tours, self-guided school groups, and a broader general public use of the refuge (e.g., hunting, fishing, camping, and boating) would be encouraged under this management scheme, while attempting to minimize the impacts to threatened and endangered species and their habitats. Facilities such as parking lots, trails, and restrooms would be developed on the refuge to accommodate the increased public use. Locational and informational signs would be installed to assist visitors in accessing remote areas of the refuge.

Habitat Protection and Wildlife Management

Day-to-day activities would include some field work on threatened and endangered species. Routine field work would include monitoring sea turtle nesting activity and ecosystem degradation resulting from increased public use. Baseline inventory and monitoring of other species, participation in the South Golden Gate Estates Hydrologic Restoration Plan, water quality monitoring, and control of exotic plants and animals on the refuge would be limited due to staffing constraints. Proposed oil and gas plans would be reviewed to minimize impacts to habitat and wildlife. Mitigation for exploration may include habitat restoration and public use enhancement projects.

Partnerships and Cooperative Management of Resources

Emphasis would be placed on partnerships to enhance public use opportunities. Management coordination would occur between the refuge and the Florida Department of Environmental Protection-Rookery Bay National Estuarine Research Reserve. However, it would be limited due to staffing constraints. Partnering for improved watershed management and habitat conservation would be limited to issues involving threatened and endangered species.

Education and Public Outreach

Opportunities for increased environmental education and outreach would be maximized. An Outdoor Recreation Planner would work with the Rookery Bay National Estuarine Research Reserve, Collier County Environmental Education Consortium, school groups, volunteers, and local agencies to educate youth and adults of southwest Florida on the plight of threatened and endangered species and about refuge activities. Volunteers and public and private agencies would be actively recruited to assist with these efforts. An Information Specialist would ensure that the same message was delivered to the public by way of the media.

Research and Monitoring

Research and monitoring on the refuge would focus on the impacts of public use on threatened and endangered species, including the effects of airboat and personal watercraft use on refuge resources. Monitoring the population status of other species, monitoring the effect that the South Golden Gate Estates Hydrologic Restoration Plan would have on refuge resources, and water quality monitoring would be limited due to staffing constraints.

Protection of Archaeological Resources

Archaeological sites within the refuge would be accessible to the public as part of the Public Use Management Plan and would be protected from looting and vandalism. Interpretation and educational programs would be developed to incorporate these cultural resources. There would be relatively little coordination between federal and state archaeologists to provide additional protection or conduct additional investigations of these areas, since primary emphasis would be placed on public use and environmental education programs.

Staffing Needs

The refuge staff currently consist of a seasonal Park Ranger and a Wildlife Biologist. Without additional funding or staffing for the biological program, the refuge would be unable to implement projects to address its responsibilities and those of the South Florida Ecosystem over the next 15 years. However, a Public Use Management Plan would be developed and implemented.

Management Goals, Objectives and Strategies Under Alternative C

Goal

1.0 Conserve, enhance, and protect the fish and wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

Objective

1.1 Identify and determine the status of imperiled species and their use of the refuge and its habitats.

1.2 Establish baseline inventory and monitoring procedures for other refuge species and habitats.

Strategy

1.2.2 By 2010, develop a comprehensive inventory of refuge wildlife and habitats to include, but not limited to, mammals, migratory and resident birds, fish , reptiles and amphibians, aquatic insects, and habitat delineations including submerged grass bed areas.

Objective

1.3 Develop and implement management strategies to protect or enhance endangered species, other wildlife, and their habitats.

Strategies

1.3.1 Enforce boat speed regulations established by the State to protect manatees and manatee critical habitat.

1.3.3 By 2000, develop a plan with other agencies to restore natural sheetwater flows to the refuge in conjunction with the proposed South Golden Gate Estates Hydrologic Restoration Plan. By 2001, establish an initial monitoring protocol to evaluate the restoration effort.

1.3.10 Review oil exploration plans to ensure that adverse impacts to refuge natural and cultural resources are minimized.

Objective

1.4 Implement an invasive exotic species inventory, monitoring, and control program.

Strategies

1.4.1 By 2010, further identify and quantify the acreage of invasive exotic plants on the refuge coastal keys.

1.4.3 Identify and quantify acreage of invasive exotic plants in the area north of the mangrove system.

1.4.5 Assess the status of fire ants on sea turtle nesting beaches and their impact on turtle nest success. If necessary, implement control measures including the feasibility of using pesticides during non-nesting months.

Goal

2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

Objective

2.1 Manage recreational activities that affect wildlife and native habitats.

Strategies

2.1.1 Hire an Assistant Refuge Manager to assess and manage public use and resource management activities.

2.1.8 Provide limited signs and markers at strategic locations within the refuge to assist visitor navigation.

Goal

3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

Objective

3.1 In 2002, establish a spcial use permit process to regulate commercial activities including co-managed lands and waters.

Strategies

3.1.2 Explore the feasibility of a common charter fishing guide permit with Everglades National Park. The permit would allow a guide who fishes both areas to be covered by one permit.

3.1.3 Establish application procedures for a refuge special use permit.

Goal

4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

Objective

4.1 By 2008, increase local awareness of south Florida ecosystem, the Rookery Bay National Estuarine Research Reserve, and the refuge through the development and implementation of an outreach program.

Strategies

4.1.1 Establish partnerships with support groups and Rookery Bay National Estuarine Research Reserve to assist with outreach, events, and environmental education. Work with partners to participate in at least two outreach events each year that feature refuge resources (e.g., National Wildlife Refuge Week, International Migratory Bird Day, Earth Day, Estuary Day, Fishing Tournament, etc.).

4.1.2 Become an active member of the Collier Environmental Education Consortium. Work to increase the Consortium's involvement and collaboration in refuge outreach efforts.

4.1.3 By 2008, collaborate with refuge eco-tour concessionaires to disseminate refuge and state aquatic preserve resources and management information to the public. Encourage permitted eco-tour vendors to attend orientation programs hosted by Rookery Bay National Estuarine Research Reserve that promote responsible and informed commercial use of the area.

4.1.5 Add two new personnel to the Ten Thousand Islands and Florida Panther National Wildlife Refuge Complex staff. A Media Specialist is needed to coordinate news events, press releases, and information transfer to local, state, and national news outlets.

Objective

4.2 By the year 2010, develop facilities and associated amenities to promote public education of the ecosystem and refuge program.

Strategies

4.2.1 Enhance interpretive facilities at a proposed U.S. 41 multi-agency Southwest Florida Environmental Information Center. Seek cooperative grants to upgrade exhibits and maintain the center.

4.2.2 Establish a visitor contact station and a small office and dock facility in Goodland to educate visitors on refuge management and resources, promote appropriate visitor use, and facilitate refuge operations. Enlist a partner to acquire the building site by 2002, and establish other partners to construct facilities by 2004. (Special Project 17)

4.2.3 By 2009, develop the U.S. 41 Oil Pad road into a walking interpretive trail. Construct trailhead parking and a wildlife observation tower along the road. Pursue cost share opportunities with the Florida Department of Transportation to construct roadside parking.

Goal

5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

Objective

5.1 By 2000, implement a Cooperative Agreement with the State of Florida concerning management of submerged lands and state islands. The agreement would allow cooperative designation of law enforcement authority, resource management responsibilities, research and monitoring activities, and management of public use.

5.2 Develop agreements and Memorandums of Understanding with other state, federal, and private entities on management of resources and human activities. Develop a Memorandum of Understanding with the Florida Department of Environmental Protection, and the Fish and Wildlife Conservation Commission that would address cooperative resource management responsibilities, research and monitoring activities, and management of public use.

Strategies

5.2.1 Continue to maintain the established prescribed and wildfire agreements with the state, including refuge neighbors such as Collier Seminole State Park, Fakahatchee Strand State Preserve, and Picayune Strand State Forest.

5.2.4 By 2001, establish a plan with Rookery Bay National Estuarine Research Reserve to coordinate research activities conducted on the refuge and surrounding areas.

Goal

6.0 Protect refuge cultural resources, encourage archaeological investigations, and promote interpretation and appreciation of the area's history.

Objective

6.1 Comply with federal and state historic preservation legislation and regulations to protect refuge archaeological resources. The Regional Archaeologist will be responsible for the following strategies:

Strategies

6.1.3 Develop and implement a site protection plan in consultation with the State Historic Preservation Office, federally recognized Native American nations, and the professional archaeological community.

6.1.5 Work with the State Historic Preservation Office to ensure confidentiality of cultural resource data within the refuge and the State of Florida.

6.1.6 By 2000, work with the State Historic Preservation Office to formally establish which refuge management actions require its review and comment.

6.1.9 By 2000, ensure that all refuge law enforcement officers take the Archaeological Resources Protection Act training course.

Objective

6.2 By 2008, develop a cultural resources interpretation and education program.

Strategy

6.2.1 By 2002, compile a comprehensive literature review of past archaeological, anthropological, and historical investigations within and near the refuge. Produce an annotated bibliography to document the region's history and the utility of the scientific methodology.

Funding Under Alternative C

A total of $75,000 was allocated for the Biologist and seasonal Park Ranger positions in FY 1999. This alternative is supported by the following special projects:

Figure 18. Project Cost Summary under Alternative C

Project	*One Time Cost*	*Recurring Base*	*First-Year Need*
5. Fishery Biologist	38,000	100,000	138,000
11. Enhance Administrative Program	0	100,000	100,000
12. Assess Watercraft Impacts	510,000	0	510,000
13. Produce Refuge Brochures	15,000	0	15,000
15. Develop Lesson Plans	5,000	0	5,000
16. Provide Additional Staff	0	280,000	280,000
17. Enhance Interpretive Facilities	25,000	2,000	27,000
18. Establish Goodland Office	500,000	20,000	520,000
Total Costs	1,093,000	502,000	1,595,000

Figure 19. Organizational Structure for Management of Ten Thousand Islands National Wildlife Refuge under Alternative C.

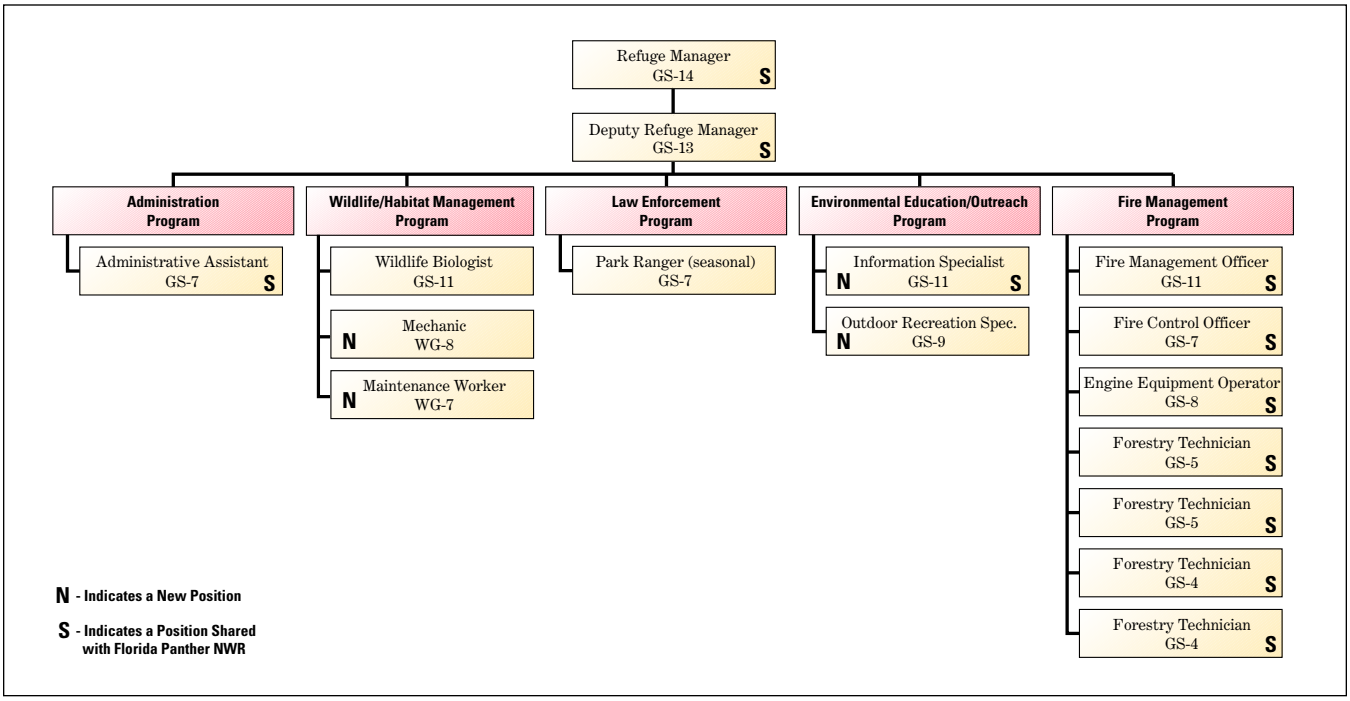


Figure 20. Issues and Alternatives Matrix

Issues	*Alternative A: No Action*	*Alternative B: Ecosystem Approach*	*Alternative C: Maximize Public Use Programs*
Commercial and Recreational Uses on the Refuge	Allow existing recreational practices without monitoring their impacts on refuge resources. Allow existing commercial uses without monitoring their impacts on refuge resources.	Increase recreational and public use opportunities, including sport fishing and duck hunting, and monitor their impacts on refuge resources. Commercial uses to continue along with monitoring to determine their impacts on refuge resources.	Increase recreational and public use opportunities and monitor their impacts on threatened and endangered species. Encourage sport fishing and duck hunting. Allow existing commercial uses and monitor their impacts on threatened and endangered species.
Use of Personal Watercraft and Airboats on the Refuge	Allow airboat and personal watercraft use on submerged lands within the refuge contingent upon decisions made by the State of Florida. Airboat, swamp buggy, and other off-road vehicles prohibited in freshwater marsh areas of refuge.	Allow airboat and personal watercraft use on the refuge subject to results of a cooperative study with the State of Florida to determine impacts on refuge resources. Airboat, swamp buggy, and other off-road vehicles prohibited in freshwater marsh areas of refuge.	Allow airboat and personal watercraft use on the refuge subject to results of a cooperative study with the State of Florida to determine impacts on refuge resources. Airboat, swamp buggy, and other off-road vehicles prohibited in freshwater marsh areas of refuge.
Habitat Protection and Wildlife Management	Emphasis on listed species only.	Collect baseline information on refuge resources including vegetation, fish, and wildlife. Participate in South Golden Gate Estates Hydrologic Restoration Plan and water quality monitoring. Control exotic plants and animals on the refuge.	Emphasis on listed species, especially as it pertains to public use impacts.
Partnerships and Cooperative Management of Resources	No partnering to improve watershed or protect cultural resources, except with Rookery Bay National Estuarine Research Reserve and to protect listed species.	Develop partnerships to help protect and manage watershed and cultural resources and encourage use of applied research. Develop agreements to manage refuge submerged lands. Partner with landowners to help conserve and restore South Florida Ecosystem.	Develop partnerships to protect listed species. Develop partnerships to enhance public use opportunities.
Education and Public Outreach	Pursue through the assistance of volunteers and other agencies.	Increase off-refuge outreach. Educate the youth and adults of southwest Florida. Ensure the same message is delivered to the public via the media. Recruit the assistance of other agencies and volunteers.	Maximize off-refuge outreach. Educate the youth and adults of southwest Florida. Ensure the same message is delivered to the public via the media. Recruit the assistance of other agencies and volunteers.
Research and Monitoring	Monitor status of listed species. Encourage others to do research.	Monitor status and trends of plant and animal communities, South Golden Gate Estates Hydrologic Restoration Plan, and water quality. Conduct a cooperative study with the Rookery Bay National Estuarine Research Reserve on the impacts of airboat and personal watercraft use on refuge resources. Conduct a fire effects study.	Monitor impacts of public use on listed species. Conduct cooperative study with the Rookery Bay National Estuarine Research Reserve on the impacts of airboat and personal watercraft use on refuge resources.
Protection of Archaeological Resources	Limited protection, education, and investigation of cultural resources.	Protect refuge archaeological resources. Develop a cultural resources interpretation and education program. Promote additional investigations of refuge cultural resources.	Protect refuge archaeological resources to some extent. Develop a cultural resources interpretation and education program.
Lack of Funding	Focus on listed species issues.	Provide enhanced biological and habitat monitoring program. Develop public use and environmental education programs. Increase coordination with off-refuge land managers.	Develop public use and environmental education programs.

Affected Environment

Osprey
Photo by Larry W. Richardson

The refuge provides habitat for a wide range of invertebrates, fishes, amphibians, reptiles, birds, and mammals. The refuge and the adjacent Ten Thousand Island areas provide important habitat for several notable threatened and endangered species, including the Atlantic loggerhead, green, Kemp's ridley, and Hawksbill sea turtles, American crocodile, wood stork, bald eagle, piping plover, and West Indian manatee. Roughly 198 species of fish and more than 189 species of birds use the refuge. The refuge also plays an important role in the restoration of the South Florida Ecosystem. Lands and waters of the ecosystem have been critically altered due to environmental and economic impacts of urbanization, agriculture, and other human activities. Also important are the recreational uses of the refuge. The public uses the mangrove ecosystem and greater area of the refuge in a variety of pursuits, including sportfishing, birdwatching, camping, boating, and enjoying the aesthetics of the area.

Climate

The subtropical/tropical climate with strong marine influence from the Gulf of Mexico is responsible for many of the refuge's features. It is warm enough to permit year-round growth of many forms of plant life and wet enough to replenish areas of standing water during the rainy season. More than 75 percent of the rain normally falls during the 6-month wet season of May through October. Rainfall averages 55 inches per year, but has ranged from 35 to 80 inches. During the summer rainy season, shallow depressions fill with water and because of the poor drainage, most of the water remains standing until it evaporates or slowly drains. Thus, as much as 90 percent of the area is inundated to depths ranging from a few inches to more than 3 feet at the height of the rainy season. During the winter drydown, water is concentrated in depressions formed by low spots in the bedrock or the deepest parts of the strands. Temperatures occasionally fall below freezing in winter and rise above 90°F during the summer with an average annual temperature of about 73°F.

The effects of global warming are likely to impact this coastal refuge. Indications are that sea levels are rising on the order of 1-2 mm per year. Global warming raises the sea level by releasing water contained in ice caps and glaciers, and by heating the sea water which, in turn, increases the water volume by reducing its density. Ultimately, a rise in sea level would alter the habitats of the refuge by increasing salinity in freshwater and brackish wetlands. This would also impact the species that depend upon those habitats.

Air Quality

With the exception of smoke and particulate matter from infrequent prescribed burns for habitat management, the air quality of the refuge is generally good, however, relatively unknown. Partnerships will be sought with U.S. Geological Survey, Environmental Protection Agency, South Florida Water Management District, and National Oceanic and Atmospheric Administration to provide some level of analysis to help determine potential sources of nitrogen, phosphorus, atrazine and other elements that may be delivered to the system through airborne resources. The refuge, situated in a rural area, is generally not affected by air pollution.

Water Resources

The refuge lies within the southwestern portion of the Big Cypress Watershed that is important to both man and the environment. The Corkscrew Regional Ecosystem Watershed and the Okaloacoochee Slough form the two northern origins of the watershed. Waters from these wetlands flow through the refuge and south through the Fakahatchee and Picayune Strands into the Ten Thousand Islands area. These wetlands provide flood protection to the urban and agricultural areas of southwest Florida by filling up and holding water from the major rainfall events that frequently occur in south Florida. These wetlands also filter and cleanse these waters before they enter the aquifer and storage reservoirs that are tapped for drinking water. In addition, the Big Cypress Watershed provides habitat for a diverse system of plants and animals unique to Florida and the United States. Most of the remaining Florida panthers, Big Cypress fox squirrels, and Everglades minks can only be found in this system. Subtropical palms, orchids, and other plants, as well as large expanses of cypress and sawgrass prairies, describe this area that can be found nowhere else in the United States.

