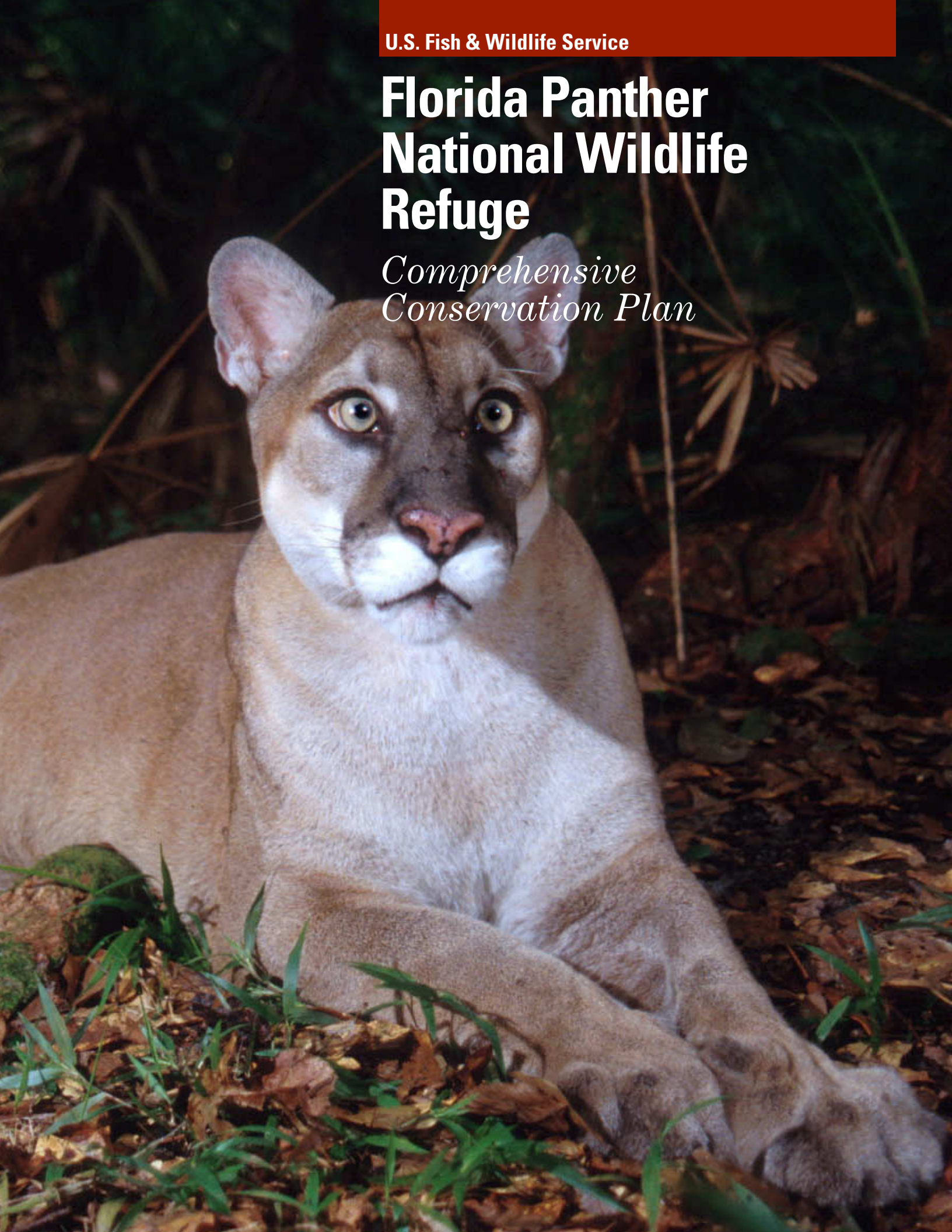
U.S. Fish & Wildlife Service

Florida Panther National Wildlife Refuge

Comprehensive Conservation Plan



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3/22/2000

Date

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Introduction

Purpose of and Need for the Comprehensive Conservation Plan
Under the provisions of the National Wildlife Refuge System Improvement Act of 1997, the Fish and Wildlife Service has prepared a Comprehensive Conservation Plan for the Florida Panther National Wildlife Refuge, Collier County, Florida.

This plan will serve as an operational guide for the refuge manager over the next ten to fifteen years. Its purpose is to identify the role that the refuge will play in support of the mission of the National Wildlife Refuge System, the South Florida Ecosystem, and the recovery of the Florida panther. It also identifies the goals of the Florida Panther National Wildlife Refuge and how they address public concern for more access to the refuge.

Florida panther
Photo © Larry W. Richardson

The plan is designed 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.

Panther tracks
Photo by Darrell Land, Florida Fish and Wildlife Conservation Commission

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.

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 516 national wildlife refuges provide important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. 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.

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 Florida Panther National Wildlife Refuge

Refuge Location

The refuge is located approximately 20 miles east of Naples, Florida. The south boundary of the refuge parallels Interstate 75 (Alligator Alley); the east boundary follows State Road 29. Private lands border the refuge on both the north and west. The refuge shares common boundaries with Big Cypress National Preserve (east) and Fakahatchee Strand State Preserve (south).

Purpose of the Refuge

The refuge was established to conserve fish, wildlife, and plants which are listed as threatened and/or endangered species (Endangered Species Act of 1973). In addition, the refuge was established for the development, advancement, management, conservation, and protection of fish and wildlife resources (Fish and Wildlife Act of 1956).

Figure 1. Refuge Vicinity Map

Comprehensive Conservation Plan

The following two critical Service planning documents also played a strong role in defining the purpose of the refuge:

- First, the need and mechanism for establishing the refuge was provided in the 1985 "Fakahatchee Strand Environmental Assessment." This assessment clearly states that the refuge area should be acquired for the benefit and recovery of the endangered Florida panther.
- Second, the Service's 1995 "Florida Panther Recovery Plan," a document prepared by the Florida Panther Interagency Committee, states that the Florida Panther National Wildlife Refuge is essential to the survival of the panther and that the refuge should enhance habitat conditions for the panther and the panther's prey species.

Thus, the refuge's purpose has strong ties to the protection and recovery of the endangered Florida panther and its habitat. The refuge manager will give the panther greater consideration than other refuge species in management operations, and in making compatibility determinations relating to public use of the refuge.

Florida panther
Photo by Don Pfitzer

The Florida Panther and Recovery Program

The Florida panther, Puma (Felis) *concolor coryi*, is one of the most endangered large mammals in the United States. A single wild population in southern Florida, estimated to contain 30-50 adults, is all that remains of an animal that historically ranged throughout most of the southeastern United States. This population utilizes landscapes totaling approximately two million acres, about half of which is in private ownership. Panthers utilize all available native landscapes from upland pine flatwood and hardwood hammock forests to wetland systems dominated by wet prairies and swamp forests. For this reason, the panther serves as a "barometer" of habitat conditions for the vast majority of other terrestrial plant and animal species endemic to south Florida. Preservation and proper management of habitats for the panther benefit vast numbers of other species indigenous to the ecosystem.