Bottlenose dolphin
Photo by Larry W. Richardson

The refuge receives its freshwater inflow from the Big Cypress Watershed, which contains approximately 1,009,925 acres. Natural drainage patterns in Collier County, within this watershed, have been significantly altered by the construction of canal systems designed to lower annual peak water levels during the rainy season to prevent flooding. The system includes the Golden Gate Estates and Henderson Creek canals and Faka Union and borrow canals used for the construction of U.S. 41, Interstate 75, and State Road 92.

The refuge is characterized as an estuarine system which is defined as a coastal body of water with a measurable freshwater inflow. The southern one-third consists of mangrove islands situated in the saline waters of the Gulf of Mexico. The northern one-third is made up of marshes that predominately contain fresh water. The middle one-third is the area of greatest mixing of salt and fresh water. The salinity gradient depends upon tide, freshwater inflow, and other meteorological events.

The Ten Thousand Islands estuarine ecosystem contains bays, interconnected tidal embayments, lagoons, and tidal streams. The estuary has a mean depth of 3 meters. Salinities, affected by tidal and freshwater inflow, range from 18.5 o/oo to 39.4 o/oo with the lower values occurring during the wet season from May through October. Highest values occur during the dry (winter) season and can exceed those of the open Gulf (35-36 o/oo). The estuary has a mixed semi-diurnal tide. Tidal range averages 0.6 meters with higher and lower extremes during periods of spring tides.

Geology and Soils

The Ten Thousand Islands area is a combined result of Floridian geology and oceanology. The Miocene Tamiami Limestone formation underlies all of Collier County, including the Ten Thousand Islands National Wildlife Refuge. Lying on this limestone is the Pleistocene Anastasia Formation, a combination of subaerially lithified sands and shell hash. Pamlico sands, deposited during sea level transgressions in the late Pleistocene, are mixed with decaying organic material and mangrove peats to form the mixtures of soils found in the refuge. The two most abundant soils, peat and peaty-sand, are associated with the mangrove swamps and saltmarshes, respectively. Both soils have poor drainage capabilities.

Quartz sand and shell hash, produced by erosion of marine and subaerial limestones to the north and subsequently carried southward into the refuge by longshore currents, have been deposited on some of the refuge's coastal islands. Round, Panther, Hog and Coon Keys have beach areas as a result of this process.

Another unique upland feature of the refuge and the region is shell mounds. These are mostly kitchen middens and refuse sites used by the aboriginal Calusa Indians. They often form prominent topographical features above the low-lying contiguous tidelands. Dismal Key is such a formation and, at an elevation of 13 feet, is the highest point on the refuge.

Vegetative Habitats and Habitat Management

The Service and others are concerned for the refuge's long-term environmental health and wildlife productivity. Nationwide studies have documented declines in numerous grassland- and wetland-dependent wildlife populations, most of which have been attributed to habitat loss and alteration. Adjoining land uses exert influences that alter refuge habitats. It is evident that the long-term biological health of the refuge is highly dependent upon the ecological health of habitats within the watershed.

Blue-winged teal
Photo by Larry W. Richardson

The refuge is located within the West Indian Biogeographic Region and represents a nearly pristine mangrove estuary system. The refuge is part of the larger Ten Thousand Islands system, one of the largest mangrove-forested regions in the New World. Pine/Cabbage Palm/Oak, Freshwater Marsh, Saltwater Marsh, Mangrove Forest, Submerged Vegetated Bottom, Submerged Non-vegetated Bottom, Coastal Strand, Coastal Hammock, and Open Water are the nine habitats that occur on the refuge. The three dominant habitats are Freshwater Marsh,

Roseate spoonbill
USFWS Photo

Saltwater Marsh, and Mangrove.

Descriptions of the habitats are as follows:

Pine/Cabbage Palm/Oak

This habitat consists of southern slash pine and scattered mixed hardwoods including live and laurel oaks, red maple, red bay, cabbage palm, and a variably dense understory of saw palmetto, wax myrtle, and numerous other shrubs. Mesic and hydric pine flatwoods occur in the refuge. Hydric pine flatwoods are dominated by slash pine with an understory of wetland plants. Hydric pine flatwoods are distinct from mesic pine flatwoods by the absence of an understory of saw palmetto and other species that are more xeric in nature. Hydric pine flatwoods have the highest plant species diversity of any habitat in south Florida. Scattered islands of this dryer habitat are found within the northern one-third of the refuge.

Freshwater Marsh

This is the dominant habitat type within the northern one-third of the refuge. The predominant plants in this type are bulrushes, cattails, assorted grasses and sedges, and submerged wigeon grass. The freshwater marsh often intergrades into the salt marsh with little noticeable transition.

This transitional marsh area is often characterized by small ponds, prairies, creeks, rock outcrops, and advancing white and red mangrove saplings. Within the northern marsh area, palms and palmettos grow on slightly higher elevations. Some of the marshes up to U.S. 41 are affected to some extent by brackish water during extreme high tides. Near U.S. 41, fresher conditions exist, especially during periods of heavy rain and rapid runoff from the Big Cypress Swamp. Vegetation in this transitional area consists of saltgrass, cordgrass, switchgrass, and needlegrass with black rushes, broomsedge, cattails, waterlily, and ferns.

Saltwater Marsh

This marsh is found between the freshwater marsh and the mangrove forest habitat types. Although it may not have a direct tidal connection, it invariably contains brackish water and is periodically inundated at the higher spring tides and during storm events. The predominant plants are cordgrasses, black needle rush, and saltgrass. Salt marshes are among the most productive systems for organic matter in any estuary and support large numbers of vertebrate and invertebrate species. These wetlands are also important feeding areas for many resident and migratory wading birds, waterfowl, raptors, and mammals.

Mangrove Forest

Mangrove forest is the dominant habitat type within the intertidal zone on the southern half of the refuge. Red, black, and white mangrove species occur within this type, as does buttonwood, a mangrove associate species, which is often grouped with this forest assemblage. Red mangroves comprise the dominant vegetation on most of the islands, particularly on the fringe along the bays and tidal creeks. Black and white mangroves comprise mixed forests on island interiors and in the tidally flushed basins located more landward. Buttonwood is common on beach strands of outer islands and on natural and man-made levee ridges about the mainland margins. The understory in some areas contain saltmarsh species such as glasswort and saltwort, while ferns form a ground cover in more interior areas. Conditions that limit the distribution of mangroves include climate, salinity, tidal fluctuation, substrate, and available nutrients. Nearly all of the mangrove forests on the refuge are second growth, ranging from 30 to 100 years old. This is a result of destructive hurricanes in 1918 and 1960, which caused extensive deforestation along the southwest Florida coast. In 1992, Hurricane Andrew caused scattered blowdowns and topped

Red-breasted merganser on the edge of mangrove shoreline
Photo by Larry W. Richardson

crowns of inferior trees throughout the refuge.

There are a few areas within the mangrove zone that are high enough to support upland vegetation. Dismal Key, for example, is an old shell mound which supports subtropical hammock species such as gumbo limbo and white stopper. Some of the outer islands have sand dunes high enough to be invaded by railroad vine, prickly pear cactus, and spider lily. Australian pine is a common invasive exotic species on these islands.

The mangrove forests of the refuge are of significant value to the estuarine system. Leaves from the mangroves are constant sources of detritus for small organisms. The complex branching prop roots of the red mangrove support a large number of animals and epiphytic plants. The root structures capture and stabilize sediments and retard erosion. Mangroves cleanse inflowing water and aid in nutrient cycling. They function as the primary producer in the food chain and therefore serve as the base for productivity and life within this ecosystem. The mangrove canopy and root tangle also serve as protected habitat for nursery-stage fish, crustaceans, and shellfish. Red mangrove islands within the bay provide important habitat for nesting and roosting colonial water birds.

Submerged Vegetated Bottom

Seagrasses associated with open water areas are not extensive on the refuge, but occur in certain areas. The dominant species include cuban shoal grass, manatee grass, snook grass, and turtle grass. These grasses are submerged flowering plants which stabilize sediments, entrap silt, recycle nutrients, provide shelter, habitat, and substrate for animals and other plant forms, provide important nursery grounds, and are important direct food sources. They are important not only for their productivity but also for the important animal life associated with the community. These beds serve as food sources for the endangered manatee, important nursery areas for juvenile forms of shellfish, and as substrate for many algal species fed on by invertebrates, which are in turn eaten by fishes. Many commercially important fishes spend at least a portion of their lives in these grassbeds.

Submerged Non-vegetated Bottom

This habitat is also associated with open water areas and is comprised primarily of marl or soft mud (very fine sand and silt/clay), with occasional oyster bars and sandbars which are not stabilized by vegetation. The non-vegetated bottom is more extensive on the refuge than the vegetated bottom. This bottom provides habitat for various benthic invertebrates including polychaetes, assorted crustaceans, and mollusks. Live bottom reefs of oysters or other mollusks are scattered throughout the refuge. When exposed at low tides, these areas are commonly called “tidal flats”and are used extensively by shore and wading birds as feeding and loafing areas.

Loggerhead sea-turtle nesting in coastal strand habitat
Photo by Larry W. Richardson

Coastal Strand

These include the high energy coastal barrier islands that are exposed to moderate and high energy wave action, and sediment transport via littoral currents. Coastal strand communities are highly adapted to harsh environments of high temperature extremes, porous coastal sands, salt spray, and abrasive aeolian sand. Sea oat, sea rocket, and railroad vine are typical pioneer plants on the beaches and foredunes. Endangered sea turtles nest within these systems during the summer months.

Coastal Hammock

This habitat occurs within the scattered shell mounds of the mangrove forests and marsh habitats. This assemblage is dominated by stoppers, gumbo limbo, oaks, bay trees, cabbage palms, and sea grape. Depending upon the location, the understory contains a variety of lesser hardwood species and ferns. Some areas have been invaded by exotic plants such as Brazilian pepper, Australian pine, and lather leaf.

Open Water

Numerous open water bays exist on the refuge. Commonly called "deep water habitat," these areas provide a safe haven for larger fishes and marine mammals when the tide is low. Seagrasses grow in areas where sufficient sunlight reaches the bay bottom. The very deepest portion of the subtidal zone is utilized by boaters as a means of ingress and egress. These areas are used extensively by fish and consequently piscivorous birds.

Wildlife Diversity

The Ten Thousand Islands National Wildlife Refuge is known for its diversity and abundance of wildlife. The South Florida Ecosystem is located along one of the primary migratory routes for bird species that breed in temperate North America and winter in the tropics of the Caribbean and South America. A total of 189 breeding and non-breeding bird species have been documented on the refuge and an additional 109 species occur in the vicinity. Forty-five species of reptiles and amphibians, 22 species of mammals, and 198 species of fish are known to occur on the refuge. The following information lists some of the more common species of wildlife found on the refuge.

Land Birds

More than 116 species of neotropical migrants have been recorded in the South Florida Ecosystem. Both resident and migratory land birds utilize refuge habitats. The refuge is home to at least 30 resident species with the red-bellied woodpecker, white-eyed vireo, fish crow, Carolina wren, common yellowthroat, and red-winged blackbird being most common. The white-crowned pigeon, mangrove cuckoo, gray kingbird, and black-whiskered vireo have limited breeding distributions in North America and all are found on the refuge. Migratory species comprise the majority of land birds that frequent the refuge. Common migrants that winter on the refuge include the belted kingfisher, tree swallow, blue-gray gnatcatcher, American robin, yellow-rumped warbler, and palm warbler.

Wintering broad-winged hawk
Photo by Larry W. Richardson

Waterfowl

Waterfowl use is mainly in the ponded areas just north of the mangrove forest. However, waterfowl also use the inland bay system where stands of widgeon grass occur after periods of increased freshwater flow. Waterfowl wintering in the area include blue-winged teal, northern pintail, green-winged teal, ring-necked duck, lesser scaup, hooded merganser, and red-breasted merganser. Mottled ducks can be found on the refuge throughout the year.

Marsh and Water Birds

Although only one colonial water bird rookery is known to occur on the refuge, the shallow waters are used extensively for feeding. All species of Florida herons, the great, snowy, reddish, and cattle egrets, as well as the white ibis, roseate spoonbill, and wood stork use the area. Other fish eating birds use the offshore areas and range into the island bays. These include the brown pelican, double-crested cormorant, and various gulls and terns. Shorebirds, such as the black-bellied plover, sanderling, willet, spotted sandpiper, and ruddy turnstone, utilize beach areas and tidal flats for feeding and roosting, especially during spring and fall migration and the winter months.

Raptors

The osprey, swallow-tailed kite, bald eagle, and red-shouldered hawk are the most common raptors frequenting the refuge. Peregrine falcons can be found on the refuge during fall, winter, and spring.

Mammals

The most conspicuous mammals observed in the open water areas of the refuge are the West Indian manatee and bottlenose dolphin. Raccoons are common throughout the refuge. No Florida panthers have been observed on the refuge although white-tailed deer, their dominant prey, are occasionally found in the northern portion of the refuge. Black bear use the mangrove forests and northern portions of the refuge.

Fish

The estuarine waters of the Ten Thousand Islands are used by many species of marine animals. More than 198 species of fish occur in the area. Sport fish found include gray snapper, snook, sea trout, redfish, tarpon, and sheepshead.

Reptiles and Amphibians

Nearly all amphibians depend on aquatic habitats for reproduction and overwintering, and many species are specifically adapted and restricted to the aquatic environments. The most commonly encountered frogs are the Florida cricket frog, green treefrog, and Florida leopard frog. Although reptiles are generally less dependent on water, a clear preference to aquatic systems is displayed by many turtles, snakes, and alligators. The American alligator is the largest reptile on the refuge and American crocodiles may have occurred. The southern black racer, mangrove water, and Florida cottonmouth snakes are probably the most abundant on the refuge. The most commonly encountered sea turtles are the loggerhead, green, Kemp's ridley and Hawksbill sea turtles. Loggerhead sea turtles nest on the coastal strand beaches of the outer islands of the refuge.

Short-billed dowitcher on oyster bed
Photo by Larry W. Richardson

Oyster Beds

The oyster community is an important substrate and link in the bay's food web. The rock-like substrate formed by oyster colonies is the only hard substrate found in the open water areas of the refuge. Consequently, "oyster bars" provide an increased habitat diversity within those areas. The oyster's position in the food web is as a secondary consumer, converting zooplankton, detritus, and dissolved organics into animal protein, which is then available to higher levels of consumers through predation. The oysters and associated animals are utilized by other animals which feed on or around the oyster bars. There have been reports of as many as 31 species of invertebrates found on oyster bars in other areas of the Gulf coast.

West Indian manatee
USFWS Photo by Gaylen Rathburn

Threatened and Endangered Species

The high degree of endemism among south Florida's plants, animals, and biotic communities, combined with extensive land conversion and habitat degradation by humans, have imperiled many of the region's species. The South Florida Ecosystem supports 70 federally threatened or endangered species. Seven of these species are known to occur on the refuge including:

- Loggerhead Sea Turtle (Caretta caretta)
- Green Sea Turtle (Chelonia mydas)
- Kemp's Ridley Sea Turtle (Lepidochelys kempii)
- Hawksbill Sea Turtle (Eretmochelys imbricata)
- Wood Stork (Mycteria americana)
- Bald Eagle (Haliaeetus leucocephalus)
- West Indian Manatee (Trichechus manatus)

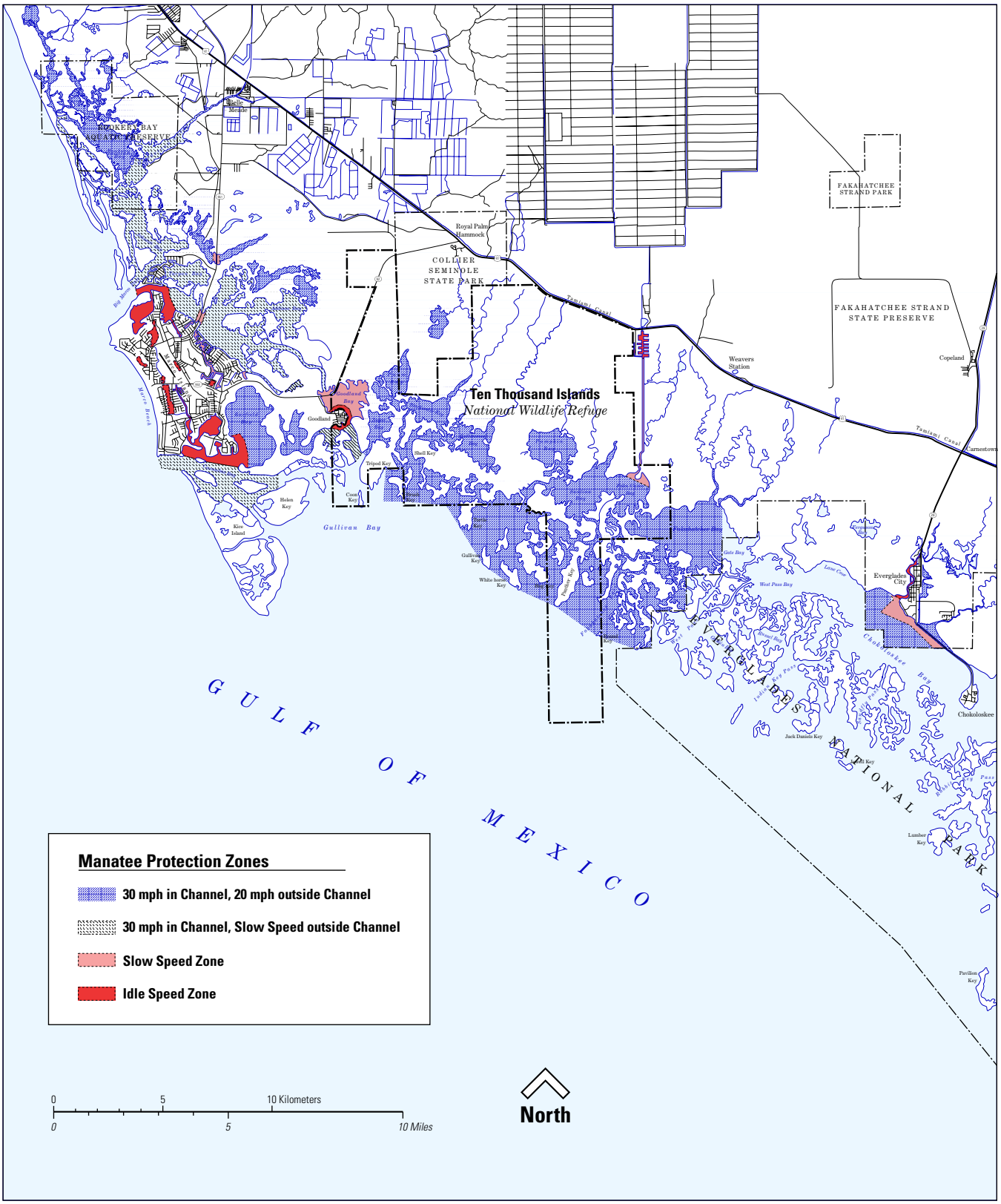
The State of Florida has designated manatee protection zones in Collier County, including areas within the refuge boundary (Fig. 21).

Nine other federally threatened and endangered species are known to occur near the refuge including:

- Leatherback Sea Turtle (Dermochelys coriacea)
- Eastern Indigo Snake (Drymarchon corais couperi)
- American Crocodile (Crocodylus acutus)
- Snail Kite (Rostrhamus sociabilis)
- Piping Plover (Charadrius melodus)
- Red-cockaded Woodpecker (Picoides borealis)
- Florida Scrub Jay (Aphelocoma coerulescens coerulescens)
- Cape Sable Seaside Sparrow (Ammodramus maritimus mirabilis)
- Florida Panther (Puma concolor coryi)

In addition, 4 federal candidate and 34 state listed species also occur on or near the refuge. The Fish and Wildlife Service Multi-Species Recovery Plan for the South Florida Ecosystem describes in detail these species, their habitat components, and the actions needed for recovery.

Figure 21. Manatee Speed Zones



Public Use, Compatibility, and Environmental Education

The refuge headquarters, located in Naples, serves as the contact station for distribution of information and brochures. Environmental education programs are provided to various groups upon request in an "off-refuge" manner. Refuge staff participate in environmental education programs at local schools and other public events.

Present recreational use of the Ten Thousand Islands and adjacent mainland marshes is primarily characterized by fishing, boating, and nature study. Currently, public access to the refuge is limited to Highway 41 and a few boat access ramps. Guides are generally necessary for those unfamiliar with the area.

Cultural Resources

Seventeen archaeological sites are recorded for the refuge. These sites are predominately prehistoric shell middens and date to the Glade 1-3 Periods (ca. 500 B.C. - 1500 A.D.). The sites are often extensive shell works and ridges made of oyster, clam, conch, and scallop and yield a variety of ceramics, shell and bone tools, animal bones, and plant remains. Historic sites, such as fishing shacks and small farmsteads, often overlay the prehistoric shell middens. The fishing shacks served as temporary shelters for the area's fishermen and watermen. In the late 19th-early 20th centuries, a number of individuals cleared large areas on these mounds for small farmsteads and grew vegetables as well as pineapples, citrus and mangoes for the Key West market.

The Calusa or a related group inhabited the area in the 17th century, and were present when the Spaniards explored the area. Of more current significance to the refuge are the Seminole and Miccosukee Indians, who currently live in the area and in Oklahoma. These tribes are believed to be remnants of Creek groups living in southern Georgia, southeast Alabama and northern Florida during the 18th century. The earlier indigenous aboriginal population declined rapidly shortly after European contact and left a void which Seminole and Miccosukee Bands filled. Although the Seminoles and Miccosukees may have utilized the refuge in the 19th and early 20th centuries, no sites or camps have been found or reported on the refuge which can be attributed to either group. Much of the coastal zone, including the Ten Thousand Islands, was settled by American fishermen, farmers, timbermen, and real estate developers. Pressures exerted by these individuals and the U.S. military restricted Seminole and Miccosukee Bands to the interior of the Florida peninsula.

Socioeconomic Environment

Collier County is located on the southern Gulf coast of the Florida peninsula due west of the Miami-Ft. Lauderdale area. Modern-day settlement of the county evolved in isolated pockets during the 1870s while the region was still a part of St. Johns County. Monroe County, including present day Collier County, was created in a division of St. Johns County in 1883. In 1887, it became part of Lee County and remained such for 36 years until May 8, 1923, when Collier County was established. The county contains approximately 2,025.45 square miles of land area, and is one of the largest counties east of the Mississippi River, being larger than the States of Rhode Island and Delaware. Naples, located in the western coastal area of Collier County, is the largest incorporated city and serves as the county seat. Everglades City lies south and east of Naples. With the exception of Naples and Immokalee, the communities are widely scattered in sparsely populated pockets along the coast and interior. Only the extensive development of Marco Island and Naples in recent years has altered the established pattern of growth, which has evolved in the rural and island settlements over the last century and a half.

Photo by Larry W. Richardson

However, this rural lifestyle continues to change as the region experiences astounding urban growth, and more communities expand and others develop to meet the needs of an increased residential and tourist population. Rapid growth and lack of environmental safeguards prior to 1970, resulted in the loss or significant alteration of many acres of productive wetlands and upland habitats from dredging, drainage, and fire. This loss preceded the major growth era, with unmanaged growth further effecting water quality, water storage capacity, and the diversity and abundance of wildlife in the county. While there were only 16,000 people living in the county in 1960, the population is expected to increase to nearly 350,000 by the year 2020 (Enterprise Florida, Inc.), with a current annual growth rate of 68.60 percent (compared to a state growth rate of only 27.95 percent). Collectively, the entire southwest Florida region is, and will continue to be, one of the fastest growing regions in the United States.

The shallow estuaries of the refuge are excellent fishing grounds for sport and commercial fishermen. Sixteen species of commercially harvested species of fish and shellfish reside in the estuarine system or depend upon estuaries for a critical portion of their life cycles. Commercial harvested catches of these species have averaged more than four million pounds per year, mullet being the principal commercial fish. Snook, mangrove snapper, redfish, and spotted seatrout are sought after for sport fishing.

For business owners and employees alike, Collier County offers an opportunity without comparison. Clean air, subtropical climate, and diverse recreational opportunities make Collier County extremely desirable to tourists, retirees, and year-round residents. For residents and tourists, the relatively unspoiled southwest Florida coast offers a myriad of living and recreational opportunities. The extensive natural resources of the county have been widely advertised and marketed resulting in phenomenal growth, especially along the coast. Unfortunately, the very growth and development which makes southwest Florida such an alluring place for so many also threatens the natural habitat mosaic of the region. Special, coordinated efforts from all stakeholders involved with south Florida issues will be necessary to not only preserve the quality of the national environment in the region, but the quality of life for southwest Florida residents and visitors as well.

Environmental Consequences

Consequences Common to all Alternatives

The effects will not have a significant impact on the human environment. The actions will not have a significant effect on public health and safety. Alternatives A and B will not affect the unique characteristics, geographic area or ecologically critical areas, however, Alternative C may have an adverse impact on the use of the refuge by endangered sea turtles, manatees, and other wildlife. Alternative C could generate substantial controversy on a national level, however, Alternatives A and B would not. The actions specified in all alternatives are not unique, uncertain, or unknown. The actions are based on methods found successful in similar habitats and geographic areas or follow accepted research protocol to determine the best course of action. The actions do not set a precedent for future actions with significant effects nor do they represent a decision in principle about a future consideration. The cumulative impacts have been analyzed and based on similar activities, past actions, and foreseeable future actions, Alternatives A and B would not offer cumulatively significant impacts to the environment. None of the alternatives will significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, or impact other cultural or historic resources. Actions listed in Alternatives A and B are not likely to adversely affect threatened or endangered species, or their habitats. Alternative C actions may adversely affect the endangered sea turtles and manatees. Actions of the alternatives will not lead to a violation of federal, state, or local laws imposed for the protection of the environment. Those actions requiring federal, state, or county review will undergo standard review processes and if adverse effects are noted, they will be mitigated or deleted.

The following discussion assesses the environmental impacts associated with the approval and implementation of the Comprehensive Conservation Plan for Ten Thousand Islands National Wildlife Refuge. Each alternative is discussed separately. The topics identified in the Affected Environment section, as well as some of the issues identified in the planning process for the Comprehensive Conservation Plan, are discussed below and summarized in Figure 20.[1]

Alternative A: No Action

Climate

This alternative would have no effect on the climate. However, there would be limited opportunity to study the effect of climatic changes on the refuge (i.e., global warming) as there would be no direction to do so.

Air Quality

Some short-term impacts may occur as a result of limited prescribed burning to protect listed species. Burning may be required for habitat improvement or to reduce the invasion of exotic plants. Although burning may cause a temporary degradation of local air quality, the area is sparsely populated and, therefore, would have little effect on human environment. No long-term or adverse effects to air quality would occur.[2]

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[1] This section of the EA concerns only the implications of broad management framework changes, and not specific refuge management strategies set out in the CCP. Specific plan goals, objectives, and strategies listed in the CCP may be subject to additional NEPA compliance prior to implementation. Because of the broad perspective of this EA, the analysis did not lend itself to quantitative measures. The analysis attempts to narratively describe anticipated measures of change with regard to the issues based upon the alternative management framework discussed.

[2] Public Law 101-549, 104 Stat. L399 (codified as amended as 42 U.S.C. A. Sections 7401 to 7671q). Certain large national parks, national wildlife refuges, and designated wilderness areas are considered "Class 1" areas under the Clean Air Act. (CFR, Title 40, Part 81.400. The Service's policy is to ensure that the quality of air and water discharged from refuge activities and facilities is in compliance with applicable federal laws, regulations, and orders. [5 RM 11.1: Pollution Abatement, Section B] In addition, the policy requires refuges to implement management actions that will protect refuges from pollution sources outside the refuge. Other guidance includes: "The Clean Air Act: Its Relation to Fish and Wildlife Resources," USFWS, OBS76/20.8. 1977; and "Procedures for Refuge Compliance with the 1977 Clean Air Act Amendments."

Water Resources

Under the No Action Alternative, the quantity and quality of water would be negatively impacted over the long run. Currently, the refuge has no water management guidelines to aid in setting management objectives. Also, this alternative would not provide direction for the refuge to actively develop partnerships and cooperative agreements with other jurisdictions and private landowners in developing strategies to protect the water resources in the Big Cypress Watershed. Cape Romano-Ten Thousand Islands and Rookery Bay Aquatic Preserves, managed by the Florida Department of Environmental Protection, overlay much of the refuge's submerged lands. Under this alternative, a cooperative agreement would be actively pursued with the State to manage these submerged lands. The proposed South Golden Gate Estates Hydrologic Restoration Plan would likely have a major impact on refuge waters. The Service would not be able to actively pursue and participate in the planning of this project to ensure that the resources of the refuge are not compromised. Additionally, no measures to protect the watershed from development activities would occur. Therefore, agricultural and residential development around the refuge would continue to be a threat that could seriously impact water quality.

Geology and Soils

This alternative would have no effect on the geology of the refuge. However, the surface and subsurface soils could be subjected to accelerated soil loss. Without restoration of natural water flows and fire regimes, elimination of invasive exotic plants, and seagrass and mangrove protection, the soils of the refuge could continue to be degraded. Monitoring and management of refuge soils to prevent further degradation would not occur under this alternative.

Wood storks with Great egrets
USFWS Photo

Vegetative Habitats and Habitat Management

Under the No Action Alternative, encroachment of invasive exotic vegetation would continue to reduce native plant communities. Seagrass and mangrove forest habitats could decline due to water quality and quantity, and soil impacts.

Habitat management would focus on threatened and endangered species that are known to utilize the refuge. Marine seagrass and mangrove forest habitats would probably decline or remain at current levels, which is lower than historic levels. Prescribed burning would not be implemented as a management tool to enhance waterfowl habitat in wetlands. The refuge would continue to provide habitat for land birds and other wildlife, but would sustain population levels considerably below their historic levels. If oil and gas exploration were to occur, there may be some loss of mangrove and other wetland habitats to exploration activities. Oil and gas wells on the refuge will always present the threat of a contaminant spill.

Wildlife Diversity

Manatees and sea turtles would remain the primary focus and, presumably, their populations would increase due to active management practices. Impacts to manatees from watercraft-related mortality may increase since there is a positive correlation between boat numbers and water-related manatee mortality. Biological diversity would not be restored from the effect of lost historical habitat that has occurred, and continues to occur, on the landscape. For example, native plant communities would continue to be lost to encroaching invasive exotic plants, and seagrasses and mangrove forests would continue to be lost due to lack of understanding as to their function and relationship within the ecosystem.

Opportunities to improve habitat, wildlife, and biological diversity on non-refuge lands would be missed as there would be no strategies developed to coordinate with other jurisdictions and private landowners, except as they relate to threatened and endangered species that occur on the refuge.

Threatened and Endangered Species

Certain species of concern would benefit under this alternative. Most projects would revolve around the protection and enhancement of the Atlantic loggerhead turtle, Atlantic green turtle, Kemp's ridley turtle, Hawksbill turtle, and West Indian manatee populations and habitats.

Because management emphasis would primarily focus on sea turtles and manatees, opportunities to achieve cumulative enhancement of biological diversity and manage threatened and endangered species would be missed. Populations of listed species, including the American alligator, wood stork, swallow-tailed kite, bald eagle, and other species that may occur on the refuge, would probably remain at current levels due to management's focus on manatees and sea turtles.

Manatee
Photo by P.W. Sykes

In addition, there would be no strategies developed to work cooperatively with landowners in the surrounding areas to affect sustainable resource management. Management practices on private lands have a significant effect on the overall health of the watershed. If unsound land and water use practices are employed, threatened and endangered species on the refuge could be impacted.

Public Use, Compatibility, and Environmental Education

Under the No Action Alternative, the public use and environmental education programs would continue to be operated in their current state. Public use would be allowed and determined to be compatible with the purposes for which the refuge was established. The use of personal watercraft and airboats would be compatible on submerged lands within the refuge, since there would be no study conducted to determine otherwise. Airboats, swamp buggies, and other off-road vehicles would be incompatible in the shallow freshwater marshes on the refuge south of U.S. 41.

This alternative would result in limited environmental and public education opportunities. Educational programs would be given upon request, but no formal outreach would be employed. The office headquarters would continue to serve as the visitor contact station. However, no effort would be made to enhance the existing educational materials or displays, or to develop interpretive trails.

Under this alternative, management opportunities to prevent sea turtle egg poaching and bird harassment would be lost, as well as the ability to enforce boating speed zones to reduce manatee strikes. If these actions continued to degrade the refuge's ecosystem, public use could be determined to be incompatible with the purpose for which the refuge was established and, therefore, all public uses could be prohibited.

Cultural Resources

Under this alternative, the current program does not provide for the implementation of specific cultural resource protection strategies. The lack of a clear direction on how to handle cultural resource issues could have a negative impact on the cultural resource sites of the refuge.

Socioeconomic Environment

This alternative would not provide for increased revenues to the local economy because public and commercial uses would remain at current levels, or be eliminated if impacts to the refuge were determined to be incompatible with the purposes for which the refuge was established. Commercial and sport fishing activities would likely continue at current or increased levels in the short term. However, the quantity and quality of catches are likely to diminish over time due to lack of coordination to restore damaged habitats, lack of harvest data on which to base management decisions, and unregulated uses that are not enforced. Management would be unable to substantially improve local awareness of the refuge and its mission due to the minimal public outreach program. Consequently, the public would not be as well informed on the plight of threatened and endangered species.

Red winged blackbird
photo by Larry W. Richardson

Alternative B: Ecosystem Approach

Climate

This alternative would have no effect on the climate. However, there would be opportunities to study the effect of climatic changes on the refuge (i.e., global warming).

Air Quality

Some short-term impacts are likely to occur due to the implementation of prescribed burning that this alternative advocates. Burning is required for habitat improvement in marsh habitats and to reduce the invasion of exotic plants. Although burning may cause a temporary degradation of local air quality, the area is sparsely populated and, therefore, would have little effect on the human environment. No long-term or adverse effects on air quality would occur.[3]

Water Resources

Under the Ecosystem Approach, water quantity and quality on the refuge would be further protected and enhanced. Strategies would be developed to ensure sound use of off-refuge surface and ground water by developing partnerships and cooperative agreements with other jurisdictions and private landowners to protect the water resources in the Big Cypress Watershed. Cape Romano-Ten Thousand Islands and Rookery Bay Aquatic Preserves, managed by the Florida Department of Environmental Protection, overlay much of the refuge's submerged lands. A cooperative agreement between the Service and the State of Florida would be actively pursued for the management of these submerged lands. The proposed South Golden Gate Estates Hydrologic Restoration Plan would likely have a major impact on refuge waters. The Service would actively pursue and participate in the planning of this project to ensure that the resources of the refuge are not compromised.

Geology and Soils

This alternative would have no effect on the geology of the refuge while protecting and enhancing soils by restoring natural water flows and fire regimes, controlling invasive exotic plants, and protecting seagrass and mangrove habitats. Control methods used to remove invasive exotic vegetation could negatively impact refuge soils in the short term by causing erosion, but restoring these areas to native habitats should ultimately prevent soil loss. Since fire historically played an important role in maintaining native habitats, prescribed burns should restore and/or maintain soils in their natural condition. The only proposed development on the refuge is along the oil pad road. This development, along with the expected increase in recreational use along the road, should have minimal, if any, impact on refuge soils. Refuge soils would routinely be monitored for degradation under this alternative.

[3]Ibid., pp. 57.

Vegetative Habitats and Habitat Management

Under this alternative, habitat management would be conducted that results in more natural habitats which, in turn, would increase the overall health and biological diversity on the refuge. Subtropical palms, orchids, and other plants, as well as large expanses of mangrove and aquatic habitats, would continue to be managed and protected. Habitat management practices would be employed to restore various upland and wetland habitats by controlling invasive exotics and restoring natural water flow and fire regimes. These practices would not only benefit sea turtle nesting habitat and manatee foraging areas, but would also benefit fish, amphibians, reptiles, waterfowl and mammals. Protection and enhancement of mangrove forests and seagrass beds would provide increased cover and forage base for wildlife and increase nursery beds for marine species, which would increase commercial and sport fish resources.

Additionally, partnerships with agencies and private landowners that affect sound use of the watershed would be implemented. This would help to ensure balanced water flows and improved water quality for both freshwater and saltwater habitats. Oil and gas plans would receive careful review. If mineral rights are acquired, the threat of habitat loss and contamination would be eliminated.

Wildlife Diversity

The ecosystem approach is designed to restore fish and wildlife populations, resulting in overall increased diversity. This approach would provide an opportunity for maximizing land and habitat protection for the benefit of native wildlife populations. Management practices would restore historical habitat characteristics in order to improve wildlife diversity. Strategies would be developed in conjunction with adjacent landowners to preserve and enhance the natural habitats of both land and water to support diverse, flourishing communities of plant and animal species. Water and vegetation enhancement measures, including invasive exotic plant control, restoration of seagrass beds, water flow, fire regimes, and protection of mangrove forests, would enhance species richness as well. Likewise, the diversity and abundance of commercial and sport fish species should increase as would populations of colonial nesting birds.

Bald eagle
Photo by Larry W. Richardson

Threatened and Endangered Species

All federal and state listed species would benefit under this alternative. There are currently 23 federally threatened, endangered, and candidate species, and an additional 33 state listed species found on or near the refuge. Management practices would focus on the recovery and enhancement of these species, with major emphasis on those commonly found on the refuge such as the Atlantic loggerhead turtle, Atlantic green turtle, Kemp's ridley turtle, Hawksbill turtle, wood stork, bald eagle, and West Indian manatee.

Management strategies to aid in the recovery of these species would include cooperating with other agencies and landowners, managing existing habitats and populations, determining biological requirements of listed species, protecting historic habitat, and developing information and education programs. Specific practices may include removing exotic plants and animals from sea turtle nesting beaches, improving foraging habitat for the wood stork and manatee, constructing nest platforms for the bald eagle, investigating prescribed burning alternatives to improve habitat for the Florida grasshopper and Cape Sable seaside sparrow, and coordinating interagency crocodile and manatee surveys.

The public will directly benefit from the proactive nature of the ecosystem approach. Under this alternative, management practices would be initiated before a species reaches critically low population levels since population

and habitat monitoring will be conducted for a wide variety of species on the refuge. This approach is less disruptive to those who depend on refuge resources for commercial and recreational use.

Public Use, Compatibility, and Environmental Education

Under this alternative, future waterfowl hunting, camping, boating, wildlife observation, and commercial and sport fishing would be allowed. These activities are compatible with the purposes of the refuge, and with appropriate controls in place, the above activities are not anticipated to have serious impacts on refuge resources. A permit system would be implemented to allow the refuge to monitor changes in visitation and commercial activity so that preventive action could be taken if these uses cause negative impacts. In addition, an increased law enforcement presence would minimize illegal activity, thus protecting legitimate uses. Since the refuge was established, in part, to provide habitat for threatened and endangered species, expansion of these activities would depend on the population status of, and impacts to, these species.

The construction of an office in Goodland containing interpretive displays, enhancement of multi-agency visitor center displays, and development of short interpretive trails, placed near parking and boat ramp areas, would not adversely affect refuge habitats or species associated with them. Further, it would greatly promote awareness of the plight of listed species, as well as educate visitors about refuge programs.

In addition, opportunities for environmental education would be promoted off refuge. Outreach to children and other segments of the population would be developed by designing environmental programs tailored to fit the needs of local schools from elementary to high school levels and by giving presentations at local community events and to various interest groups.