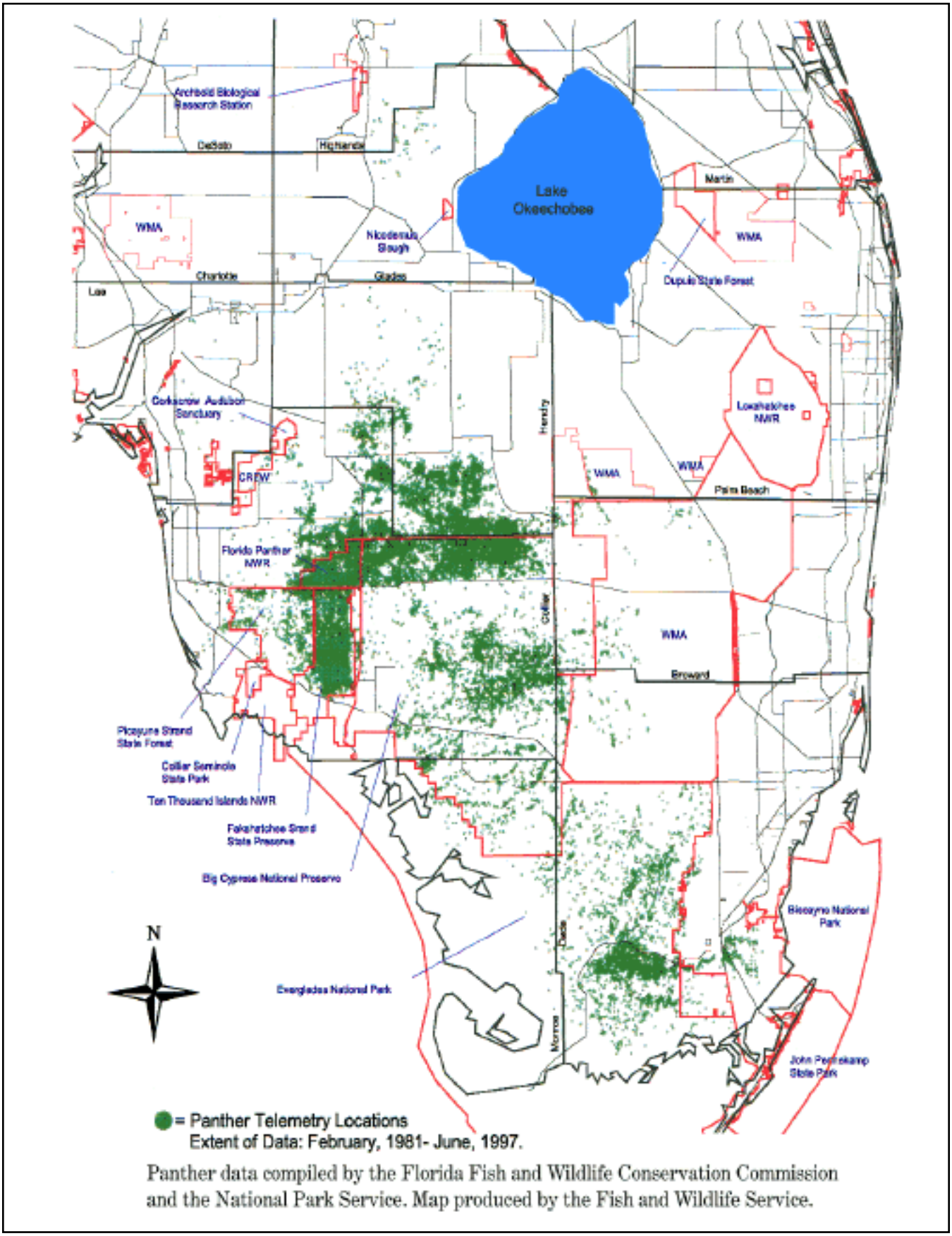
The historical distribution of the panther is reported to have extended west to Arkansas and Louisiana (possibly into eastern Texas); eastward across Mississippi, Alabama, Georgia, Florida, and the southern parts of South Carolina and Tennessee. It has also been reported that the panther intergraded with three other subspecies of the American puma; *P.c. stanleyana* to the west, *P.c. hippolestes* to the northwest, and *P.c. cougar* to the northeast. There are no historical population figures available. However, using the current population density in southern Florida as a basis for projection, the minimum historical population would have likely numbered from 2 to 4 thousand adults.

Literature suggests that the Florida panther was extirpated over much of its historical range by the late 1800s. Human persecution and habitat destruction were historic factors that contributed to the endangered status of the panther.

By the time the panther was granted protection (State -1950; Federal-1967), the taxon was already in danger of extinction throughout its historic range. Early recovery efforts focused around the Florida Fish and Wildlife Conservation Commission's Florida Panther Clearinghouse (formerly known as the Florida Game and Fresh Water Fish Commission) and associated field surveys, initiated in the late 1970s. These efforts primarily focused on attempts to determine and document the panther population in south Florida.

Intensive radio-instrumentation and monitoring were initiated in 1981. As of April 12, 1999, 79 panthers have been instrumented and monitored producing a vast amount of biological and demographic information *(Fig. 2)*. Demographically, the population appears to function similar to mountain lion populations throughout occupied areas to the west. Physiologically, the population exhibits numerous manifestations attributed to generations of isolation and inbreeding. Environmental contaminants may also be contributing to some of these conditions.

Figure 2. Florida Panther Distribution Map



Panther data compiled by the Florida Fish and Wildlife Conservation Commission and the National Park Service. Map produced by the Fish and Wildlife Service.

Florida panther kitten
USFWS photo by Larry W. Richardson

Florida panther
USFWS photo

Threats to the panther generally fall into three basic categories:

1. Population Security

The single, small population provides little security against extinction. In a population of this size, a disease outbreak or other catastrophic event could reduce the population to a level at which it could no longer sustain itself.

2. Population Viability

Population viability is threatened by numerous physiological and reproductive abnormalities prevalent within the population. For the most part, these conditions are considered manifestations of isolation and inbreeding, and possible environmental contamination. These include a high rate of abnormal sperm (90+ percent malformed), cryptorchidism (a testicular abnormality affecting 30-60 percent of males), congenital heart defects (including atrial septal defects), and possible immune deficiencies.

3. Habitat Destruction/Fragmentation/Contamination

Remaining panther habitat in south Florida is under tremendous threat from urban and agricultural conversion. Approximately half of the occupied landscape is under private ownership. It appears that habitats available to the radio-instrumented segment of the population in south Florida are at, or approaching, carrying capacity for the panther.

In 1986, the Florida Panther Interagency Committee was formed to provide for a cooperative, coordinated federal/state recovery program for the panther. The committee is made up of the Service, the National Park Service, the Florida Fish and Wildlife Conservation Commission, and the Florida Department of Environmental Protection.

Recovery activities generally focus around the following three areas of emphasis:

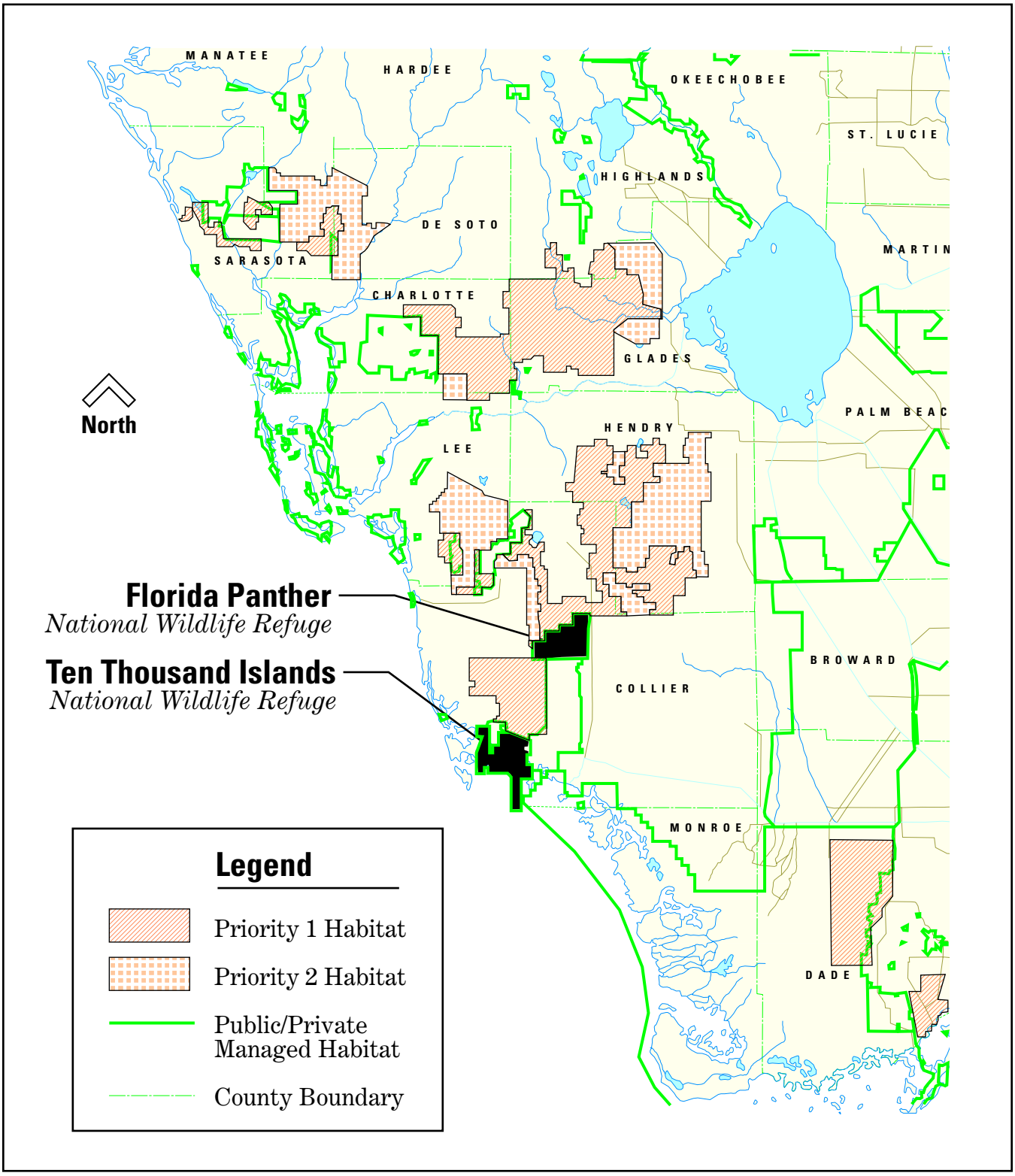
1. Actions to protect, enhance, and monitor the existing population in south Florida, its associated habitats, and prey resources.

Agencies represented on the Florida Panther Interagency Committee focus on actions on their respective lands to enhance conditions for the panther. Approximately 900,000 acres of panther habitat on private lands have been identified in the Florida Panther Preservation Plan (Logan 1993). The plan classifies habitats as either Priority 1 or Priority 2, based on panther use and/or habitat quality *(Fig. 3)*. Priority 1 habitats are used most frequently by panthers and contain lands of high quality, native habitat. Priority 2 habitats are used less frequently by panthers and represent lands of lower quality, native habitat interspersed with intensive agriculture, serving as buffer zones to urban development and other forms of encroachment. Efforts are underway to design cooperative conservation programs that will provide incentives to landowners who maintain panther habitat on their lands.

2. Actions to address population health.

A genetic restoration program, designed to restore natural gene flow lost because of population isolation for a century or longer, was initiated in 1995. Eight *P.c. stanleyana* females were translocated into the population from southwest Texas. In 2000, the Committee was revised to form a Florida Panther Working Group. Intercross litters have been produced and geneticists project that within a few generations, lost genetic variability and viability will be restored.

Figure 3. Priority Panther Habitats Map



3. Actions to reestablish the panther into historic range areas.
The current recovery objective, as promulgated by the revised Florida Panther Recovery Plan (1995), is to achieve a minimum of three viable, self-sustaining populations within the historic range of the panther. To reach this goal, at least two populations will have to be reestablished populations. Fourteen candidate population reestablishment sites have been identified in a preliminary site identification/evaluation effort. A completed reintroduction feasibility study (1995) within a north Florida/ south Georgia candidate site, using Texas cougars as surrogate panthers, concluded that reestablishment of additional panther populations is biologically feasible. The study concluded that habitat and prey available in this site are sufficient to support a viable, self-sustaining population of panthers. Based on preliminary evaluations, other candidate sites appear capable of supporting panther populations. It now appears that the most significant remaining obstacle to advancing panther recovery is effectively dealing with sociological/political issues related to population reestablishment, which surfaced during the study. A program to evaluate and address these issues was initiated in early 1998.

The future of the panther looks brighter now than at any time since recovery efforts began in the late 1970s. The genetic restoration program appears to be successful and the reintroduction feasibility study has shown that habitats exist within the panther's historic range capable of supporting reestablished populations.

History of the Refuge
Prior to refuge establishment the area was owned by the Collier Family. Land use was limited to private hunting leases and cattle grazing. Several hunting camps were constructed throughout the refuge. The largest camp was located on the east side and was referred to as the "Fakahatchee Conservation Club." Deer were hunted by the lease holders or their guests with the aid of dogs, tree stands, and swamp buggies, or on foot.

The Florida Panther National Wildlife Refuge was established in June 1989 by the authority of the Endangered Species Act to protect the endangered Florida panther. The recovery plan for the panther was approved by the Service in December 1981, and revised in 1987 and 1995. The original plan stated ". . . it is vital to acquire the remainder of the Fakahatchee Strand and the prairies and cypress forests adjacent to it to ensure that a unified management strategy can be effected between the Fakahatchee Strand, the Big Cypress National Preserve, and the Everglades National Park."

The Service purchased the initial 24,300 acres of the refuge from the Collier Family (for which Collier County was named) for $10.3 million through a series of fee title acquisitions. With the addition of lands from the Collier Land Exchange on December 18, 1996, the refuge grew to approximately 26,400 acres.

The refuge encompasses the northern origin of the Fakahatchee Strand which is the largest cypress strand in the Big Cypress Swamp drainage basin. Orchids and other rare swamp plants grow within the strand's interior. The refuge contains a diverse mix of pine forests, cypress domes, marl prairies, hardwood hammocks, and lakes surrounded by swamps.

In addition to the panther, 20 other species of animals are found in the refuge vicinity that are either state or federally listed as threatened, endangered, or as species of special concern. The Florida black bear, alligator, wood stork, roseate spoonbill, limpkin, Eastern indigo snake, Florida grasshopper sparrow, Everglades mink, and Big Cypress fox squirrel are a few examples. Other resident wildlife include white-tailed deer and feral hogs, which are important panther prey species.

Panther Utilization of the Refuge

Since radio-instrumenting of Florida panthers began in 1981, the area around and what is now the Florida Panther National Wildlife Refuge has been heavily utilized by panthers. During a period of 18 years, more than 42,000 telemetry locations have been made of 79 panthers and 8 Texas cougars. Of these locations, 302 from 13 individual panthers were made on what is now the refuge prior to establishment in June 1989, and more than 4,338 locations of 32 panthers and 3 Texas cougars on the refuge since establishment. The Florida Fish and Wildlife Conservation Commission reports that since 1986 only two radio-collared panthers have denned on the refuge. During this time, an additional 12 den sites were located in the vicinity of the refuge, and the refuge was used, in part, to raise kittens from these sites. The refuge, centrally located within the core of heaviest, collared panther distribution, forms an intrinsic link between the Fakahatchee Strand State Preserve to the south and the Bear Island Unit of the Big Cypress National Preserve to the east. As such, the refuge has been used by 3-11 collared panthers (and Texas cougars since 1995) each month. Compared to Bear Island, where both panther and deer densities are high, the refuge receives roughly twice the utilization by panthers per acre, despite significantly lower prey resources. Use of the refuge by cats averaged 84 use-days per month over a 3-year period (1996-1998).