King rail
Photo by Larry W. Richardson

Continuation of public access to the refuge is an integral part of the overall management plan. However, review of the management needs and potential problems indicates motorized boat traffic is the source of many adverse impacts to the natural system. These impacts are not currently a threat to the overall health of the refuge, but the cumulative impact of increased motorized boat traffic is a basis of concern.

Presently, two types of access modes (airboats and personal watercraft) occur infrequently on the refuge. However, these uses are expected to grow with Collier County's predicted increase in population. Both of these access modes are characteristically loud, fast, and capable of cruising in extremely shallow water. In consultation with the State of Florida, airboat and personal watercraft use would be allowed in submerged lands of the refuge subject to completion of a study to determine their compatibility. Due to the adverse effects on wildlife, vegetation, and the aesthetics of the refuge experience, off road vehicles including airboats, swamp buggies, and personal watercraft would not be allowed in the northern marshes of the refuge.

Cultural Resources

Implementation of the Ecosystem Approach would result in compliance with all Service and other applicable federal and state laws to provide the fullest protection possible to the cultural resources on the refuge. It would ensure that all appropriate measures are taken to protect the resources. Visitor use and associated effects would be monitored through appropriate public use and law enforcement efforts. New cultural resource sites and objects found on the refuge would be reported immediately to the State Historic Preservation Office to ensure investigation in a timely manner.

Socioeconomic Environment

The adoption of the Ecosystem Approach would be a benefit to the local economy. This alternative provides flexibility in determining compatibility of commercial and recreational uses of the area while ensuring protection of refuge resources in perpetuity. These features should result in more stable commercial resources and increased recreational opportunities thereby benefitting local merchants and commerce in general.

These proposed changes, in combination with the permit system, encourage increases in tourism in a structured and strategic manner. The permit system would allow the refuge to effectively monitor increases and make management adjustments based on visitation levels. The refuge program, in combination with the public use program at Big Cypress National Preserve, Collier Seminole State Park, and Everglades National Park, would provide additional support to the economics of the local community.

Should it occur, the banning of personal watercraft and airboats on the co-managed submerged lands of the refuge is not expected to have a negative effect on the socioeconomic environment of the area.

Little blue heron
Photo by Larry W. Richardson

Alternative C: Maximize Public Use on the Refuge

Climate

This alternative would have no effect on the climate. However, there would be limited opportunity to study the effect of climatic changes on the refuge (i.e., global warming) as the emphasis would be placed on public use impacts.

Air Quality

Some short-term impacts may occur as a result of limited prescribed burning to protect listed species. Burning may be required for habitat improvement or to reduce the invasion of exotic plants. Although burning may cause a temporary degradation of local air quality, the area is sparsely populated and, therefore, would have little effect on human environment. No long-term or adverse effects on air quality would occur.[4]

Water Resources

Under this alternative, the quantity and quality of water would be negatively impacted over the long run. Water management guidelines for the refuge would not be pursued to aid in setting management objectives. This alternative also would not provide direction for the refuge to actively develop partnerships and cooperative agreements with other jurisdictions and private landowners in developing strategies to protect the water resources in the Big Cypress Watershed. Cape Romano-Ten Thousand Islands and Rookery Bay Aquatic Preserves, managed by the Florida Department of Environmental Protection, overlay much of the refuge's submerged lands. Under this alternative, the Service would not actively pursue a cooperative agreement with the State to manage these submerged lands, except as they relate to public use and protection of listed species opportunities. The proposed South Golden Gate Estates Hydrologic Restoration Plan would likely have a major impact on refuge waters. The Service would not be able to actively pursue and participate in the planning of this project to ensure that the resources of the refuge are not compromised. Additionally, no measures to protect the watershed from development activities would occur. Therefore, agricultural and residential development around the refuge would continue to be a threat that could seriously impact water quality.

Geology and Soils

This alternative would have no effect on the geology of the refuge. However, the surface and subsurface soils could be subjected to accelerated soil loss. Without restoration of natural water flows and fire regimes, elimination of invasive exotic plants, and seagrass and mangrove protection, the soils of the refuge would continue to be degraded. Monitoring and management of refuge soils to prevent further degradation would not occur under this alternative, except as they relate to public use activities.

This alternative calls for developing facilities to accommodate increased public use on the refuge. The construction of facilities such as the Goodland visitor center, oil pad road interpretive trail, parking area, and restrooms would have limited impacts on the soils of the refuge.

[4]Ibid., pp. 57.

Vegetative Habitats and Habitat Management

Under this alternative, encroachment of invasive exotic vegetation would continue to reduce native plant communities. Seagrass and mangrove forest habitats could decline due to water quality and quantity, and soil impacts.

Habitat management would focus on public use impacts and threatened and endangered species that are known to utilize the refuge. Marine seagrass and mangrove forest habitats would probably decline or remain at current levels, which is lower than historic levels. Prescribed burning would not be implemented as a management tool to enhance waterfowl habitat in wetlands. The refuge would continue to provide habitat for land birds and other wildlife, but would sustain populations considerably below their historic levels. If oil and gas exploration were to occur, there may be some loss of mangrove and other wetland habitats to exploration activities. Oil and gas wells on the refuge will always present the threat of a contaminant spill.

Wildlife Diversity

Manatees and sea turtles would remain the primary focus and, presumably, manatee and sea turtle populations would increase due to active management practices. Impacts to manatees from watercraft-related mortality may increase since there is a positive correlation between boat numbers and water-related manatee mortality. Biological diversity would not be restored from the effect of lost historical habitat that has occurred, and continues to occur, on the landscape. For example, native plant communities would continue to be lost to encroaching invasive exotic plants, and seagrasses and mangrove forests would continue to be lost due to lack of understanding as to their function and relationship within the ecosystem.

Opportunities to improve habitat, wildlife, and biological diversity on non-refuge lands would be missed as there would be no strategies developed to coordinate with other jurisdictions and private landowners, except as they relate to public use.

Threatened and Endangered Species

USFWS Photo

Certain species of concern would benefit under this alternative. Most projects would revolve around the protection and enhancement of the Atlantic loggerhead turtle, Atlantic green turtle, Kemp's ridley turtle, Hawksbill turtle, and West Indian manatee populations and habitats.

Because management emphasis would primarily focus on sea turtles and manatees, opportunities to achieve cumulative enhancement of biological diversity and manage threatened and endangered species would be missed. Populations of listed species, including the American alligator, wood stork, swallow-tailed kite, bald eagle, and other species that may occur on the refuge, would probably remain at current levels due to management's focus on manatees and sea turtles.

In addition, there would be no strategies developed to work cooperatively with landowners in the surrounding areas to affect sustainable resource management, except as they relate to public use. Management practices on private lands have a significant effect on the overall health of the watershed. If unsound land and water use practices are employed, threatened and endangered species on the refuge could be impacted.

Public Use, Compatibility, and Environmental Education

Under this alternative, commercial and sport fishing, hunting, boating, camping, and wildlife observation would be promoted, and thus be compatible with the purposes of the refuge. Serious impacts to threatened and endangered species that are known to occur on the refuge would be monitored by implementing a permit system. This system would allow the refuge to monitor changes in visitation and commercial activity so that preventive action could be taken if these uses cause negative impacts. Further expansion of these activities would depend on the impacts to threatened and endangered species.

The environmental education program would be actively promoted and developed on and off the refuge. Self-guided trails would be developed with appropriate interpretive material displayed along the way. Tours of the refuge would be given to interested groups. Outreach to children and adults of southwest Florida would be developed by designing environmental programs tailored to fit the needs of local schools and by giving presentations at local community events and to various interest groups. Volunteers would be actively recruited and partnerships with other agencies would be formed to assist with public use and environmental education programs.

Increases in the public use and environmental education programs under this alternative could negatively impact refuge resources. An intense development of facilities to accommodate increased public visitation would be needed, including a significant increase in base funding and staff to effectively manage the public. Building of the facilities could result in disturbances and losses of some habitat types. This alternative would promote public uses increasing the number of visitors to remote locations of the refuge. The refuge would be susceptible to trampling of aquatic, riparian, and other habitats due to increased foot traffic and boating, as well as littering and disturbances to native wildlife. Expansion of the number and kind of uses permitted could create conflicts between user groups, such as commercial fishermen and wildlife observers.

Under this alternative, an increased law enforcement presence would be needed to enforce the additional regulations that come with increased public use. Law enforcement actions would be stepped up considerably to prevent sea turtle poaching and to enforce boating speed zones to reduce manatee strikes. If these actions continued to increase beyond the limits of refuge staff resources, public use could be limited or be determined incompatible with the purpose for which the refuge was established. Therefore, certain public uses may be prohibited.

Management and research on the refuge would focus on public use and the impacts to threatened and endangered species which occur on the refuge. In consultation with the State of Florida, airboat and personal watercraft use would be allowed in refuge submerged lands subject to completion of a study to determine their compatibility. Due to the adverse effects on wildlife, vegetation, and the aesthetics of the refuge experience, off road vehicles including airboats, swamp buggies and personal watercraft would not be allowed in the freshwater marshes of the refuge.

Cultural Resources

This alternative would provide for greater interpretation of historic and archaeological resources on Ten Thousand Islands National Wildlife Refuge for public use and environmental education purposes. Interpretive displays would focus on historic uses. However, other cultural resource sites associated with the refuge would be opened for interpretation as well. This would require the development of additional trails, exhibits, and displays. Increased visitation to these sites could increase vandalism, pot hunting, and casual taking of artifacts. Law enforcement activities would need to be stepped up considerably in order to prevent such violations. Coordination between federal and state archaeologists to further assess the cultural importance of the sites would be sacrificed in favor of promoting interpretive activities.

Socioeconomic Environment

This alternative would have significant short-term beneficial impacts to the socioeconomic environment of the local community, but may have detrimental effects in the long-term. Increased visitation to the refuge would bring increased revenues to the local economy. Commercial uses would be promoted on the refuge including compatible eco-tour operations. Commercial and public blue and stone crab harvesting would be promoted. Netting for mullet, as well as hook and line for other species of fish that occur on a seasonal and less frequent basis, would be promoted as year-round activities. Therefore, charter fishing vendors would increase. Local construction contractors would benefit by the increase in public use and educational facilities. While listed species are not anticipated to be impacted by these activities, the increased public use may degrade other natural resources for which the refuge is known and current users depend.

Should it occur, the banning of personal watercraft and airboats on shallow submerged lands of the refuge is not expected to have a negative effect on the socioeconomic environment of the area.

Figure 22. Summary of Environmental Consequences by Alternative

Environmental Impact Areas	Alternative A *No Action*	Alternative B *Ecosystem Approach*	Alternative C *Maximize Public Use*
Air Quality	Burning may cause a temporary degradation of local air quality. The area is sparsely populated, therefore, this would have little effect on human environment.	Burning as a management tool may cause a temporary degradation of local air quality. The area is sparsely populated, therefore, this would have little effect on the human environment.	Burning as a management tool may cause a temporary degradation of local air quality. The area is sparsely populated, therefore, this would have little effect on human environment.
Water Resources	Quantity and quality of water would be negatively impacted over the long run.	Water quantity and quality on the refuge would be further protected and enhanced. Partnerships and cooperative agreements with other jurisdictions and private landowners would protect the water resources in the Big Cypress Watershed.	Quantity and quality of water would be negatively impacted over the long run.
Geology and Soils	No effect on the geology of the refuge.	No effect on the geology of the refuge, while protecting and enhancing soils by restoring natural water flows and fire regimes, controlling invasive exotic plants, and protecting seagrass and mangrove habitats.	This alternative would have no effect on the geology of the refuge. However, the surface and subsurface soils could be subjected to accelerated soil loss.
Vegetative Habitats and Habitat Management	Encroachment of invasive exotic vegetation would continue to reduce native plant communities.	Habitat management practices would be employed to restore various upland and wetland habitats by controlling invasive exotics and restoring natural water flow and fire regimes.	Encroachment of invasive exotic vegetation would continue to reduce native plant communities.
Wildlife Diversity	Biological diversity would not be restored from the effect of lost historical habitat that has occurred, and continues to occur, on the landscape.	This approach would provide an opportunity for maximizing land and habitat protection for the benefit of native wildlife populations. Management practices would restore historical habitat characteristics in order to improve wildlife diversity.	Manatees and sea turtles would remain the primary focus. Biological diversity would not be restored from the effect of lost historical habitat that has occurred, and continues to occur, on the landscape.
Threatened and Endangered Species	Management would primarily focus on sea turtles and manatees, resulting in a missed opportunity to achieve cumulative enhancement.	Management practices would focus on the recovery and enhancement of threatned and endangered species, with major emphasis on those commonly found on the refuge such as the Atlantic loggerhead turtle, Atlantic green turtle, Kemp's ridley turtle, Hawksbill turtle wood stork, bald eagle, and West Indian manatee. Practices would be initiated before a species reaches critically low population levels since population and habitat monitoring would be conducted for a wide variety of species on the refuge.	Management would primarily focus on sea turtles and manatees resulting in a missed opportunity to achieve cumulative enhancement of biological diversity and threatened and endangered species management.

Figure 22. Summary of Environmental Consequences by Alternative (continued)

Environmental Impact Areas	Alternative A *No Action*	Alternative B *Ecosystem Approach*	Alternative C *Maximize Public Use*
Public Use	The use of personal watercraft and airboats would be compatible on refuge submerged lands. Airboats, swamp buggies, and other off-road vehicles would be incompatible in the shallow freshwater marshes of the refuge south of U.S. 41.	Future waterfowl hunting, camping, boating, wildlife observation, and commercial and sport fishing would be allowed. A permit system would be implemented to allow the refuge to monitor changes in commercial activity so that preventive action could be taken if these uses cause negative impacts. Airboat and personal watercraft use would be allowed on refuge submerged lands subject to completion of a study to determine their compatibility. Due to the adverse effects on wildlife, vegetation, and the aesthetics of the refuge experience, off road vehicles including airboats, swamp buggies, and personal watercraft would not be allowed in the freshwater marshes of the refuge.	Commercial and sport fishing, hunting, boating, camping, and wildlife observation would be promoted, and thus be compatible with the purposes of the refuge.
Environmental Education	Educational programs would be given upon request, but no formal outreach would be employed.	Construction of an office in Goodland containing interpretive displays, enhancement of the Southwest Florida Environmental Center displays, and development of short interpretive trails, placed near parking and boat ramp areas, would not adversely affect refuge habitats or species associated with them and would greatly promote awareness of the plight of listed species, as well as educate visitors about refuge programs.	The environmental education program would be actively promoted and developed on and off the refuge. Increases in the public use and environmental education programs under this alternative could negatively impact refuge resources. Building of the facilities could result in disturbances and losses of some habitat types. Expansion of the number and kind of uses permitted could create conflicts between user groups, such as commercial fishermen and wildlife observers.
Cultural Resources	The lack of a clear direction on how to handle cultural resource issues could have a negative impact on the cultural resource sites of the refuge.	Compliance with all Service and other applicable federal and state laws will provide the fullest protection possible to the cultural resources on the refuge.	Provide for greater interpretation of historic and archaeological resources on the refuge for public use and environmental education purposes. Increased visitation to these sites could increase vandalism, pot hunting, and casual taking of artifacts. Law enforcement activities would need to be stepped up considerably in order to prevent such violations.
Socioeconomic Environment	Commercial and sport fishing activities would likely continue at current or increased levels in the short term. However, the quantity and quality of catches are likely to diminish over time due to lack of coordination to restore damaged habitats and lack of harvest data on which to base management decisions.	This alternative provides flexibility in determining compatibility of commercial and recreational uses of the area while ensuring protection of refuge resources in perpetuity. These features should result in more stable commercial resources and increased recreational opportunities thereby benefitting local merchants and commerce in general. Should it occur, the banning of personal watercraft and airboats on shallow submerged lands of the refuge is not expected to have a negative effect on the socioeconomic environment of the area.	This alternative would have significant short-term beneficial impacts to the socioeconomic environment of the local community, but may have detrimental effects in the long term. Increased visitation to the refuge would bring increased revenues to the local economy. Commercial uses would be promoted, including concessionaires who would be invited to do business on the refuge. Should it occur, the banning of personal watercraft and airboats on shallow submerged lands of the refuge is not expected to have a negative effect on the socioeconomic environment of the area.

Cumulative Impacts

Each alternative was evaluated as to its 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 reasonably 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 the potential for cumulative impacts because of the strategic approach to managing refuge programs, including wildlife-dependent public uses, and the consideration of resource conflicts and opportunities within a broad management framework. This would be a change from the issue-by-issue, problem-by-problem, fragmented approach inherent in the No Action Alternative. Where site development activities are to be proposed during the next 15 years, each activity would be given appropriate National Environmental Policy Act consideration. At that time, any required mitigation activities would be designed into the specific project to reduce the level of impacts to the human environment and to protect fish and wildlife and their habitats.

Mitigation and Residual Impacts of Alternative B

No mitigation would be necessary in the adoption and implementation of Alternative B. Where site development activities will be proposed during the next 15 years, each activity would be given the appropriate National Environmental Policy Act consideration. At that time, any required mitigation activities would be designed into the specific project to reduce significant adverse impacts to the environment. Long-term monitoring will help in determining actual effects and how the Service should respond.

The refuge would closely regulate proposed activities to lessen any potential impacts such as restricting use to seasons when known breeding and nesting activities are at a minimum.

The refuge would prohibit any activities in areas where endangered species would be negatively affected.

The refuge would monitor uses and establish a system to keep track of numbers of users and adjust activity levels accordingly.

Compatibility Determination

Use:

- Increased access for wildlife recreation, observation and environmental education;
- Commercial harvest of fishery resources in co-managed waters over submerged lands under restrictions established by state regulations;
- New strategies for study and management as detailed in the Ten Thousand Islands National Wildlife Refuge Comprehensive Conservation Plan.

Station Name:
Ten Thousand Islands National Wildlife Refuge
Date Established:
December 18, 1996

Establishing and Acquisition Authorities:
Arizona-Florida Land Exchange Act of 1988
16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956)
16 U.S.C. 742f(b)(1) (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...."*
>
> *(Fish and Wildlife Act of 1956)*
>
> *"...for the benefit of the 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...."*
>
> *(Fish and Wildlife Act of 1956)*

Refuge Goals:

1.0 Conserve, enhance, and protect the wildlife resources, especially threatened and endangered species, and the other natural values supported within the refuge portion of this unique south Florida coastal ecosystem.

2.0 Provide visitors with quality recreational opportunities, guided by the refuge's vision and mission, and compatible with its purpose.

3.0 Co-manage sustained-yield commercial harvesting, guiding, and other enterprises that are compatible with the purpose of the refuge.

4.0 Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.

5.0 Promote cooperation among agencies, private landowners, organizations, and other stakeholders in the management of natural and cultural resources within the Big Cypress Watershed.

6.0 Protect refuge cultural resources, encourage archaeological investigations, and promote interpretation and appreciation of the area's history.

In addition, follow the Goals of the National Wildlife Refuge System (page 91).

Other Applicable Laws, Regulations and Policies:

- Endangered Species Act of 1973 (16 USC 1531-1543).
- Marine Mammal Protection Act of 1972 (16 USC 1361-1384; 1401-1407).
- National Wildlife Refuge Administration Act of 1966 as amended (16 USC 668dd-668ee).
- Antiquities Act of 1906 (34 Stat. 225).
- Archaeological Resources Protection Act (16 USC 460aa-46011)
- Refuge Recreation Act of 1962 (16 USC 460k-460k-4).
- Title 50; Code of Federal Regulations; Parts 25-33.
- Migratory Bird Treaty Act of 1918 (16 USC 703-712).
- National Environmental Policy Act of 1969, NEPA (42 USC 4321).
- Refuge Revenue Sharing Act of 1935 (16 USC 715s).
- Criminal Code Provisions of 1940 (18 USC 41).
- Refuge Trespass Act of June 25, 1948 (18 USC 41; 62 Stat. 686).
- National Historic Preservation Act of 1966 (16 USC 470).
- National Wildlife Refuge Regulations for the most recent year (50 CFR Subchptr C; 43 CFR 3101.3-3).
- Lacey Act (16 USC 3371-78; 18 USC 42).
- Bald Eagle Protection Act (16 USC 668-668d).
- North American Wetlands Conservation Act of 1990.
- Management and General Public Use of the National Wildlife Refuge System, Executive Order 12996, 1996.
- National Wildlife Refuge System Administration Act of 1997.
- Florida State Laws

Additional refuge specific regulations as published.

Description of Use:

A. Increase access for wildlife recreation, observation and environmental education. Specifically, the following measures would be developed:

- Development of a walking interpretive and wildlife viewing trail along the oil pad road. New construction would include a parking area, restroom, and interpretive exhibits along the trail. The trail would contain interpretive and educational exhibits on refuge programs and natural resources. The trail would be day-use only.
- Development of a non-motorized boat trail in the refuge marsh south of U.S. Highway 41. The trail would originate from the oil pad road. Post markers would be installed along the route as a guide. The trail would provide wildlife observation in an area that is difficult to access. The wildlife viewing area would be day-use only.
- Initiate a limited, quality waterfowl hunt program in the marsh south of U.S. Highway 41. Teal, scaup, ring-necks, hooded mergansers, and mottled ducks are the common species found during the winter months.

B. Commercially harvest fish in co-managed waters over submerged lands under restrictions established by State regulations

Commercial harvest of fish and shellfish would continue under guidelines established by State regulations. The Comprehensive Conservation Plan outlines monitoring schemes to ensure these resources are harvested on a sustained-yield basis.

C. The Comprehensive Conservation Plan for Ten Thousand Islands National Wildlife Refuge contains six refuge goals. Each goal has new strategies for study and management.
These uses are further defined in the Comprehensive Conservation Plan and Environmental Assessment.

Anticipated Biological Impacts of the Use:
It is not anticipated that such activities will have major adverse effects for endangered species or other refuge flora and fauna. The impacts of these activities are more fully described in the Comprehensive Conservation Plan and Environmental Assessment. This compatibility determination is based on the findings and recommendations of that plan.

NEPA Compliance:

_____ Categorical Exclusion

_XX_ Environmental Assessment

_____ Environmental Impact Statement

_XX_ Finding of No Significant Impact

Determination: (Check One)

_XX_ This use is compatible.

_____ This use is not compatible.

Stipulations Necessary to Ensure Compatibility:
All of the activities discussed in the Comprehensive Conservation Plan for Ten Thousand Islands National Wildlife Refuge will be considered compatible with the purpose of the refuge if guidelines provided in the plan are followed as prescribed. If there is any evidence that indicates such activities create adverse impacts, the activity will be stopped or curtailed.

Justification:

A. Access
Wildlife observation, recreational hunting, and environmental education are important secondary uses because they create an awareness of our resources and management problems, which has proved to benefit wildlife resources. The status of Florida's wetlands and wildlife is under constant threat and increased awareness is desperately needed. These uses would help educate the public on the importance of these resources and refuge management that would have long-term benefits for the South Florida Ecosystem.

B. Commercial Fishing
Commercial fishing is a traditional use of the co-managed waters over submerged lands. The State of Florida, which co-manages this area, believes present state regulations are maintaining the fishery on a sustained yield basis. Further monitoring described in the plan would provide confirmation.

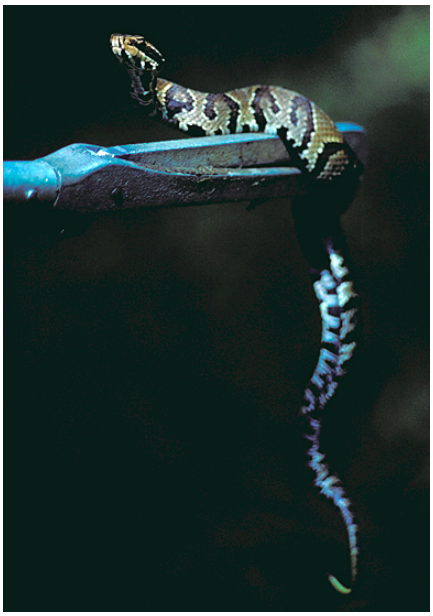
C. Studies and Management
The studies and management outlined in the Comprehensive Conservation Plan have been designed to assist in better understanding and managing natural systems on and off the refuge.

Goals Of The National Wildlife Refuge System

1. To preserve, restore and enhance in their natural ecosystems (when practicable) all species of animals and plants that are endangered or threatened with becoming endangered.
2. To perpetuate the migratory bird resource.
3. To preserve a natural diversity and abundance of flora and fauna on refuge lands.
4. To provide an understanding and appreciation of fish and wildlife ecology and humanity's role in environment and to provide refuge visitors with high quality, safe, wholesome and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purpose(s) for which the refuge was established.

Legal Policy and Administrative 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 Ten Thousand Islands National Wildlife Refuge.



Cottonmouth/water moccasin
Photo by Larry W. Richardson

Also included are 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 refuge and other surrounding jurisdictions in the ecosystem.

Legal Mandates

Administration of 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. Included are those statutes and mandates pertaining to the management of the Ten Thousand Islands National Wildlife Refuge.

For those laws that provide special guidance and have strong implications relevant to the Service or the refuge, legal summaries are offered below. 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.

List of 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).

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

6. Fish and Wildlife Coordination Act, (1934) as amended (16 U.S.C. 661-666).

   The Act is "the first major federal wildlife statute to employ the strategy of compelling consideration of wildlife impacts. The Act authorized 'investigations to determine the effects of domestic sewage, trade wastes, and other polluting substances on wildlife, encouraged the development of a program for the maintenance of an adequate supply of wildlife on the public domain' and other federally owned lands, and called for state and federal cooperation in developing a nationwide program of wildlife conservation and rehabilitation."[2]

7. Historic Sites Act of 1935 (16 U.S.C. 461).

   The Act declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration, and protection of such sites. National Historic and Natural Landmarks are designated under authority of this Act. As of January 1989, 31 national wildlife refuges contained such sites.

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.

    This Act authorizes the Secretary of the Interior "to administer areas of the System 'for public recreation when in his/her judgement public recreation can be an appropriate incidental or secondary use; provided, that such public recreation use shall be permitted only to the extent that it is practicable and not inconsistent with the primary objectives for which each particular area is established.' Recreational uses 'not directly related to the primary purposes and functions of the individual areas' of the System may also be permitted, but only upon a determination by the Secretary that they 'will not interfere with the primary purposes' of the refuges and that funds are available for their development, operation, and maintenance."[3]

[2] Ibid., pp. 181.
[3] Ibid., pp. 125-126.

12. Refuge Revenue Sharing Act of 1964, (16 U.S.C. 715s) as amended (P.L. 95-469, approved 10-17-78).

    The Act provides "that the net receipt from the sale or other disposition of animals, timber, hay, grass, or other products of the soil, minerals, shells, sand, or gravel, from other privileges, or from leases for public accommodations or facilities in connection with the operation and management of areas of the National Wildlife Refuge System shall be paid into a special fund. The monies from the fund are then to be used to make payments for public schools and roads to the counties in which refuges having such revenue producing activities are located."[4]

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).

    This Act, derived from sections 4 and 5 of Public Law 89-669, "consolidated 'game ranges,' 'wildlife ranges,' 'wildlife management areas,' 'waterfowl production areas,' and 'wildlife refuges,' into a single 'National Wildlife Refuge System.' It (1) placed restrictions on the transfer, exchange, or other disposal of lands within the system; (2) clarified the Secretary's authority to accept donations of money to be used for land acquisition; and (3) most importantly, authorized the Secretary, under regulations, to 'permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he determines that such uses are compatible with the major purposes for which such areas were established.'"[5]

15. National Historic Preservation Act of 1966 (16 U.S.C. 470).

    Public Law 89-665 as repeatedly amended, provided for preservation of significant historical features (buildings, objects, and sites) through a grant in aid program to the States. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation. As of January 1989, 91 historic sites on national wildlife refuges have been placed on the National Register.

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).

[4] Ibid., pp. 126.
[5] Ibid., pp. 125.

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.

According to Bean, the 1973 Act "builds its program of protection on three fundamental units. These include two classifications of species--those that are 'endangered' and those that are 'threatened' --and a third classification of geographic areas denominated 'critical habitats.'"[6]

The Act: (1) Authorizes the determination and listing of species as threatened and endangered, and the ranges in which such conditions exist; (2) Prohibits unauthorized taking, possession, sale, and transport of endangered species; (3) Provides authority to acquire land for the conservation of listed species, using land and water conservation funds; (4) Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife; and, (5) Authorizes the assessment of civil and criminal penalties for violating the Act or regulations.

Section 7 of the Endangered Species Act requires Federal agencies to ensure that any action authorized, funded, or carried out by them does not jeopardize the continued existence of listed species or modify their critical habitat.

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).

These Executive Orders require both the protection and the enhancement of wetlands and floodplain. Both were signed in May 1977. When federally owned wetlands or floodplain are proposed for lease or conveyance to non-federal public or private parties, both executive orders require that the agency: "(a) reference in the conveyance those uses that are restricted under federal, state or local... regulations; and (b) attach other appropriate restrictions to the uses of such properties by the ... purchaser and any successor, ... or (c) withhold such properties from..." lease or disposal (E.O. 11990, 4, E.O. 11988, 3(d). In addition, each agency is required to "avoid undertaking or providing assistance" for activities located in wetlands unless (1) ..."there is no practicable alternative...", and (2)... "the proposed action includes all practicable measures to minimize harm...which may result from such use" (E.O. 11990, 2). The term "agency" is defined in both of these Executive Orders as having the same meaning as the term "Executive agency" which means an Executive department, a Government corporation, and an independent establishment.

[6] Ibid., pp. 331.

22. The Archaeological Resource Protection Act of 1979 (P.L. 96-95, 93 Sta. 721, dated October 1979). (16 U.S.C. 470aa - 47011).

    This Act largely supplanted the resource protection provisions of the Antiquities Act for archaeological items. It established detailed requirements for issuance of permits for any excavation or removal of archaeological resources from Federal or Indian lands. It also established civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from Federal or Indian land in violation of any provision of Federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any State or local law. Public Law 100-588, approved November 3, 1988, (102 Stat. 2983) lowered the threshold value of artifacts triggering the felony provision of the Act from $5,000 to $500, made attempting to commit an action prohibited by the Act a violation, and required the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation.

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).

    Approved September 1980, this Act authorized grants for development and implementation of comprehensive State nongame fish and wildlife plans and for administration of the Act. It also required the Service to study potential mechanisms for funding these activities and report to Congress by March 1984. According to Bean, the Act "strives to encourage comprehensive conservation planning, encompassing both nongame and other wildlife....The impetus for the enactment of this legislation was the perception that animals not ordinarily valued for sport hunting or commercial purposes receive insufficient attention and funds from state wildlife management programs."[7]

    Public Law 100-653 (102 Stat. 3825), approved November 14, 1988, amended the Act to require the Service to monitor and assess nongame migratory birds, identify those likely to be candidates for endangered species listing, identify appropriate actions, and report to Congress one year from enactment. It also requires the Service to report at five year intervals on actions taken.

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).

    This Convention, commonly referred to as the Ramsar Convention, was adopted in Ramsar, Iran, February 3, 1971, and opened for signature at UNESCO headquarters, July 12, 1972. On December 21, 1975, the Convention entered into force after the required signatures of seven countries were obtained. The United Senate consented to ratification of the Convention on October 9, 1986, and the President signed instruments of ratification on November 10, 1986. The Convention maintains a list of wetlands of international importance and works to encourage the wise use of all wetlands in order to preserve the ecological characteristics from which wetland values derive. The Convention is self implementing with the U.S. Fish and Wildlife Service providing U.S. secretariat responsibilities and lead for Convention implementation.

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.

    Under this Act, permits are required to be obtained for discharges of dredged and fill materials into all waters, including wetlands. Implementation of the 404 program involves three other federal agencies in addition to limited state involvement. The Environmental Protection Agency (EPA), the National Marine Fisheries Service, and the Service review permit applications and provide comments and recommendations on whether permits should be issued by the Corps. EPA has veto authority over permits involving disposal sites if impacts are considered unacceptable. EPA also develops criteria for discharges and state assumption of the 404 program. Section 404 regulations were changed in 1984 due to a national lawsuit, and 404 jurisdictions now apply to tributaries of navigable waters and isolated wetlands and waters if interstate commerce is involved.

44. The Food Security Act of 1985 (Farm Bill).

45. 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.

46. 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 has evolved, while holding on to a fundamental national commitment to threatened wildlife ranging from the endangered bison to migratory birds of all types. Examples of this are the earliest national wildlife refuges and preserves. 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 Fisheries 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 Fisheries 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.

The mission of the Fish and Wildlife Service was recently revised by the President of the United States in Executive Order 12996 to reflect the importance of conserving natural resources.
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 were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other federal and 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.

The National Wildlife Refuge System Improvement Act of 1997 represents a consensus among diverse constituencies with interests in the management and use of the refuge system. The legislation establishes a strong and singular conservation mission for the National Wildlife Refuge System which 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."*

In administering the system, the legislation requires the Secretary of the Interior to ensure that the mission of the National Wildlife Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the refuge system.

The legislation clearly states that each refuge shall be managed to fulfill both the mission of the refuge system and the individual refuge purposes. This serves to underscore that the fundamental mission of the refuge system is wildlife conservation.

The legislation further recognizes wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation as the priority public uses of the refuge system. These uses are legitimate and appropriate public uses where compatible with the refuge system mission and the individual refuge purposes. These priority public uses are dependent upon healthy wildlife populations, and if the refuges are managed well, these priority public uses will, in turn, prosper into the future. The legislation also states that these priority public uses receive enhanced consideration over other uses in planning and management.

Scoping and Public Involvement Process

In compliance with the National Environmental Policy Act, community participation was an integral component of the planning for this refuge. Initial planning efforts for the management of the refuge began in February 1997, with the formation of a team of Service personnel and representatives of several state and local agencies. See Part 3 for a list of participants. A meeting of the team was held to develop a planning strategy and determine methods of involving the public in the planning process.

In April 1997, the Refuge Manager, Jim Krakowski, requested public comments by way of news releases, informational letters, briefings regarding issues, concerns, and opportunities related to the management of the refuge, and personal interviews during public meetings held in March and April. Thus began the process of soliciting public participation to determine the scope of issues to be addressed in planning for the refuge.

To assist individuals and organizations in responding to this request, a survey form was developed and made available (See Figure 23). The refuge manager received completed surveys and/or letters from numerous individuals and organizations. These survey forms and letters were subsequently analyzed by The Hayden Group, Inc., of Newnan, Georgia, an independent consulting group which provided the Service with a general overview of public opinion regarding management of the refuge.

To enhance public participation during the planning process, a stakeholder group was established in July 1997. The stakeholder group included a broad spectrum of interests offering business, tourism, conservation, recreation, and historical perspectives. See Part 4 for a list of stakeholders. The role of the stakeholder group was to assist in developing the key components of the proposed management plan for the refuge. Stakeholders were selected by the Refuge Manager and through a series of facilitated meetings, all of which were open to anyone wishing to attend, the group utilized the issues, concerns, and opportunities expressed through the scoping process in drafting its materials. Key components of the proposed plan were consensus tested at community forums held throughout the planning process. Service personnel used all information gathered from the scoping process, input from the stakeholders, and series of meetings and community forums held for stakeholders and various publics, to prepare the Comprehensive Conservation Plan. The meetings were facilitated by Jim Stansbury of Stansbury Resolutions by Design, Inc., in Bradenton, Florida, and occurred as follows:

Workshop #1 - August 13, 1997, Fire Hall, Goodland, Florida

Community Forum #1, Workshop #2 - September 3, 1997, YMCA, Marco Island, Florida

Workshop #3 - September 29, 1997, YMCA, Marco Island, Florida

Workshop #4 - November 6, 1997, Edison Community College, Naples, Florida

Community Forum #2, Workshop #5 - November 13, 1997, Comfort Inn, Naples, Florida

Workshop #6 - December 1, 1997, Comfort Inn, Naples, Florida

Service responses to issues, concerns, and opportunities are presented in Part 1 and a mailing list is provided in Part 5.

Figure 23. Public Involvement Survey Form (page 1)

TEN THOUSAND ISLANDS NATIONAL WILDLIFE REFUGE
PUBLIC COMMENT SURVEY FORM

NAME/AFFILIATION_____

ADDRESS_____

CITY/STATE_____ZIP CODE_____

Managed by the U.S. Fish and Wildlife Service (Service), Ten Thousand Islands National Wildlife Refuge (TTINWR) was established on December 18, 1996 to protect the important mangrove and marsh habitats, the rich diversity of native wildlife, and the endangered species of this area. The refuge contains approximately 20,000 acres and lies between the Faka Union Canal and SR 92, south of US 41, excluding Collier Seminole State Park in Collier County, Florida. The refuge shares a portion of its boundary with the State of Florida's Cape Romano-Ten Thousand Islands Aquatic Preserve.

There are numerous management issues concerning this refuge and the Service would like to hear your opinion on them. We have developed this survey to help you address some of the issues. Please feel free to add additional comments at the end of the form. Your opinions are important and we will use them to help us develop refuge management plans. Thank you for taking the time to provide your comments.

1. Are you in favor of duck hunting on the refuge? _____
If so, how should it be managed? (Open seasons, quotas or no number restrictions, use of permits, etc.). Please explain your response.

_____
_____
_____
_____

2. How do you feel about commercial harvesting (crabbing, netting, shelling) on the refuge? Do you believe that any of these activities might have an adverse impact on sea turtles, manatees, near-shore fisheries, or other refuge resources? Use the second sheet, if more room is needed.

_____
_____
_____
_____

3. How do you feel about camping and other kinds of recreational activities on islands where endangered sea turtles dig their nests? Do you believe that these activities might have an adverse impact on turtle nesting? If so, how can we manage these activities?

_____
_____
_____
_____

Public Involvement Survey Form (page 2)

activities be regulated, and how?

5. Have you any suggestions on how the US Fish and Wildlife Service can meet its mandated responsibility to protect the endangered manatee in refuge waters?

6. How do you feel about air boating on refuge lands and waters where sea turtles, manatees, near-shore fisheries, wading birds or other refuge resources could be found?

7. What concerns/questions do you have that might be addressed through scientific research?

8. What would you like to know more about regarding the Ten Thousand Islands refuge, its natural resources, or the US Fish and Wildlife Service? How could we effectively share this information with the public?

9. Please list any other comments, issues, or concerns you have regarding the refuge. (Add additional pages, if needed)

Part 1 - Service Responses to Issues, Concerns, and Opportunities

The following topics were identified by the Service and through the public involvement process. Comments listed are representative of those received by the Service; responses from the Service follow the comments.

1. Commercial Uses On, and Access to, Ten Thousand Islands National Wildlife Refuge.

Commercial Uses on the Refuge -- A variety of commercial uses occur on the Ten Thousand Islands National Wildlife Refuge. Blue and stone crabs are caught with traditional underwater cage traps. Netting for mullet, as well as hook and line for other species of fish, occurs on a seasonal and less frequent basis. Charter fishing is the predominant use with probably more than 30 fishing guides taking clients to the refuge. The tour business includes canoe/camp trips, boat cruises, and shell collection trips. Issues raised during the public involvement process primarily focused on whether any of these uses have adverse effects on the natural resources of the refuge.

Issues, Concerns, and Opportunities Regarding Commercial Uses on the Refuge:

- Should commercial harvesting (e.g., crabbing) continue to be allowed on the refuge?
- Should other commercial uses (e.g., airboat and personal watercraft tours) be permitted to operate on the refuge?
- Should commercial fishing and nature tour guides be permitted to operate without regulation on the refuge?
- Will refuge regulations come at the expense of local jobs?

Survey Responses Regarding Commercial Uses on the Refuge:

A majority (58 percent) of the 192 responses to the first question indicated that commercial harvesting should not be allowed on the refuge while 42 percent indicated commercial harvesting should be allowed. Adverse impacts to the environments mentioned by survey respondents included the possibility of sea turtles and manatees getting tangled in nets and lines, and the possible depletion of some species through over-harvesting and interferences with their reproductive processes.