Prey Resources of the Refuge

Most commonly sought after prey by Florida panthers include white-tailed deer, wild hog, raccoon and armadillo. Management of prey on the refuge centers around deer since they are widely distributed across all habitats. Wild hog populations are generally restricted to the eastern side of the refuge. Estimates of deer numbers, based on track counts performed by the Florida Fish and Wildlife Conservation Commission from 1989-1991, indicate one deer per 182-224 acres. These numbers are relatively low in comparison to adjacent Bear Island, at 1 deer per 42-68 acres, and the Fakahatchee Strand State Preserve, at 1 deer per 133-200 acres. Heavy use of the refuge may be more indicative of its benefit to panthers as a corridor linkage between other areas, than its appeal for providing optimum prey. Recent research also has indicated that large mammal kills by panthers on the refuge occur approximately 20 percent less often than on adjacent Bear Island, where deer numbers are three to four times higher. Nevertheless, prey resource management remains a priority objective of the refuge.

Florida sunset
Photo by D. W. Pfitzer

Habitat Management and Research

Since establishment of the refuge, step-down plans were developed to guide interim management. Research was begun and information was gathered for incorporation into a more thorough Habitat Management Plan that would address refuge management within an ecosystem approach, and maintain and enhance the natural attributes and potential of the refuge. Research, completed and ongoing, collected on the refuge and elsewhere in the ecosystem by the Florida Fish and Wildlife Conservation Commission and other cooperators, has provided much needed information on panthers, bears and white-tailed deer. Operational step-down plans currently in use, and to be incorporated and/or modified for inclusion into the Habitat Management Plan, include the Fire Management Plan, Croplands Plan, Wildlife Inventory Plan and Exotic Plant Control Plan. These plans have been reviewed by various cooperators. The development of these step-down plans relatively soon after the establishment of the refuge was undertaken based on their perceived immediate need, independent of

research findings that would contribute to kinds of management in a larger plan. As for the Fire Management Plan, the use of prescribed fire and implementation of fire suppression techniques as management tools for south Florida environs are widely recognized. Furthermore, prescribed fire management on the refuge has been, and will remain, a primary tool to maintain and enhance the refuge for the Florida panther and other wildlife and plant species. The Habitat Management Plan will also incorporate step-down plans to address hydrological and habitat restoration and management of other species of wildlife and plants indigenous to the ecosystem.

Great egrets, Roseate spoonbills, and Glossy ibis
Photo by Don Pfitzer

Current Management Practices on the Refuge

Prescribed burning is the primary refuge management tool used to maintain native plant communities and enhance habitat for the panther's main prey species, the white-tailed deer. The refuge is divided into 54 burn compartments. Each year, the refuge burns from 5 to 8 thousand acres in separated compartments on a 3- to 4-year rotation.

Exotic plant control is used to protect the native habitats on the refuge. Invasive Brazilian pepper, melaleuca, cogon grass, and climbing fern have plagued the refuge. A mechanical cutting and herbicide program is conducted each year to combat this threat.

Research is an ongoing activity on the refuge. Most of the work to date has centered around the prescribed fire program and its impact to the resources of the refuge. Current research includes:

- Prescribed fire/deer forage quality
- Prescribed fire/deer movements
- Prescribed fire/cabbage palm mortality
- Florida panther movement/biology
- Effects of public use on panthers
- Lucky Lake Strand water control structure/vegetation monitoring
- Water quality/contaminants study
- Development of mast survey techniques
- Refuge small mammal diversity
- Refuge orchid inventory

Resource protection is an important management activity. The refuge's full-time law enforcement officer patrols the refuge boundary to protect resources from illegal poaching and trespass. In addition, this officer participates in monthly highway radar patrols of SR 29 with Florida Fish and Wildlife Conservation Commission officers. This effort has assisted in slowing traffic in an area where panther and motor vehicle collisions have occurred.

Environmental education is provided by refuge staff at local schools and various public gatherings since the refuge is closed to nearly all public access and use. Occasional tours of the refuge are given to small groups on a limited basis.

to protect Florida panther habitat

Role of the Refuge

The Florida Panther National Wildlife Refuge was established under the authority of the Endangered Species Act to protect Florida panther habitat. The refuge receives heavy use by this critically endangered species. During any given month, 3-11 collared panthers utilize refuge habitat areas. The refuge contains significant portions of the home ranges of several panthers and also functions as a vital habitat linkage for panthers utilizing adjacent portions of the Big Cypress National Preserve and Fakahatchee Strand State Preserve. The refuge and its management play a crucial role in the protection and recovery of the Florida panther. In addition, the refuge serves as a research and demonstration area for the management of panther habitat and healthy natural systems.

The Florida Panther Recovery Plan of 1995 specifically tasks the refuge with conducting refuge panther surveys to monitor activity; establishing a monitoring program for panther prey species; enhancing habitat for panther prey species; and developing a comprehensive management plan to address the needs of the panther (Habitat Management Plan).

In December 1998, after the retirement of the Florida Panther Recovery Coordinator, the Service redefined its roles and responsibilities for management and recovery of the panther. The refuge role was expanded to include designation as the lead on issues pertaining to management of the current population (i.e., genetics, radio tracking, captive breeding, research, land acquisition, etc.). The refuge will share coordination with the Service's Vero Beach, Florida, Ecological Services Office and the Service's South Florida Ecosystem Team on issues concerning panther conservation and recovery in south Florida. This new role will cover a multitude of tasks in the Florida Panther Recovery Plan.

restoration of the South Florida Ecosystem

Florida Panther and Ten Thousand Islands National Wildlife Refuges are two major components of the Big Cypress Watershed. These refuges serve as key areas to assess development impacts, restoration efforts, and health of wildlife and natural functions within this vast watershed covering Lee, Collier, and Hendry counties. In addition, the refuge plays an important role in the restoration of the South Florida Ecosystem.

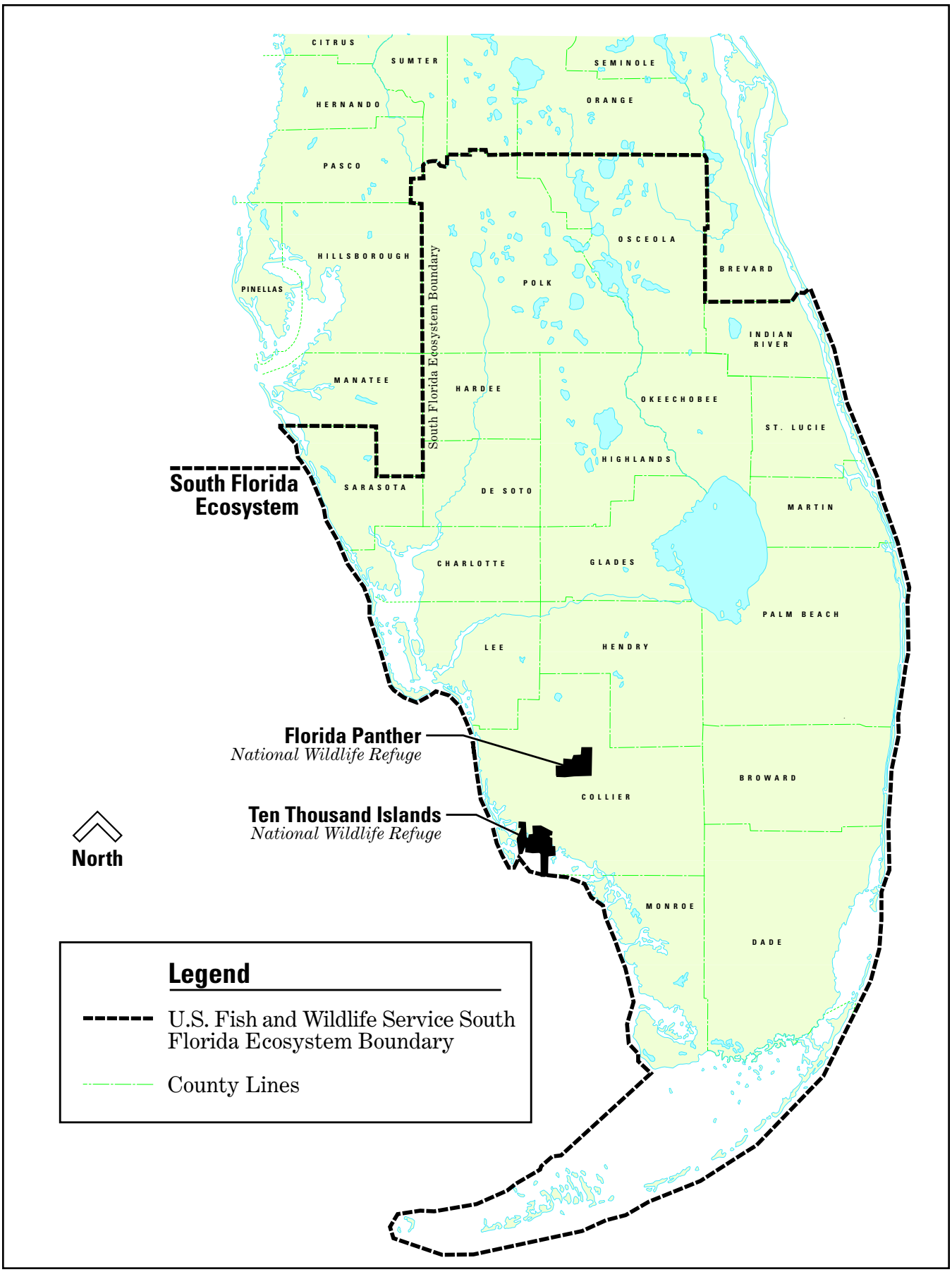
Common moorhen
Photo © Larry W. Richardson

Refuge Function within the Ecosystem, and Ecosystem Priorities

The South Florida Ecosystem encompasses more than 16.5 million acres of richly diverse habitats covering the 19 southernmost counties in Florida. It is a subtropical region that lies between the Caribbean and temperate North America *(Fig. 4)*. Environmental and economic impacts of urbanization and agriculture, as well as 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 loss of habitat 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.

Figure 4. South Florida Ecosystem Map



The following priorities have been determined by the Service for the South Florida Ecosystem, which includes the refuge:

- Protect and manage units of the National Wildlife Refuge System and other national interest lands.
- Protect migratory birds and protect, restore, and manage 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.

Legal Policy, Administrative Guidelines, and Other Considerations

Administration of national wildlife refuges is governed by various International treaties, federal laws, Presidential Executive Orders and regulations affecting land and water as well as the conservation and management of fish and wildlife resources. Policies for 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.

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 other federal, state, and local entities:

- Cooperative Agreement between the South Florida Water Management District and Department of the Interior, Fish and Wildlife Service, for the construction of a water control structure on Merritt Canal (designed to restore hydrology to Lucky Lake and Stumpy Strands);

- Interagency Agreement between the Department of the Interior, Big Cypress National Preserve and Florida Panther National Wildlife Refuge (for law enforcement);

- Local Operational Agreement between the Big Cypress National Preserve and Florida Panther National Wildlife Refuge and Ten Thousand Islands National Wildlife Refuge (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, Division of Forestry (for wildfire suppression and prescribed burning);

- 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); and

- Florida Panther Interagency Committee Memorandum of Agreement (to coordinate efforts to restore the Florida panther to non-endangered status). This agreement is in the process of revision.

Great egrets
USFWS Photo by B. Gill

Management Direction

Refuge Mission

The mission of the Florida Panther National Wildlife Refuge is to conserve and manage lands and waters in concert with other agency land efforts within the Big Cypress Watershed, primarily for the Florida panther; other threatened and endangered species; natural diversity; and cultural resources for the benefit of the American people.

Refuge Vision Statement

The Florida Panther National Wildlife Refuge, as a vital link in the recovery of the panther, will be managed for the conservation of the panther, its habitat, other threatened and endangered species, natural diversity, and compatible uses. The refuge will be a model of effective collaboration in natural resource management and education among diverse public interests, public and private landowners on a voluntary basis, and various conservation agencies.

Issues, Concerns, and Opportunities

A variety of public participation techniques was used throughout the planning process to ensure that future management supports the purpose and mission of the refuge, contributes to the mission of the system, and is reflective of the issues, concerns, and opportunities expressed by the public. A summary of the planning and public involvement process may be found in Appendix C.

The following key issues, concerns, and opportunities were identified during the planning process:

Public Access

This was a major issue voiced by the public regarding the refuge. Traditionally, the refuge has been closed to public access with the exception of limited, small group tours. The public was evenly divided on the amount of access it felt should occur on the refuge.

Cooperative Land Management and Partnerships within the Big Cypress Watershed

The refuge is one of many public land management areas that, along with private land interests, make up the Big Cypress Watershed. Management actions in one part of the watershed may adversely impact other parts of the system. There was a desire among some stakeholders to have the watershed cooperatively managed.

Public Awareness of the Panther and Refuge Programs

Survey respondents indicated an interest in knowing more about the panther and refuge programs.

Panther Habitat Protection on Private Lands

A sizeable portion of important habitat used by the panther exists on private lands. Although some landowners said they would not be interested in selling their land, they expressed an interest in maintaining natural areas.

Refuge Research and Management

Research and habitat management is considered an important tool in successfully managing the refuge.

Refuge Staffing
The staff is not of sufficient size to undertake initiatives needed to address Service responsibilities for the refuge and/or the South Florida Ecosystem.

Oil and Gas Exploration
Plans for oil and gas exploration on the refuge present a threat to wildlife, wetlands, and hydrologic flow.

The issues, concerns, and opportunities listed above are addressed in the management approach for the refuge, with special emphasis placed on refuge access.

Overview of the Management Direction

An Ecosystem Approach will be used to manage the refuge. This approach takes into account that the refuge is a part of a large watershed and a larger ecosystem, and attempts to address the needs of the panther and other wildlife while maintaining a healthy natural system. This approach was selected because it ideally meets the needs of the resources, and allows public access for wildlife observation and environmental education.

Woodstorks
USFWS photo by Larry W. Richardson

Without further study, hunting will not be allowed on the refuge. In 5 years, if independent studies and research support hunting as a compatible use on the refuge, the Service may reconsider its position. In the meantime, some educational and recreational uses will be allowed on the refuge.

The following management approach was developed from stakeholder discussions, a series of public forums, public comments received during the draft review period, and the sound professional judgement of the refuge manager.

The end result is a set of goals, objectives, and strategies that will guide the management of the refuge.

An Ecosystem Approach to Management as Related to Key Issues

Public Access
The refuge was established to provide habitat for the endangered Florida panther. The panther is one of the most endangered large mammals in existence in the United States. As such, hunting will not be allowed on the refuge. The draft comprehensive conservation plan included an objective and a set of strategies to determine the compatibility of a hunting program on the refuge. There were many comments on the draft indicating that hunting should not occur and that the studies were a waste of funds. As evidenced in extensive post-draft consultations with the Florida Fish and Wildlife Conservation Commission, the Commission felt that a compatibility determination should be made without further study. As a result, the Service has decided not to allow recreational hunting to occur on the refuge.