People wanted to be kept informed about how regulations on use of the refuge will affect them in terms of using the area and how it might affect their property values and means of livelihood.

Stakeholder Responses Regarding Commercial Uses on the Refuge:

Stakeholders and other public participants recommended that current levels of commercial activities and uses continue to be allowed, but that those uses be coupled with research. Within a 5-year period, management would review the impacts of commercial activities and uses on refuge resources in order to make informed decisions on whether to continue, expand, reduce, or discontinue those uses.

Service Responses Regarding Commercial Uses on the Refuge:
Commercial activities of local importance occur within the submerged lands of the refuge. In consultation with the State of Florida, the Service would follow the recommendations of the stakeholder committee. Current commercial activities would be permitted and allowed to continue, with additional studies conducted in order to make an informed decision in the future as to whether to continue, expand, reduce, or discontinue these activities within the refuge. Strategies within the plan outline the type of information needed to make future decisions. The Service would review these activities in 5 years, but decisions may take place before or after that time depending on the results of monitoring and studies and contingent upon approval by the State Board of Trustees, as referenced in Appendix F. The Service cannot predict whether or not monitoring activities and studies will be funded, occur in a timely manner, or if they will produce the results needed to make informed decisions.

2. Personal Watercraft and Airboat Use on the Refuge.
These two access modes were identified as potential refuge problems early on in the public scoping process. Presently, both types of uses occur infrequently and by a small number of individuals and businesses. Two airboat and two personal watercraft tour businesses are known to use the refuge. Personal watercraft use by the public is infrequent, due to the remoteness of the refuge. However, this use is expected to grow with Collier County's predicted increase in population. Both of these access modes are characteristically loud, fast, and capable of cruising in extremely shallow water.

Issues, Concerns, and Opportunities Regarding Personal Watercraft and Airboat Use on the Refuge:
- Personal watercraft and airboats are disruptive to bird life, other wildlife, and vegetation.
- Personal watercraft and airboats are not a threat to wildlife or habitats.
- Personal watercraft and airboats can access shallow water areas causing adverse effects to grass beds.
- Personal watercraft and airboats do not have underwater propellers. Conventional boat motors cause harm to manatees and grass beds.
- Personal watercraft and airboats are noisy and disrupt the refuge aesthetic experience.
- Most people who use personal watercraft are thrill seekers and destroy the harmony of the area.
- The livelihood of some businesses depend upon the use of personal watercraft and airboats.
- Personal watercraft and airboat use should be regulated.
- Personal watercraft and airboats should be confined to limited areas, trails, and numbers.
- Issue permits to personal watercraft and airboat users who want to use the refuge.

Survey Response Regarding Personal Watercraft and Airboat Use on the Refuge:
Eighty-four percent of 227 respondents identified adverse effects associated with personal watercraft use on the refuge. Opinion about airboating was closely divided with 51 percent of responses in favor of allowing airboat use on the refuge. However, the majority of those in favor of airboats on the refuge advocated some restrictions on their use.

Stakeholder Responses Regarding Personal Watercraft and Airboat Use on the Refuge:
The stakeholders felt that the two modes of access needed to be addressed differently. They voted to disallow personal watercraft use at the start while conducting research to make an informed decision on whether to allow or disallow this use within a 5-year plan review period. Stakeholders voted to allow the use of airboats at the start while conducting research to make an informed decision on whether to continue, expand, reduce, or discontinue this use within a 5-year plan review period.

Service Responses Regarding Personal Watercraft and Airboat Use on the Refuge:
Most personal watercraft and airboat use occurs within the submerged lands of the refuge. In consultation with the State of Florida, the Service has made the following conclusion and decision. We would allow personal watercraft and airboat use on submerged lands within the refuge subject to the results of a study to determine their effects on wildlife and natural resources. The Service believes both of these modes of access have adverse effects on wildlife, grass beds, vegetation, and the aesthetics of the refuge experience. However, our beliefs must be supported or rejected by appropriate research on this issue, of which there has been very little conducted. The Service cannot predict whether or not studies will be funded, occur in a timely manner, or if research will produce the results needed to make informed decisions.

3. Habitat Protection, Wildlife Management, and the use of Partnerships to Help Manage Refuge Resources.
The Ten Thousand Islands National Wildlife Refuge is surrounded by state and federal land management units including Everglades National Park, Fakahatchee Strand State Preserve, Picayune Strand State Forest, Collier Seminole State Park, Cape Romano-Ten Thousand Islands Aquatic Preserve, Rookery Bay Aquatic Preserve, and Rookery Bay National Estuarine Research Reserve. The refuge nearly surrounds the town of Goodland and abuts the residential community of Port of the Islands. The submerged lands of the refuge overlap portions of the above-mentioned aquatic preserves. A cooperative agreement between the Service and the State of Florida is needed to properly manage these submerged lands. The proposed South Golden Gate Estates Hydrologic Restoration Plan would likely have a major impact on refuge resources. The Service needs to participate in the planning of this project to ensure that the resources of the refuge are not compromised. During the stakeholder workshops, there was substantial interest in developing a non-Service coalition to foster information transfer.

Issues, Concerns, and Opportunities Regarding Habitat Protection, Wildlife Management, and the use of Partnerships to Help Manage Refuge Resources:

- Should the refuge remain an inviolate sanctuary for endangered species, such as sea turtles, wood storks, Florida panthers, and manatees?
- Sea turtle nesting and public use.
- Return sheet flow to the watershed, monitor the South Golden Gate Estates rehydration effort.
- Address pollution and water quality issues.
- Will the creation of the refuge necessitate the adoption of new regulations?
- Another layer of government is not needed in the Ten Thousand Islands area.
- Boating regulations are a concern for many.
- What are the best methods for controlling invasive exotic plants which are disruptive to native plant communities?
- Habitat protection is a priority.
- Is there a need for cooperative land management and regulatory consistency with other public and private landowners? How would this be effectively accomplished?
- Too many rules and permits to obtain from the different managing agencies.
- Coordinated management is lacking between the various agencies.
- Enter into a cooperative agreement with the state over management of refuge navigable waters.
- Consolidate management of existing areas under fewer administrations.

Survey Response Regarding Habitat Protection, Wildlife Management, and the use of Partnerships to Help Manage Refuge Resources:

There were numerous suggestions on how the Service could protect manatees in refuge waters including establishment and enforcement of speed limits, following existing rules and regulations, public education and better signs, better enforcement, no boats or limit boats in critical areas, conduct more studies, and maintain data on incidents.

Stakeholder Response Regarding Habitat Protection, Wildlife Management, and the use of Partnerships to Help Manage Refuge Resources:

Stakeholders agreed that there should be cooperative land management and regulatory consistency among public and private landowners. This may be accomplished through cooperative agreements with the state and other adjacent landowners.

Service Response Regarding Habitat Protection, Wildlife Management, and the use of Partnerships to Help Manage Refuge Resources:

The Service agrees with the recommendation of the stakeholder committee. More communication and coordination with the other land managers within the watershed must occur if we are to effectively conserve the diverse resources of this ecosystem. This plan identifies various ways in which the refuge will accomplish these tasks.

4. Public Use, Recreation, Education, and Outreach on the Refuge.
The refuge is well known to residents and visitors alike who enjoy a variety of recreational pursuits in its remote waters. Throughout the year, thousands of sport fishermen pursue a multitude of game fish. Canoe and kayak float trips are common during the winter months as are overnight stays at Panther, Hog and Round Keys. Duck hunting has occurred in the refuge marshes south of U.S. 41. The primary issue raised was whether any of these uses are now having, or will have, an adverse effect on refuge resources and, if they are having an adverse effect, what to do about it.

Many individuals indicated a desire to know more about the responsibilities of the Service, how they can provide input to the planning, and how they can help further the goals for the refuge. Many of the survey respondents had suggestions on how the Service could effectively share information with the public.

Issues, Concerns, and Opportunities Regarding Public Use, Recreation, Education, and Outreach on the Refuge:

- Will the establishment of the refuge lead to the degradation of the area's natural resources as a result of more visitors and users of the area?
- The area is over-fished; fish stocks are greatly reduced compared to the past.
- Catch and release fishing should be encouraged.
- How will camping, boating, and other recreational activities (duck hunting, fishing, etc.) be affected by refuge regulations?
- No new regulations.
- Camping on sea turtle nesting islands may have an adverse effect on turtles.
- Limitations and facilities are needed for island camping.
- Concern about the manatee zone speed limits and access to refuge.
- There are so few ducks, hunting should not be allowed.
- Manage a limited, highly controlled duck hunt.
- How can the refuge more effectively educate the public about the refuge, its natural resources, and its role in the South Florida Ecosystem?
- Survey respondents wanted more information.
- A visitor facility is needed.
- Print brochures showing the refuge boundaries and benefits of the refuge.
- Give lectures and school programs on refuge programs and resources.
- Hold public meetings on management of the refuge.
- Set up a web site on the Internet.
- Use the media.
- Use the marinas to disseminate information.
- Tell the public nothing. The less the public knows about the area the better off the area will be.

Survey Response Regarding Public Use, Recreation, Education, and Outreach on the Refuge:

A large majority of responses (88 percent) favored allowing camping and other recreational activities on islands where sea turtles nest. However, they suggested these activities may need restrictions during the nesting season. A majority of respondents feel that personal watercraft have an adverse impact on sea turtles, manatees, near-shore fisheries, and other refuge resources. Almost half recommend banning them. However, some suggested allowing them with appropriate restrictions. Opinion about air boating was closely divided with 51 percent of responses in favor of, and 49 percent against, allowing air boating in the refuge. Of the 108 responses in favor of air boating in the refuge, slightly more than two-thirds of these responses advocated some type of restrictions on air boat use.

Opinion was evenly divided among the 246 responses regarding whether duck hunting should be allowed on the refuge. The most frequently mentioned ways of managing duck hunting on the refuge were to designate open and closed seasons, designate specific areas for hunting, establish limits on the number of hunters, and limit the number of ducks that may be taken. Thirty-one responses favored not changing anything (i.e., allow duck hunting under the present state and federal laws and regulations).

Suggestions on how the Service could effectively share information with the public included the use of mass media; publication and distribution of newsletters, pamphlets, and brochures; providing speakers at various group or public meetings; operating visitor centers; and providing information through the Internet.

Stakeholder Response Regarding Public Use, Recreation, Education, and Outreach on the Refuge:

Stakeholders, and other public participants, recommended that current levels of commercial uses and activities continue to be allowed, but that those uses be studied to minimize adverse impacts to refuge resources. Within a 5-year period, management would review the impacts of commercial uses and activities on the resources in order to make informed decisions on whether to continue, expand, reduce, or discontinue those uses in the future.

The group recognized the importance of this issue by fully supporting and assisting with the drafting of Goal No. 4, “Promote the interpretation, education, and appreciation of coastal natural resources of the Ten Thousand Islands area, and the importance of conserving them.”

Service Responses Regarding Public Use, Recreation, Education, and Outreach on the Refuge:

Existing secondary uses complement the mission and goals of this refuge. Sport fishing and limited, high quality duck hunting would be promoted by the Service. The Service agrees with the stakeholder committee to allow these activities to continue with additional studies conducted in order to make an informed decision as to whether to continue, expand, reduce, or discontinue them. Strategies within the plan outline the type of information needed to make future decisions. The Service will review these activities in 5 years, but decisions may take place before or after that time frame depending on the results of monitoring activities and studies. The Service cannot predict whether or not monitoring activities and studies will be funded, occur in a timely manner, or if research will produce the results needed to make informed decisions.

The issue of whether to allow personal watercraft and airboat use on the refuge caused controversy among participants, and could not be resolved among them. In this case, the Refuge Manager, in cooperation with the State of Florida, will allow the use of personal watercraft and airboats until such time that studies indicate otherwise.

In order to protect the natural resources of the refuge and the South Florida Ecosystem, the public must be informed of the issues at hand and protection efforts that are needed. The Service agrees with the stakeholder committee to make the environmental education program at Ten Thousand Islands National Wildlife Refuge a significant one. The strategies of the plan include additional staff and facilities to accomplish this goal.

5. Research and Monitoring on the Refuge.
Research and monitoring on the refuge would focus on fish and wildlife, habitat and water quality, watershed restoration, and public use.

Issues, Concerns, and Opportunities Regarding Research and Monitoring on the Refuge:

- What opportunities or resources are available to the refuge for ecosystem monitoring and research on the refuge?
- Answer questions related to effective management of habitat for threatened and endangered species.
- Research and monitoring of fishery resources.
- Cooperate with existing research.
- Additional research and management is not needed for this area.
- How can the refuge better mitigate the impacted hydrology as a result of the South Golden Gate Estates restoration?
- How should the archaeological sites on the refuge best be protected, monitored, and conserved?

Survey Response Regarding Research and Monitoring on the Refuge:
Suggestions for scientific research included such areas as pollution and water quality, manatee protection, habitat protection, fish-related concerns, and boating-related concerns.

Stakeholder Response Regarding Research and Monitoring on the Refuge:
Continue with current research and monitoring efforts. Research and monitoring will be needed to determine management direction of refuge natural resources and to make future decisions regarding commercial and recreational activities occurring on the refuge.

Service Response Regarding Research and Monitoring on the Refuge:
Research and monitoring will be important functions on Ten Thousand Islands National Wildlife Refuge. Priority will be given to applied research, or studies that provide information to assist in the management of listed species and coastal systems. The refuge should serve as a center for applied science and management information for other agencies and private landowners. The Service agrees with the stakeholder committee on the importance of this issue and has addressed its importance through strategies in the plan.

6. Protection of Archaeological Resources on the Refuge.
There are several documented archaeological sites, primarily ancient Calusa Indian shell middens. These cultural resources should be accessible to the public yet protected from looting and vandalism. A coordinated effort between federal and state archaeologists to do additional surveys of these areas is needed to further assess the cultural importance of the sites.

Issues, Concerns, and Opportunities Regarding Protection of Archaeological Resources on the Refuge:

- Public would like access to these areas.
- These areas need protection from looters.
- The areas should be interpreted to inform the visitor.
- Public information should address these areas, not necessarily direct people to them.
- Should coordinate with the state on conducting additional surveys of the site.
- Local people would like to assist with the investigations.

Survey Response Regarding Protection of Archaeological Resources on the Refuge:
There were no survey responses regarding archaeological resources on the refuge.

Stakeholder Response Regarding Archaeological Resources on the Refuge:
The stakeholder group recognized the importance of the cultural resources on the refuge and helped draft the objectives of the plan to protect these sites.

Service Response Regarding Protection of Archaeological Resources for the Refuge:
Protection of archaeological sites is mandated by law on national wildlife refuges. The Service agrees with the stakeholders and has developed strategies in the plan to protect, study and educate the public about these important cultural resources.

7. Staffing Needs on the Refuge.
The Ten Thousand Islands National Wildlife Refuge was established in 1996 and has a staff consisting of a seasonal Park Ranger and a Wildlife Biologist. It is located at the terminus of the Big Cypress Watershed. This plan outlines many new initiatives for this refuge that will benefit the ecosystem. This is a young refuge without adequate staff or budget.

Issues, Concerns, and Opportunities Regarding Staffing Needs on the Refuge:

- Cannot accomplish all of these new initiatives with existing staff.
- Use volunteers to help with the initiatives.
- Coordinate more with other agencies to pool resources.
- Don't need all of this government intervention, let nature take its course.

Stakeholder Response Regarding Staffing Needs on the Refuge:
The stakeholder group recognized that lack of funding, especially as it related to staffing needs, was an important issue for the refuge and helped draft the objectives for the plan that identify the need for additional funding.

Service Response Regarding Staffing Needs on the Refuge:
The Service agrees with the stakeholder committee that additional funding is needed to carry out the plan and supports the strategies described to fund these activities and fill these positions. This plan describes new initiatives that are needed to successfully address Service responsibilities for the refuge and the South Florida Ecosystem during the next 15 years. These initiatives include an enhanced biological and habitat monitoring program, a public use management and environmental education program, increased coordination with land managers off the refuge, and an expanded management program for flora and fauna. The plan identifies 4 new positions for the refuge and 6to be shared with Florida Panther National Wildlife Refuge. New positions include an Assistant Refuge Manager, Outdoor Recreation Planner, Fishery Biologist, and Biological Science Technician. Shared positions include a Computer Specialist, Hydrologist, Botanist, Visual Information Specialist, Mechanic, and Maintenance Worker. In addition, the temporary Park Ranger for Ten Thousand Islands National Wildlife Refuge and the shared Administrative Assistant would be converted from temporary to permanent status.

Draft Review Process

A Draft Comprehensive Conservation Plan and Environmental Assessment was published in October 1999, followed by Regional Office review. Availability of the draft document was published in the "Federal Register" in October 1999, and in local press releases. Upon its release, the Service gave the public an opportunity to comment on the draft document. The review period ended on November 8, 1999.

Copies of the draft document were distributed to local libraries in Collier and Lee Counties. Copies were also distributed to stakeholders and others on the mailing list. An "open house" for the public to review the draft plan with Service personnel was held on October 23, 1999, at the Comfort Inn in Naples, Florida.

At the close of the review period, the Service received responses on the draft document. See Part 2 for a summary of these comments.

The refuge staff consulted with the Florida Fish and Wildlife Conservation Commission, Florida Department of Environmental Protection, and other State conservation agencies for several months before deciding the final refuge management approach.

Part 2 Summary of Public Comments and Service Responses on Draft CCP

Comments recieved on draft CCP	*Plan Revised*	*Page No's*	*Service Response*
Correct name of Big Cypress National Preserve.	Yes	4	Change made.
Co-managed navigable waters should be referred to as co-managed submerged lands.	Yes		In some instances throughout the plan, this change was made.
How much land was conveyed to the Service to establish the Ten Thousand Islands National Wildlife Refuge	No		The acreage noted, 35,000, is correct.
Airboat use should be restricted			Airboats are restricted in the northern marshes of the refuge and the Service is cooperating with the state in seeking a study to assess watercraft impacts below mean high tide
Use correct dates for the Gulf American excavation.	Yes	12	Date was changed to 1963-71.
Revise statements regarding freshwater flow to the Ten Thousand Islands National Wildlife and water quality.	Yes	12	The Service agrees and this change was made.
Use correct name when referencing Rookery Bay National Estuarine Research Reserve.	Yes		The Service agrees and this change was made.
Include species of special concern in strategy 1.1.2, and move up start date.	Yes	21	The Service agrees and this change was made.
Include aquatic insects in strategy 1.2.2.	Yes	21	The Service agrees and this change was made.
The timetable for initiating a fisheries inventory program should be earlier than that of the hydrological restoration of South Golden Gate Estates. Rookery Bay National Estuarine Research Reserve is currently working on a fish inventory.	No		The plan does not give a time schedule for either project.
Revise strategy 1.3.3 to ensure a 60 percent hatch rate for sea turtles.	Yes	22	The Service agrees and this change was made. This strategy is 1.3.5 in the final plan.
Rephrase statement regarding land in South Golden Gate Estates.	Yes	16	The Service agrees and this change was made.
Coordinate Fisheries Management Plan with Florida Fish and Wildlife Conservation Commission.	Yes	22	The Service agrees and change was made.
Consider an earlier date for the exotic plant control program.	Yes	23	Service agrees and this was changed in strategy 1.4.2, to 2004.
Reword strategy 2.1.3 to include adjoining submerged lands.	Yes	22	Service agrees and change was made.