The Service believes hunting is not compatible on Florida Panther National Wildlife Refuge for the following reasons:

- The refuge was established for the endangered Florida panther. The refuge lies strategically within the center of a core area heavily used by panthers between the northern portions of Big Cypress National Preserve and the Fakahatchee Strand State Preserve. For this reason, it is prudent to strictly monitor and control the amount of human use on refuge lands.
- The need for an additional deer hunting area in southwest Florida is not great. More than 540,000 acres are available to the public on Big Cypress National Preserve. In addition, deer hunting on public lands is planned for the following areas in southwest Florida: Picayune Strand State Forest - 50,000 acres; Okaloacoochee Slough State Forest - 30,000 acres; and possibly Corkscrew Regional Ecosystem Watershed - 30,000 acres. We support managed deer hunts in these areas, however, the refuge has a different mandate than the aforementioned properties.
- The refuge does not have an overabundance of deer. There is a rough estimate of approximately 3 deer per-square-mile. Every deer taken by a hunter on the refuge would reduce the amount available for a panther.
- If we permit a hunt, there will always be a chance of a cat being shot by a hunter. A Texas cougar, that was part of the Florida panther genetic restoration program, was shot in 1998 on private lands.
- The refuge serves as an important research and demonstration area for applied panther habitat management. Management activities and studies, aimed primarily toward panther habitat enhancement, are ongoing projects. This will require human activity, habitat management, the establishment of vegetative plots, and animal monitoring. Hunting has the potential of interfering with these projects and adds additional human activity. The cumulative human activity may have a negative impact on refuge panther use. Moreover, hunting is not an activity that will enhance panther habitat or use of the refuge.

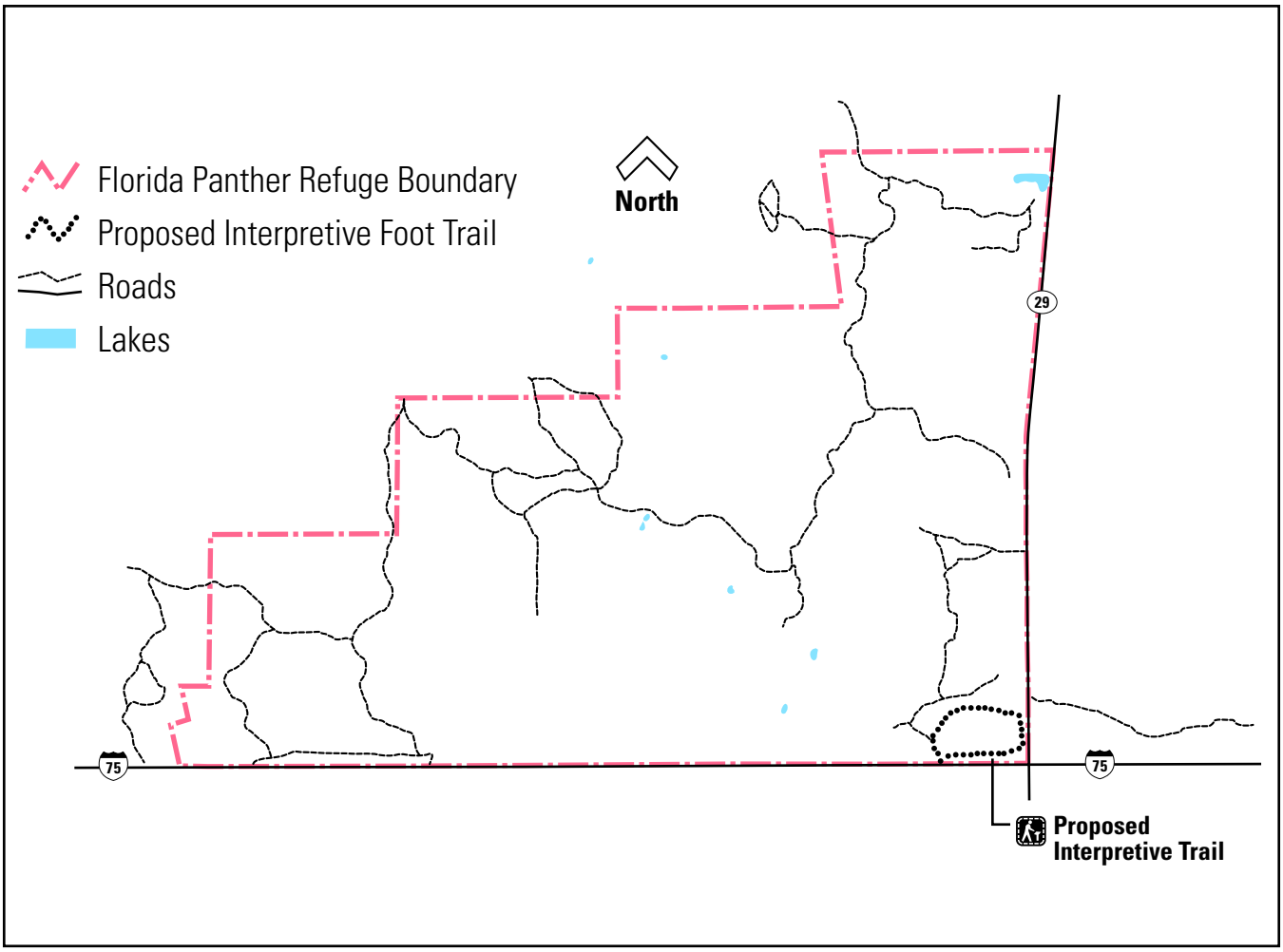
These five reasons provide the rationale for not allowing hunting to occur on the Florida Panther National Wildlife Refuge. Hunting advocates offer an argument in favor of a limited, strictly regulated hunt, but the Service believes that if it is to err in this decision, it should be in favor of the endangered Florida panther for which the refuge was established. If new information or research becomes available within 5 years of the release of this plan, the Service may reconsider its determination.

A decision to allow or disallow fishing as a public use activity will be determined within 5 years as described in Special Project 14.

Utilizing an ecosystem approach, the day-to-day management of the refuge will not significantly change. Opportunities for increased public use and recreational activities will be evaluated for implementation. However, two specific projects will be implemented to provide increased access within the refuge. In addition, the plan identifies a multi-agency education center that will help direct visitors to refuge access areas.

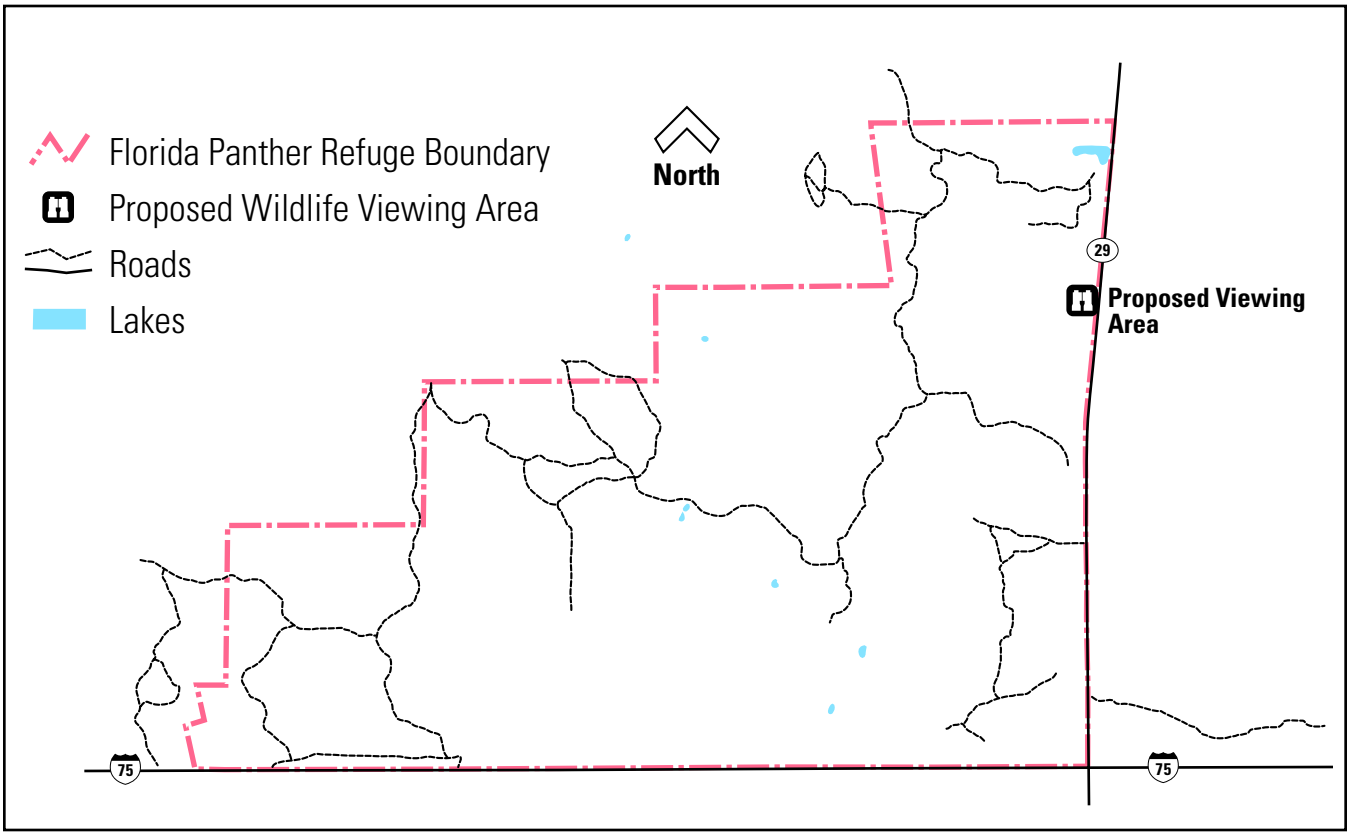
- A short interpretive foot trail, 1- to 1.5-mile in length and placed in an area of least use by panthers, will not adversely affect the animal and will greatly promote awareness of refuge programs and the plight of the panther. The trail will contain interpretive and educational exhibits for day-use only. Parking and waterless restroom facilities will be provided at the trailhead. This form of access will be allowed and developed immediately *(Special Project 12)*.

Figure 5. Proposed Interpretive Foot Trail



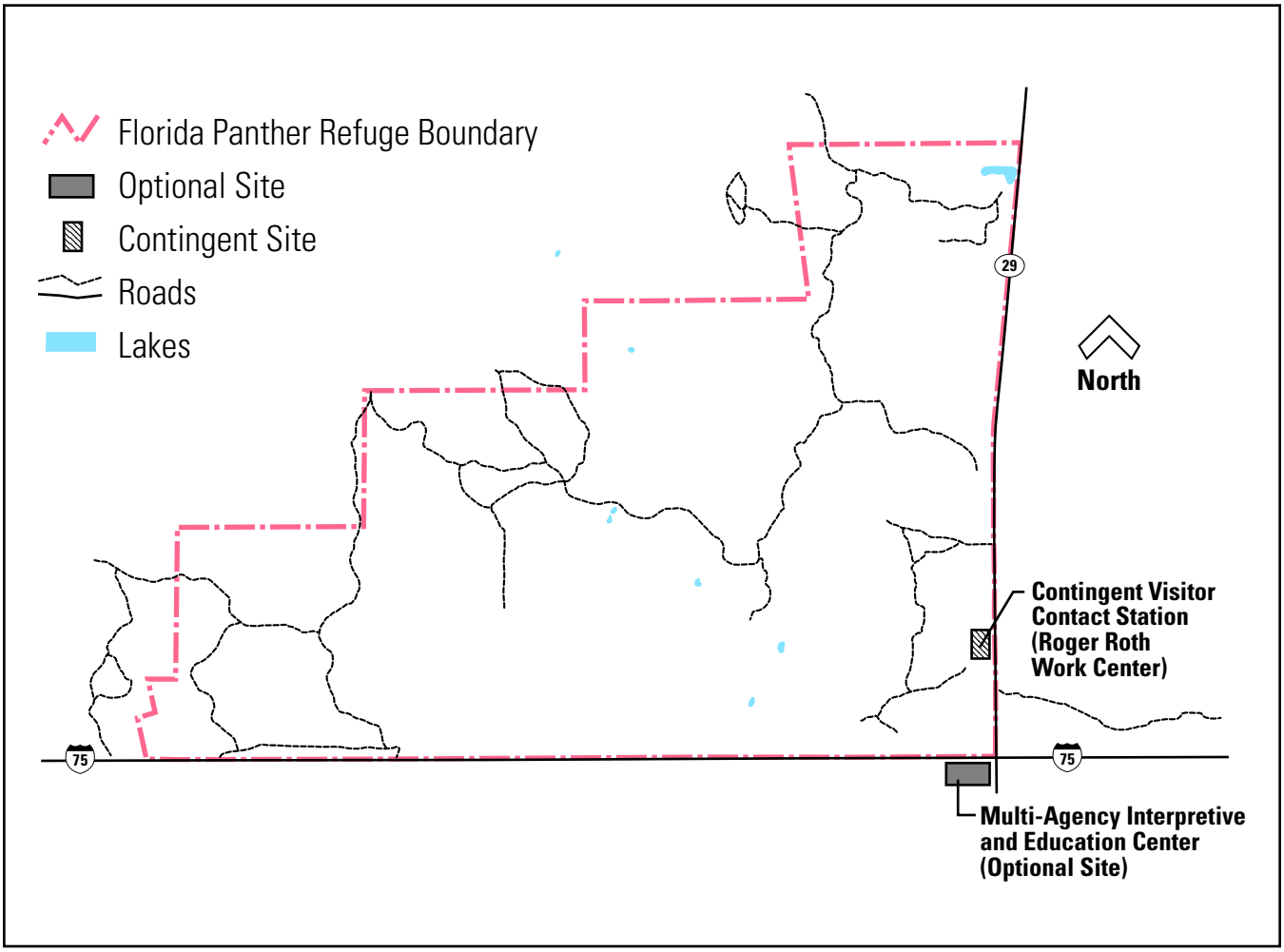
- A second public access area will be developed in association with the waterbird habitat project, which is located on the east side of the refuge near SR 29. This project also will not adversely affect the panther and will assist in educating the public of the many birds that use the refuge. This project will include the development of a parking area, waterless restroom facilities, interpretive exhibits, and observation decks. The wildlife viewing area will also be for day-use only *(Special Project 5)*.

Figure 6. Proposed Waterbird/Wildlife Viewing Area



- In the draft comprehensive conservation plan, the Service proposed a multi-agency visitor and environmental education center adjacent to the I-75 and SR 29 interchange. Several comments were received indicating that construction of a visitor center at this location would violate the terms of permits to allow construction at the interchange. Environmental conditions and ownership of lands along SR 29 have changed since the construction of the interchange. The Florida Department of Environmental Protection, which owns the southwest section of the interchange, plans to go through the environmental planning and permitting process to construct a Multi-Agency Interpretive and Education Center at this location. This Comprehensive Conservation Plan identifies the southwest corner of the interchange as an optional site for a Multi-Agency Interpretive and Education Center, on the condition that it passes public and environmental review. The Parks Division of the Florida Department of Environmental Protection will be responsible for this review effort. If planning for the interchange site is unsuccessful, the Service will facilitate the development of such a facility at another location along I-75 in Collier County. The second site has not been chosen, but would also have to pass the National Environmental Policy Act and governmental permit requirements prior to construction *(Special Project 15)*.