Comments recieved on draft CCP	*Plan Revised*	*Page No's*	*Service Response*
Add Fish and Wildlife Conservation Commission biologists for collaboration in strategies 3.2.2 and 3.2.3.	Yes	25	Service agrees and changes were made.
Revise strategy 4.1.3 to include the word "encourage".	Yes	25	Service agrees and change was made.
In Project 7, Area 4, page 32, include an alternative to cooperatively enhance existing Rookery Bay National Estuarine Research Reserve.	Yes	32	Service agrees and change was made.
In Project 11, indicate that project is a joint venture with the Rookery Bay National Estuarine Research Reserve.	Yes	35	Service agrees and change was made; project 8 in final plan.
Omit last sentence on page 69, paragraph 6.	Yes	69	Service agrees and change was made; project 12 in final plan.
On page 91, paragraph 5, clarify how the Fish and Wildlife Service will keep community informed on proposed regulations.	Yes	91	The community will be informed of new management actions and proposed regulations through the local newspapers and other news outlets.
On page 117, paragraph 4, add Office of Coastal and Aquatic "Managed" Areas.	Yes	117	The Service agrees and this change was made.
On page 117, paragraph 6, change 50 years to 25 years to be consistent with Great White Heron National Wildlife Refuge.	Yes	117	Service agrees and change was made.
Change "would" to "shall" consistently throughout the Management Agreement for Certain Lands in Collier County.	Yes	117-120	Service agrees and changes were made.
Change last sentence on page 117 to read "...and compatible with goals of the State Aquatic Preserve Program."	Yes	117	Service agrees and change was made.
Strike reference to the Fish and Wildlife Conservation Commission in paragraphs 2,5,6,7, and 8, on pages 117 and 118, and pursue separate agreement with the Commission.	Yes	117-118	Service agrees and changes were made.
Change first paragraph on page 119 to read "The Board retains the right to enter the property and to engage in continuing support of State Aquatic Preserve mangement."	Yes	119	The Service agrees and change was made.
On page120, change Division of State Lands, Bureau of Submerged Lands and Preserves to Division of State Lands, Bureau of Land Management Services.	Yes	120	Change was made.
On page 120, change Trustees signature block to read: Director, Division of State Lands.	Yes	120	Change was made.

Part 3 - Participants

David Addison ..... The Conservancy of Southwest Florida, Naples, Florida
Ken Alvarez ..... Florida Park Service, Osprey, Florida
Jim Brown ..... Fish and Wildlife Service, Atlanta, Georgia
Frank Cole ..... Fish and Wildlife Service, Tallahassee, Florida
Kim Dryden ..... Florida Game and Freshwater Fish Commission, Punta Gorda, Florida
Dave Erickson ..... Fish and Wildlife Service, Atlanta, Georgia
Fesseha Gebremikael .. Fish and Wildlife Service, Atlanta, Georgia
Jennifer Harris ..... Fish and Wildlife Service, Atlanta, Georgia
Rick Kanaski ..... Fish and Wildlife Service, Savannah Coastal Refuges, Savannah, Georgia
Jim Krakowski ..... Florida Panther and Ten Thousand Islands National Wildlife Refuge Complex Naples, Florida
Mike Mayer ..... Everglades National Park, Everglades City, Florida
Wendell Metzen ..... Fish and Wildlife Service, Jacksonville, Florida
Ananta Nath ..... South Florida Water Management District
Ben Nottingham ..... Florida Panther and Ten Thousand Islands National Wildlife Refuge Complex, Naples, Florida
Mike Owen ..... Fakahatchee Strand State Preserve, Copeland, Florida
Jon Staiger ..... City of Naples, Naples, Florida
Chris Straton ..... Collier County Audubon Society, Naples, Florida
Kris Thoemke ..... Florida Wildlife Federation, Naples, Florida
Jerry Vits ..... Fish and Wildlife Service, Atlanta, Georgia

Part 4 - Stakeholders

Dave Addison ..... Conservancy of Southwest Florida
Pam Ball ..... Boat Tour Concessionaire
Mike Barbush ..... Goodland Civic Association
Mark Bahr ..... Wave Runner Tour Operator
Ted Below ..... Collier County Audubon Society
Kris Dane ..... Goodland Marina Operator
Kim Dryden ..... Florida Game and Fresh Water Fish Commission
Dave Eimers ..... Representative of Fishing Guides
Mack Hatcher ..... Collier County Natural Resources Division
Eric Kiefer ..... Collier Seminole State Park
Mike Mayer ..... Everglades National Park
Gene Moss ..... Crabber Representative
Phil Popovici ..... Marco Island Civic Association
Karl Predmore ..... Airboat Concessionaire
Mike Shirley ..... Florida Department of Environmental Protection
Fran Stallings ..... Save the Manatee
Red Steir ..... Angler's Outlook
Kris Thoemke ..... Florida Wildlife Federation
Jackie Thompson ..... Goodland, Florida

Part 5 - Mailing List

Franklin Adams
Naples, Florida 34116

David Addison
Naples, Florida 34102

Frederick J. Adric
Marco Island, FL 34145

Charles J. Alaimo
Marco Island, FL 34145

Kenneth C. Alverez
Osprey, FL 34229

Brenoa Anderson
Labelle, Florida 33975

Ben Arnold
Tamarac, Florida 33321

Mark Bahr
Marco Island, FL 34145

Pam Ball
Goodland, FL 34140

Mike Barbush
Goodland, FL 34140

Paul Barbush
Goodland, FL 34140

Jeene Barnett
Ft. Myers, FL 33901

Brian Barnett
Tallahassee, FL 32399

Daniel P. Bartlett
Goodland, FL 34140

E. Bates
Naples, FL 34102

Gary Lee Beardsley
Naples, FL 34103

Charles E. Beauchamp
Goodland, FL 34140

Jim Beever
Fish and Wildlife Conservation Commission
Punta Gorda, FL 33955

Theodore and Virginia Below
Naples, FL 33942

Barry Berger
Naples, FL 34114

Steven M. Bertone
Naples, FL 34113

Biodiversity Legal Foundation
Boulder, CO 80308

Denis and Linda Blaise
Goodland, FL 34140

Alan E. Bogdan
Marco Island, FL 34145

Andrew Bostick
Marco Island, FL 33927

Curtis W. Bostick
Marco Island, FL 34145

Scott Brame
Mountain Rest, SC 29664

Kenneth H. Brown
Naples, FL 34114

T. J. Brown
Marco Island, FL 34145

A. Broxon
Naples, FL 34114

Betty J. Bruno
Goodland, FL 34140

Richard Burhoe
Marco Island, FL 34145

Calusa Island Yacht Club and Marina
Goodland, FL 34140

Clyde S. Cameron
Goodland, FL 34140

John and Ronna Carter
Goodland, FL 34140

David Cassidy
Naples, FL 34116

Philip Chafe
Goodland, FL 34140

Dale P. Clemens
Marco Island, FL 34145

Pedro Concepcion
Naples, FL 34117

Bill Conrad
Goodland, FL 34140

D. D. Cook
Naples, FL 34114

Keith L. Cook
Marco Island, FL 34145

Evelyn Cook
Goodland, FL 34140

Joseph Corcie
Goodland, FL 34140

Brad Cornell
Naples, FL 34108

Peter Cross
Ft. Lauderdale, FL 33301

Robert A. Cunningham
Naples, FL 34102

Sonya Durrwachter
Naples, FL 34120

Mark S. Davby
Marco Island, FL 33937

Claudia Davenport
Everglades City, FL 34139

John J. David
Naples, FL 34104

Lillian S. David
Naples, FL 34104

Becky Davis
Marco Island, FL 34145

Donald Day
Naples, FL 34112

Bill Deeb
Naples, FL 34112

William H. DeHaan
Marco Island, FL 34145

Frank F. Denninger
Hialeah, FL 33013

Ronald DePatie
Donna DePatie
Goodland, FL 34140

Frank DiAndriole
Naples, FL 34110

Tim Duffy
Marco Island, FL 34145

Kevin Dugan
Naples, FL 34112

Sydney A. Dyer
Goodland, FL 34140

Dave Eimers
Naples, FL 34119

Robert Elliot
Goodland, FL 34140

Billy G. Ellis
Goodland, FL 34140

Matt Finn
Goodland, FL 34140

Magi Fortune
Goodland, FL 34140

Mike Franklin
Goodland, FL 34140

Bob Fravel
Marco Island, FL 34145

Enid Freeman
Naples, FL 34113

Rhoda Friedlander
Marco Island, FL 34145

Friends of the Everglades
Miami, FL 33143

George H. Friess
Marco Island, FL 34145

David Garcia
Immokolee, FL 34142

Nannette L. Gatti
Naples, FL 34114

Carole Gauger
Naples, FL 34109

Robert Gehung
Naples, FL 34114

Robert & Martha Genn
Naples, FL 34114

Dennis J. Giardina
Naples, FL 34117

Richard A. Giatti
Naples, FL 33941

Flecta Girieu
Goodland, FL 34140

Peter Golling
Cape Coral, FL 33914

Richard Gordon
Naples, FL 34104

Ron Gordon
Marco Island, FL 34145

Robert H. Gore
Naples, FL 34101

James G. Graham
Goodland, FL 34140

Niki Graham
Goodland, FL 34140

Richard Griffith
Marco Island, FL 34145

Timothy and Catherine Groman
Marco Island, FL 34145

Jean Grosbach
Ester, FL 33928

Juliet Gross
Goodland, FL 34140

Scene Habermell
Goodland, FL 34140

Deon Hall
Naples, FL 34114

Hubert Hall
Naples, FL 34114

Dave Harding
Naples, FL 34113

Lee Harkness
Marco Island, FL 34145

Anna Marie Hartman
Florida Department of
Environmental Protection
Tallahassee, FL 32399

Cullum Hasty
Bonita Springs, FL 34135

Bob Henry
Naples, FL 34114

Anne Wright Hess
Goodland, FL 34140

Don & Mary Hinkel
Naples, FL 34114

John R. Hobbs
Goodland, FL 34140

Larryand Vivian Holland
Goodland, FL 34140

Robert and Martha Holmes
Naples, FL 34114

Todd Hopkins
Naples, FL 34113

Grant Hopkins
Naples, FL 34109

Douglass J. House
Naples, FL 34114

Neary J. House
Naples, FL 34114

Niles Hunold
Marco Island, FL 34145

Wayne Jenkins
Naples, FL 34117

Warren Johnston
Goodland, FL 34140

Gary Knocbel
Goodland, FL 34140

Barbara Knocbel
Goodland, FL 34140

William P. and Helen M. Kramer
Goodland, FL 34140

Maura C. Kraus
Naples, FL 34102

Charles Krout, Jr.
Naples, FL 34113

Thomas R. Kutterer
Naples, FL 34114

Nick Larison
Naples, FL 34112

James R. and Marilyn Lauffer
Naples, FL 34114

Bobbie Lee
Bonita Springs, FL 34135

Darryl Lee
Marco Island, FL 34145

Jules Lefebure
Naples, FL 34114

Nancy L. Lefebure
Naples, FL 34114

Curtis R. Lucado
Bonita Springs, FL 34134

Alfred Luckerbauer
Naples, FL 34113

Kim Luebke
Goodland, FL 34140

William T. Lull
Naples, FL 34114

William T. Lull
Naples, FL 34114

Gary Lytton
Naples, FL 34113

Brian H. Mackenzie
Naples, FL 34120

Mary MacMorris
Goodland, FL 34140

Sidney B. Maddock
Biodiversity Legal Foundation
Buxton, NC 27920

Erick Madison
Naples, FL 34120

M. Marchand
Naples, FL 34114

Noah Matson
Defenders of Wildlife
Washington, DC 20005

Charles R. Maybury
Naples, FL 34114

Mike Mayer
Everglades National Park
Everglade City, FL 34139

J. McBride
Marco Island, FL 34145

Barbara McDowel
Naples, FL 34102

Gerard F. McNeil
Naples, FL 34114

H. William Merrill
Marco Island, FL 34145

Ramon E. Miller
New Paris, OH 45347

Jack and Mary Miller
Goodland, FL 34140

L. Jack Moller
Pembroke, FL 33024

Maureen Moran
Marco Island, FL 34146

Verna Mordeca
Marco Island, FL 34145

Bryan Mordecai
Marco Island, FL 34145

Sean Morton
Naples, FL 34112

Ken Moss
Goodland, FL 34140

Tom Moss
Naples, FL 34105

Tira and Pat Motes
Goodland, FL 34140

Ivan Moyer
Naples, FL 34106

Theodome N. Naftal
Naples, FL 34114

Natural Resources Management
Naples, FL 34102

Thomas J. Newton
Marco Island, FL 34146

Ted L. Norris
Naples, FL 34102

Tara O'Neil
Goodland, FL 34140

Timothy P. O'Neil
Marco Island, FL 34145

Peter O'Neill
Marco Island, FL 34145

William Oliver
Goodland, FL 34140

G. Thomas Orerman
Naples, FL 34106

Mike Owen
Copeland, FL 34137

Frerick and Frances Palmiter
Goodland, FL 34140

Marilyn E. Pemberton
Naples, FL 34114

Kenneth J. Perl
Naples, FL 34133

James S. Peterson
Goodland, FL 34140

Carmel Peterson
Naples, FL 34112

Don Phillips
Marco Island, FL 34145

Tony Polizos
Naples, FL 34120

Robert F. Polley
Goodland, FL 34140

Mary Polley
Goodland, FL 34146

Philip Popovici
Marco Island, FL 34145

Thomas F. Porter
Goodland, FL 34140

Dick Powell
Goodland, FL 34140

Karl Predmore
Air Boat Experience
Goodland, FL 34140

John Prushko
Marco Island, FL 34145

Jeseph Radoslovich
Marco Island, FL 34145

Michael R. Ramsey
Immokalee, FL 34143

Mary H. Ratliff
Naples, FL 34114

Marney Reed
Naples, FL 34114

Raymond J. Reed
Marco Island, FL 34146

Leonore Reich
Naples, FL 34108

Robert H. Richardson
Marco Island, FL 34145

Leon Richardson
Goodland, FL 34140

Robert Rivers
Naples, FL 33464

Margaret Roberts
Goodland, FL 33933

Philip E. Roberts
Goodland, FL 34140

Richard Rogers
Marco Island, FL 34145

Mark Ryan
Marco Island, FL 34145

Save the Wildlife
Goodland, FL 34140

Brian and Rosalyn Scherf
Hollywood, FL 33019

Rudolph and Rosemarie Schwenzer
Naples, FL 34104

Thomas A. Scott
Goodland, FL 34140

Philip A. Selleck
Everglades National Park
Homestead, FL 33035

Brian Sheehan
Naples, FL 34114

Mike Shirley
DEP/Rookery Bay
Naples, FL 34113-8059

Joe Sierra
Naples, FL 34108

Jim Simmons
Naples, FL 34114

Michael Simonk
Naples, FL 34102

Gene Skille
Naples, FL 34114

T. J. Smith
Homestead, FL 33035

Carol Spaett
Naples, FL 34114

Fran Stallings
Bonita Springs, FL 34136

H. Lee Stephens
Naples, FL 34114

Jim Stevenson
Dep. of Environmental Protection
Tallahassee, FL 32399-3000

Alfred Stier
Naples, FL 34113

Judith Stiteler
Albuquerque, NM 87111

Chris Straton
Naples, FL 34110

Leslie Strauss
Naples, FL 34106

C. A. Szubeca
Naples, FL 34104

Terrence Tessarzik
Goodland, FL 34140

Kris Thoemke
Naples, FL 34103

Patti Thompson
Maitland, FL 32751

Pete and Jane Thompson
Naples, FL 34104

Sherrl Thompson
Copeland, FL 34137

Nancy B. Titus
Naples, FL 34114

Fred Tonney
Marco Island, FL 34145

Elizabeth B. Townsend
Naples, FL 34114

Carl E. Townsend
Naples, FL 34114

Walley Valleau
Marco Island, FL 34145

Clayton and Martha Vandiver
Naples, FL 34114

Louis Van Meter
Naples, FL 34114

Linda Van Meter
Goodland, FL 34140

Bret Waltele
Naples, FL 34112

Ken Waltson
Naples, FL 34110

Ronald L. Weagle
Naples, FL 34114

Gary Weeks
Goodland, FL 34140

Diane Weighart
Naples, FL 34112

Deibert White
Goodland, FL 34140

B. E. Wolfe
Goodland, FL 34140

Vicki Wood
Goodland, FL 34140

Ken Woodside
Ft. Lauderdale, FL 33314

John T. Worthington
Pineland, FL 33945

Bob Zellermsyer
Naples, FL 34109

Jerrey Zimmerman
Naples, FL 34114

Wendy S. Zumbrun
Naples, FL 34106

William F. Zumbrun
Helen L. Zumbrun
Naples, FL 34103

Intra-Service Section 7 Consultation

Division/Office: U.S. Fish and Wildlife Service, Ten Thousand Islands National Wildlife Refuge

Project Biologist/Phone Number: Jim Krakowski/(941) 353 8442, Ext. 27

Date:

I. Proposed Action:
Activities associated with the Comprehensive Conservation Plan for Ten Thousand Islands National Wildlife Refuge. The Plan would increase access to the refuge and implement additional study and management projects.

II. Location:
Collier County, Florida

III. Description of Proposed Action (describe in enough detail to allow proper evaluation of project impacts, attach additional pages as needed):
Actions can be divided into two major areas:

A. Increase in human access to the refuge for wildlife observation, recreation, and environmental education. Specifically, the following measures will be developed.

(1) Development of a walking interpretive and wildlife viewing trail along the oil pad road. New construction would include a parking area, restroom, and interpretive exhibits along the trail. The trail would contain interpretive and educational exhibits on refuge programs and natural resources. The trail would be day-use only.

(2) Development of a non-motorized boat trail in the refuge marsh south of U.S. Highway 41. The trail would originate from the oil pad road. Post markers would be installed along the route as a guide. The trail would provide wildlife observation in an area that is difficult to access. The wildlife viewing area would be day-use only.

(3) Initiate a limited, quality waterfowl hunt program in the marsh south of U.S. Highway 41. Teal, scaup, ring-necks, hooded mergansers, and mottled ducks are the common species found during the winter months.

B. Commercial harvest of fishery resources in refuge submerged lands under restrictions established by State regulations.

(1) Commercial harvest of fish and shellfish would continue under guidelines established by State regulations. The Comprehensive Conservation Plan outlines monitoring schemes to ensure these resources are harvested on a sustained-yield basis.

C. The Comprehensive Conservation Plan for Ten Thousand Islands National Wildlife Refuge contains six refuge goals. Each goal has new strategies for study and management. Strategies that are new and have impacts on endangered species include:

- 1.1.2 By 2003, conduct a comprehensive inventory of listed species.
- 1.2.2 By 2005, develop a comprehensive Inventory of refuge wildlife and habitats.
- 1.2.4 By 2005, initiate a fisheries inventory program to establish baseline data.
- 1.3.5 By 2003, initiate raccoon control program to benefit sea turtle hatching.
- 1.3.6 Remove derelict boats from refuge waters.
- 1.3.8 Acquire approximately 1,640 acres adjacent to refuge boundary.
- 1.4.2 By 2004, implement an invasive exotic plant control program.
- 1.4.5 Assess fire ant impacts to sea turtle nesting, control if necessary.
- 2.1.2 By 2000, implement a waterfowl hunt program.
- 2.1.4 By 2001, implement a study to assess powered watercraft on the refuge's shallow water environments.
- 2.1.5 By 2003, develop a Public Use Management Plan.
- 2.1.7 By 2004, develop a non-motorized boat trail south of U.S. Highway 41.
- 3.1.1 Gather information on current uses within the co-managed areas and assess compatibility.
- 3.1.4 Gather new biological information on commercial uses to facilitate compatibility determinations.
- 4.2.2 Establish a visitor contact station in Goodland.
- 4.2.3 By 2009, develop the oil pad road into a walking interpretive trail.
- 5.2.5 Collaborate with other agencies and universities to conduct water quality and hydrologic studies on the refuge.
- 6.1.1 Conduct comprehensive survey of archaeological resources.

These actions are further defined in the Comprehensive Conservation Plan and Environmental Assessment.

IV. Species and Habitats Considered:

A. List all federally threatened, endangered, proposed, and candidate species, and describe any associated critical or proposed critical habitat that may be affected by the proposed action. Make a determination of how the proposed action may affect each:

Species/Critical Habitat	*Status*[1]	*Determination*[2] *NE*	*NA*	*AA*	*Response Requested*[3]
Loggerhead Sea Turtle	T		X		
Green Sea Turtle	E		X		
West Indian Manatee	E/CH		X		
Wood Stork	E		X		
Bald Eagle	T		X		
Snail Kite*	E		X		
Piping Plover*	E		X		
American Crocodile*	E		X		
Hawksbill Sea Turtle	E		X		
Kemp's Ridley Sea Turtle	E		X		

* Species not documented on the refuge, but likely to occur.

[1]Status:
E = endangered, T = threatened, PE = proposed endangered, PT = proposed threatened, CH = critical habitat, PCH = proposed critical habitat, C = candidate species

[2]Determination:
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.

NA = not likely to adversely affect.
This determination is appropriate when the proposed action is not likely to adversely affect any listed, proposed, candidate species or designated/proposed critical habitat or there may be beneficial effects to these resources.

AA = likely to adversely affect.
This determination is appropriate when the proposed action is likely to adversely affect any listed, proposed, candidate species or designated/proposed critical habitat.

[3]Response Requested: conference, concurrence, formal consultation.

V. Determination of Effects:

A. Explanation of effects of the action: include direct, indirect, interrelated, interdependent, and cumulative effects (attach additional p ages as needed):

Definitions for Effects of the Action:

Direct Effects = are those that are an immediate result of the action.

Indirect Effects = are 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.

Interrelated = are those that are part of a larger action and depend on the larger action for their justification.

Interdependent = are those that have no significant independent utility apart from the action that is under consideration.

Cumulative Effects = are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area.

Loggerhead sea turtle
USFWS Photo

Sea Turtles: Loggerhead, Green, Kemp's Ridley, and Hawksbill

Loggerhead and Green turtles nest on the coastal sandy beaches of the refuge. In addition, they are occasionally observed in the inter-island waters of the refuge, where they may be feeding, loafing, or in transit.

(1) Increased human visitation projects. No effects because these projects would occur in the fresh marsh area of the refuge and sea turtles inhabit the coastal waters and islands.

(2) Commercial harvest of fishery resources. Commercial netting of fish (mullet) does occur during the winter months, however, the nets are small and receive constant attention. It is the Service's understanding that this netting has a minimal affect on sea turtles. Mature turtles would have a difficult time accessing the crab traps that are commonly used on the refuge. It is believed that commercial fishing would not adversely impact this species.

(3) Other Comprehensive Conservation Plan Projects. Projects 1.1.2, 1.3.3, 1.3.7, 1.4.2, 1.4.6, 2.1.4, 2.1.5, 3.1.1, 3.1.4, and 5.2.5 are projects that would all benefit the sea turtles. All of the projects would indirectly benefit these turtles by surveying animal numbers (1.1.2, 1.4.6, 3.1.4); removing predators (1.3.5, 1.4.6), protecting habitat (1.3.7, 1.4.2); or studying a problem (2.1.4, 2.1.5, 3.1.1, 5.2.5).

West Indian manatee
Photo by Larry W. Richardson

West Indian Manatee

This animal is observed on the refuge throughout the year. Numbers are usually higher during the summer months. They have been observed feeding on grass flats, resting in warm water areas, or attracted to freshwater areas near shore. Often they are observed with calves. The State of Florida has identified manatee protection zones within the boundaries of the refuge (Fig. 19).

(1) Increased human visitation projects. No effects are expected because these projects would occur in the freshwater marsh area of the refuge and manatees inhabit the coastal waters and islands.

(2) Commercial harvest of fishery resources. Commercial harvest boats can obtain a state permit to travel at speeds higher than those established for the manatee protection areas of the refuge. Further assessment in strategies 2.1.5, 3.1.1, and 3.1.4 would help determine if negative effects are occurring. Present use is not believed to have an adverse effect.

(3) Other Comprehensive Conservation Plan Projects. All of the projects would indirectly benefit the manatee by surveying animal numbers (1.1.2, 3.1.4); protecting habitat (1.3.7, 1.3.8, 2.1.4); or studying a problem (2.1.4, 2.1.5, 3.1.1, 5.2.5).

Wood stork
USFWS Photo

Wood Stork

Storks are observed feeding in shallow water areas of the refuge throughout the year. Stork nest rookeries have yet to be found on the refuge.

(1) Increased human visitation projects. These may produce some temporary disturbance to these birds as they use the northern marsh areas of the refuge. However, most of the visitation would be on the 1-mile oil pad road. Canoe and waterfowl hunter use would be limited to the cooler winter season when mosquitos are not as plentiful. Use would be directed to certain routes or areas. Sanctuary areas for the birds will be included in projects 2.1.2, 2.1.4, and 2.1.6. The added disturbance caused by these projects is not expected to adversely affect this species.

(2) Commercial harvest of fishery resources. No effects or limited effects are expected because commercial harvest occurs in the coastal waters, which is accessed at higher tides. Most of the wood stork use occurs in low tide situations or in the freshwater marsh areas of the refuge, which are not accessible to commercial harvesters.

(3) Other Comprehensive Conservation Plan Projects. All of the projects would indirectly benefit the wood stork by surveying animal numbers (1.1.2, 1.2.2); protecting habitat (1.3.7, 1.3.8, 2.1.4); or studying a problem (2.1.4, 2.1.5, 3.1.1, 5.2.5).

Bald eagle
USFWS Photo by Lee Emery

Bald Eagle

Bald eagles are commonly observed flying or roosting within the refuge. Often they are observed on exposed tidal flats feeding on fish. No eagle nests have been observed on the refuge.

(1) Increased human visitation projects. No effects or limited effects, because these projects would occur in the freshwater marsh area of the refuge and all eagle use noted to date has been on the coastal waters and islands.

(2) Commercial harvest of fishery resources. Commercial harvest boats do travel within the coastal areas of the refuge where eagles can be observed. Further assessment in strategies 2.1.5, 3.1.1, and 3.1.4 would help determine if negative effects are occurring. Present use is not believed to have an adverse effect.

(3) Other Comprehensive Conservation Plan Projects. All of the projects would indirectly benefit the bald eagle by surveying animal numbers (1.1.2, 1.2.2); protecting habitat (1.3.7, 1.3.8, 2.1.4); or studying a problem (2.1.4, 2.1.5, 3.1.1, 5.2.5).

Snail kite
USFWS Photo by P. W. Sykes

Snail Kite

The Snail Kite has yet to be documented on the refuge, however, it has been observed on nearby marshes of similar habitat to the north of refuge marshes.

(1) Increased human visitation projects. These may produce some temporary disturbance to these birds as they are believed to use the northern marsh areas of the refuge. However, most of the visitation would be on the 1-mile oil pad road. Canoe and waterfowl hunter use would be limited to the cooler winter season when mosquitos are not as plentiful. Use would be directed to certain routes or areas. Sanctuary areas for the birds would be included in projects 2.1.2, 2.1.4, and 2.1.6. The added disturbance caused by these projects is not expected to adversely affect this species.

(2) Commercial harvest of fishery resources. No effects or limited effects are expected because commercial harvest occurs in the coastal waters, which is accessed at higher tides. Snail kite use would occur in the freshwater marsh area of the refuge. This area is not accessible to commercial harvesters.

(3) Other Comprehensive Conservation Plan Projects. All of the projects would indirectly benefit the snail kite by surveying animal numbers (1.1.2, 1.2.2); protecting habitat (1.3.7, 1.3.8, 2.1.4); or studying a problem (2.1.4, 2.1.5, 5.2.5).

Piping plover
USFWS Photo

Piping Plover

This bird has been observed using the coastal shore habitat in nearby areas during the winter and migration seasons.

(1) Increased human visitation projects. No effects or limited effects are expected because these projects would occur in the freshwater marsh area of the refuge and all of the piping plover use noted to date has been on the coastal waters and islands.

(2) Commercial harvest of fishery resources. Commercial harvest boats do travel within the coastal areas of the refuge where piping plovers can be observed. Further assessment in strategies 2.1.5, 3.1.1, and 3.1.4 would help determine if negative effects are occurring. Present use is not believed to have an adverse effect.

(3) Other Comprehensive Conservation Plan Projects. All of the projects would indirectly benefit the piping plover by surveying animal numbers (1.1.2, 1.2.2); protecting habitat (1.3.7,1.3.8, 2.1.4); or studying a problem (2.1.4, 2.1.5, 3.1.1, 5.2.5).

American crocodile
Photo by P. Moler

American Crocodile

Crocodiles are suspected to inhabit the refuge, but none have been fully documented to date. This species occurs in brackish/salt water that is characteristically more tidal. Existing populations do occur less than 5 miles west of the refuge.

(1) Increased human visitation projects. No effects or limited effects are expected because these projects would occur in the freshwater marsh area of the refuge and most of the suspected crocodile use would be on the coastal waters and islands.

(2) Commercial harvest of fishery resources. Commercial harvest boats do travel within the coastal areas of the refuge where crocodiles would occur. Further assessment in strategies 2.1.5, 3.1.1, and 3.1.4 would help determine if negative effects are occurring. Present use is not believed to have an adverse effect.

(3) Other Comprehensive Conservation Plan Projects. All of the projects would indirectly benefit the crocodile by surveying animal numbers (1.1.2, 1.2.2); protecting habitat (1.3.7, 1.3.8, 2.1.4); or studying a problem (2.1.4, 2.1.5, 3.1.1, 5.2.5).

B. Explanation of actions to be implemented to reduce adverse effects: All of these species will be monitored and evaluated frequently to assure no adverse impacts occur. If adverse impacts do occur, the project and the Comprehensive Conservation Plan would be modified to correct that situation.

VI. Signatory Approval:

Project
Leader:_____
Jim Krakowski Date

VII. Reviewing Ecological Services Office (ESO) Evaluation:

A. Concurrence _____ Nonconcurrence _____

B. Formal Consultation Required _____

C. Conference Required _____

D. Remarks (attach additional pages if needed):

VIII. Signatory Approval:

ESO Supervisor: _____
Signature Date

Note: The process ends here if the proposed action is "not likely to adversely affect".

Draft Management Agreement for Certain Lands in Collier County

WHEREAS, the State of Florida, hereinafter referred to as the "State," and the United States Fish and Wildlife Service, hereinafter referred to as the "Service," own and manage adjacent tracts of land in Collier County, namely, the Service manages the Ten Thousand Islands National Wildlife Refuge, hereinafter referred to as the "Refuge," and the Florida Department of Environmental Protection, Office of Coastal and Aquatic Areas, manages the Cape Romano-Ten Thousand Islands and Rookery Bay Aquatic Preserves. In addition, the State claims sovereignty over certain submerged lands, some of which are within the boundary of the Refuge; and

WHEREAS, the Board of Trustees of the Internal Improvement Trust Fund, hereinafter referred to as the "Board," holds title to certain sovereignty submerged lands, hereinafter referred to as "State lands," in Collier County, Florida, and

WHEREAS, the Board may authorize the management of said State lands by virtue of Chapter 253.03, Florida Statutes; and

WHEREAS, the Service desires to manage submerged State lands which may be located within the boundaries of the Refuge for public purposes as outlined in the Comprehensive Conservation Plan/Environmental Assessment for the Refuge, hereinafter referred to as the "Plan," and specified in Fig 5, "Map of Co-Managed Lands and Navigable Waters" attached hereto; and

WHEREAS, the Board has determined that it would be appropriate for the Service to manage the certain State lands for public purposes as outlined in the Plan;

NOW, THEREFORE, the Board hereby grants to the Service the right to co-manage for public purposes all lands titled in the Board and all submerged lands for which the State claims sovereignty which are located within the boundaries of the overlying jurisdictional areas, hereinafter referred to as the "designated areas," as described in the Plan, which is attached hereto and made a part hereof, for a period of 50 years from the effective date of this Agreement, on the following terms and conditions:

1. The Service will manage the designated areas as provided for in the Plan in a manner which will not conflict with the conservation, protection and enhancement of said lands and will not interfere with the maintenance of public navigation projects or other public works projects authorized by the United States Congress.

2. The Service will manage the designated areas as part of the Refuge. The wildlife management, public use, and law enforcement on said lands will be administered according to the policies of the Service as well as the regulations set forth in the National Wildlife Refuge System Administration Act of 1966, provided they are acceptable to the Florida Department of Environmental Protection, Fish and Wildlife Conservation Commission, and compatible with the management goals of the State's aquatic reserve program.

3. The Plan will be reviewed jointly by the Board and the Service at no greater that 5 year intervals and updated as necessary. The Service will not alter the designated areas or engage in any activity except as provided for in the Plan without the prior written approval of the Board.

4. Upon execution of this Agreement, the Service will have the right to enter and occupy the subject lands for the purpose of fulfilling the activities designated under "implementation" in said Plan subject to existing State laws, rights and interests.

5. The Board retains the right to enter the subject lands and to engage in management activities other than those provided for herein following notification, consultation, and approval by the Service. The Service retains the right to affirm or deny any further management activities by third parties, and determine if such activities are compatible for lands incorporated into the National Wildlife Refuge System. Upon such affirmation by the Service, the Board may grant approval to third parties for compatible management activities under the terms of this Agreement.

6. Upon the request of the Board, the Service will provide information regarding Service operations within the designated areas that in any manner relate to this Agreement.

7. Inasmuch as the Florida Department of Environmental Protection (FDEP), has the constitutional authority to manage state fish and wildlife resources, and the Service desires to engage in cooperative efforts for resource management for the Refuge, a Memorandum of Understanding will be developed between the agencies to address in more detail the cooperative elements identified in items 8, 9, and 10.

8. The FDEP and the Service agree to cooperate in support of research and monitoring within the designated areas of cooperative management. Said agencies will coordinate planned research activities with each other on an annual basis, and share results of research projects. Cooperative research will also include sharing of staff and equipment resources when appropriate.

9. The FDEP and the Service agree to cooperate in support of resource management within the designated areas of cooperative management. Said agencies will coordinate planned restoration, public access, and resource protection projects with each other on an annual basis. Both parties agree to monitor and review public use and watershed land use impacts on the Refuge ecosystem.

10. The FDEP and the Service agree to cooperate in support of education and outreach efforts associated with current and future research and management activities within the designated areas of cooperative management. Said agencies will coordinate planned education field study and community outreach activities with each other on an annual basis.

11. Section 267.061(1)(b), Florida Statutes, specifies that title to all treasure trove, artifacts, and such objects or antiquity having intrinsic, scientific or historical and archaeological value, which have been abandoned on state-owned waters or state-owned sovereignty submerged lands, is vested in the Division of Historical Resources of the Department of State, for the purpose of administration and protection for the State. The execution of this Agreement in no way affects any of the parties' obligations pursuant to Chapter 267, Florida Statutes. The disturbance of archaeological and historical sites on state-owned lands is prohibited unless prior authorization has been obtained from the Division of Historical Resources in order to mitigate potential damage or disturbance of, or to preserve, archaeological and historical sites and properties.

12. This Agreement does not convey any title interest from the State or the Service in the areas described in Fig. 5, "Map of Co-Managed Lands and Navigable Waters" of the Refuge.

13. This Agreement may be unilaterally terminated by either party with or without cause, by providing written notice of the intent to the other party at least 60 days prior to the proposed date of termination.

14. The Agreement may be renewed for succeeding additional 10-year terms by mutual agreement of the parties. This option to renew if exercised, together with all additions, deletions, and modifications to this Agreement, shall be affixed hereto.

15. This Agreement and any right and privileges relative to State lands contained herein are for the sole use of the Service and shall not be assigned or transferred in whole or in part to any other party without the consent of the Board.

16. The Service agrees to assist in the investigation of injury or damage claims either for or against the State or the Board pertaining to the Service's area of responsibility or arising out of the Service's management programs hereunder and to contact the Board regarding whatever legal action the Service deems appropriate to remedy same.

17. The liability of the Service for the acts and omissions of its employees pursuant to this instrument shall be governed by the Federal Tort Claims Act.

18. The Service agrees that it will not discriminate against any individual based on race, color, religion, sex, national origin, age, handicap, or marital status with respect to any activity occurring within the area subject to this Agreement or upon lands adjacent to and used as an adjunct area.

19. Unless specified herein to the contrary, this Agreement will be governed and interpreted by applicable Federal and State laws.

20. All notices given under this Agreement must be in writing and mailed to the address of the party to whom notice is to be given, as designated by such party in writing. The Board, the FDEP and the Service hereby designate their respective address as follows:

Board:	*Division of State Lands* Bureau of Land Management Services 3900 Commonwealth Boulevard Mail Station 125 Tallahassee, Florida 32399
Service:	*Regional Director* U.S. Fish and Wildlife Service 1875 Century Boulevard Atlanta, Georgia 30345
Department of Environmental Protection	*Executive Director* Department of Environmental Protection 3900 Commonwealth Boulevard Tallahassee Florida 32399-3000 Office of Coastal Aquatic Management Areas 3900 Commonwealth Boulevard Tallahassee Florida 32399-3000

IN TESTIMONY WHEREOF, witnesseth the signature of the Regional Director, Fish and Wildlife Service, on behalf of the United States of America, and the signature of the legally designated agent of the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida, this _____day of _____, 2000.

UNITED STATES OF AMERICA - Department of the Interior

By:_____ _____ _____

Regional Director — Witness — Witness

Fish and Wildlife Service

Southeast Region

BOARD OF TRUSTEES OF THE INTERNAL IMPROVEMENT TRUST FUND OF THE STATE OF FLORIDA

By:_____ _____ _____

Director — Witness — Witness

Division of State Lands

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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.
Candidate Species	Species that the Fish and Wildlife Service is actively reviewing for possible inclusion in the threatened or endangered species lists.
Compatible Use	A wildlife-dependent recreational use, or any other use on a refuge that will not materially interfere with or detract from the fulfillment of the System or the purposes of the refuge.
Comprehensive Conservation Plan	A document that states the Fish and Wildlife Services desired future conditions of the refuge and provides long-range guidance and management direction to accomplish the purposes of the refuge, contribute to the mission of the system, and meet other relevant mandates.
Cultural Resources	The physical remains of human activity (artifacts, ruins, burial mounds, etc.), and the conceptual content or context of an area as a setting for legendary, historic, or prehistoric events such as a sacred area of native peoples. It includes historical, archaeological, and 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 and their associated non-living environment.
Ecosystem Approach	A strategy or plan to manage the natural function, structure, and species composition of an ecosystems, 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.
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 for a plant or animal community in the area where it occurs.
Herbicide	A chemical agent used to kill plants or inhibit plant growth.
Issue	Any unsettled matter that requires a management decision.
Listed Species	A plant or animal species identified as being threatened, endangered, threatened, or of special concern by either federal or state agencies.
Mitigation	Avoiding or minimizing the impacts of an action by limiting the degree or magnitude ofthe 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	A term that describes plant or animal species, habitats, or communities that originated in a particular region or area, or those that have established themselves 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	Agreements between a refuge and other federal, state, and local entities for co-management of shared natural resources, operation of multi-agency visitor centers, law enforcement, wildfire suppression, prescribed burning, and other management activities.
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 providethe basis from which objectives are developed.
Strategies	Specific approaches used to accomplish objectives and therefore goals. Strategies provide direction for defining and coordinating operational tasks to effectively achieve the objectives and goals of a plan, and in this case fulfill the refuge's purpose.
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 significant issues to be addressed in a plan. It is a process whereby the public and various federal, state, and local agencies are invited to participate.
Shrub	A plant usually with several woody stems sometimes referred to as a bush. A shrub usually differs from a tree by its low stature and/or its multiple stemmed characteristics.
Species	A category of biological classification. A distinctive kind of plant or animal having distinguishable characteristics that intrabreeds and produces viable offspring.
Stakeholder Group	A group of local citizens representing a broad spectrum of interests offering business, tourism, conservation, recreation, and historical perspectives.
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 science and art of making the land produce wildlife in defined patterns that meet the needs of humanity.