Figure 7. Prospective Sites for Visitor Contact Facilities



The refuge's Roger Roth Work Center presently serves as a field office where other agencies coordinate activities and the public receives information on refuge activities. If all efforts fail to construct a Multi-Agency Interpretive and Education Center, the Roger Roth Work Center would be upgraded to a minimal Visitor Contact Station. This contact station would be drastically smaller than the multi-agency center, would be located within the presently disturbed area of the Roger Roth Work Center, and could be a self-service facility. A contact station is needed to inform the public of the locations and activities available for public use on the refuge.

Aside from the issue of hunting, the Service will review the prospect of a public fishing area at Pistol Pond (Special Project 14). The Service will continue to offer guided swamp buggy and auto and walking tours of the refuge on a limited basis.

Cooperative Land Management and Partnerships within the Big Cypress Watershed

Considerably more emphasis will be placed on working with the local community, private landowners, non-governmental organizations, and other agencies in southwest Florida. Primary emphasis will be placed on developing partnerships with various entities that would lead to panther habitat protection, overall land and watershed protection and stewardship of the resources. More communication and coordination with other land managers within the watershed must occur if we are to effectively conserve the diverse resources of this ecosystem.

Habitat management on and off the refuge will be centered around watershed resources for the protection and enhancement of native wildlife populations, the panther, and other threatened, endangered or candidate species that rely on wetlands. These areas benefit humans by being flood retention areas, water filters and drinking water recharge zones. A geographic information specialist and a hydrologist will be recruited to gather and evaluate watershed information.

Public Awareness of the Panther and Refuge Programs

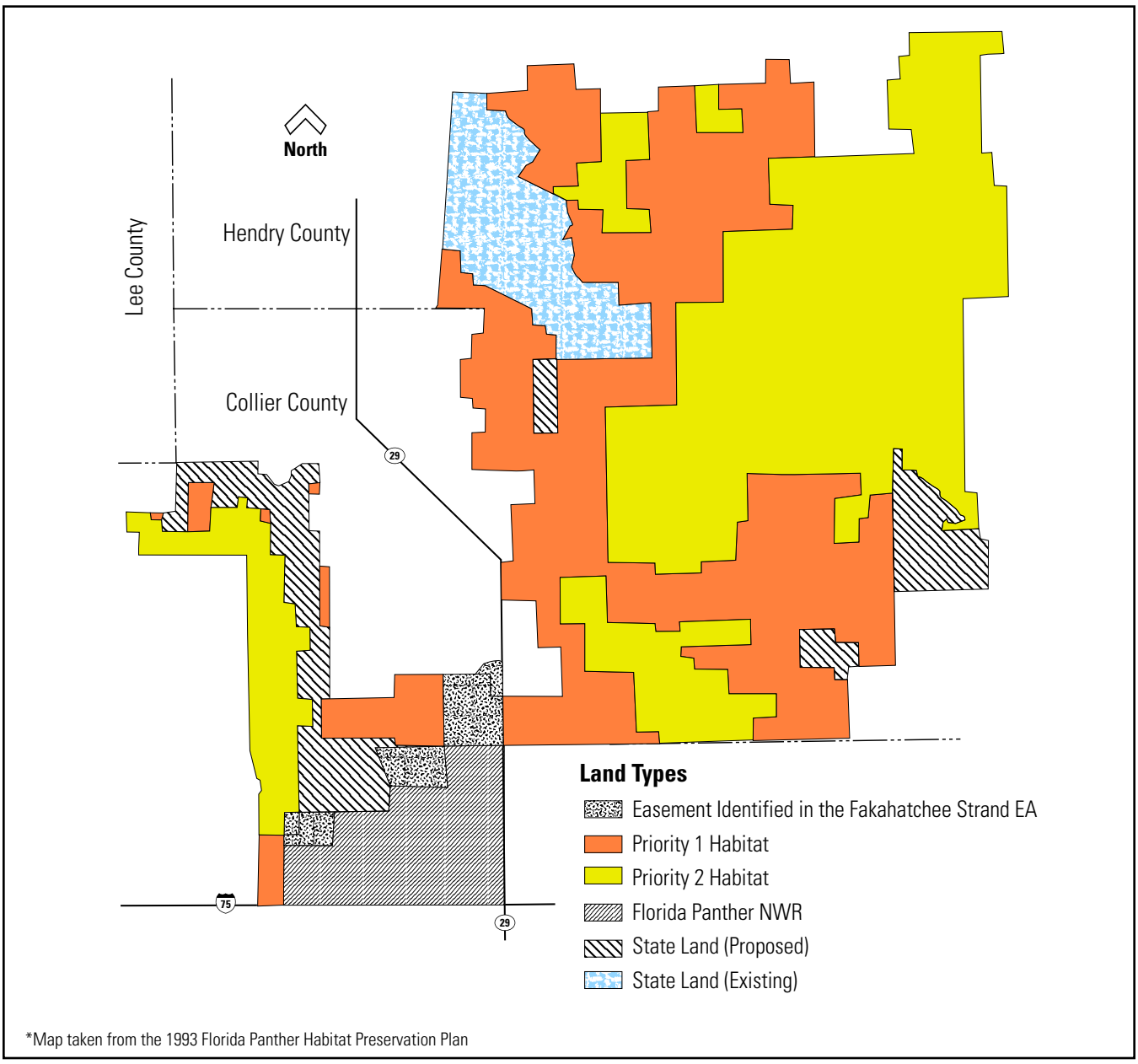
More outreach efforts off the refuge will occur under this action. The proposed Multi-Agency Interpretive and Education Center will be a key component to increased public education. A public use/environmental education specialist will work with the Collier County Environmental Education Consortium, school groups, volunteers, and other agencies to educate both youth and adults of southwest Florida about the panther and refuge activities. Furthermore, a media specialist will ensure the same message is delivered to the public by way of the media.

Panther Habitat Protection on Private Lands

Habitat important to the panther is also critical to many other plants and animals. Added protection of panther habitat will be facilitated through conservation easements, tax breaks, mitigation banks, or other types of incentives for the landowner to keep critical panther habitat in its natural state. The refuge will work in collaboration with public and private landowners, on a voluntary basis, to help ensure the protection of 370,000 acres of panther habitat north of the refuge in Collier and Hendry counties.

This will be a voluntary program for landowners. Through a variety of federal cost-share and wetland protection programs, the refuge will promote and coordinate ecosystem restoration projects within the watershed. These projects will include limited hydrologic restoration, restoration of selected plant communities, control of invasive exotic species, and limited reintroduction of endangered species. This will involve a cooperative effort between state, federal, non-governmental organizations and private landowners to protect panther habitats existing on private lands. The goal is to initiate a conservation easement/lease program to protect essential panther habitat identified in the 1993 Panther Habitat Protection Plan *(Figure 8)*. This project has two components. One part of the program will protect, through conservation easement, approximately 10,000 acres of priority panther habitat previously identified in the Fakahatchee Strand Environmental Assessment of 1985. These lands lie adjacent to the present refuge boundary to the north and west. The other part of the program will target at least 360,000 acres to be protected under term easement, or perpetual conservation easement. The project will involve only those landowners who are willing participants. Some of these areas may be considered for fee title ownership if they become available through donation, mitigation bank, or sale. This project will work in concert with other programs to protect habitats and wetlands within the Big Cypress Watershed. The easements will be monitored by two biologists working on the refuge staff. The estimated cost of the easements is $150 million. The biologists' salaries, benefits, and equipment needs would require $200,000/year. *(Special Project 17)*

Figure 8. Important Lands Eligible for Voluntary Panther Protection* as identified in the 1993 Florida Panther Preservation Plan. Priority 1 and Priority 2 habitats have also been identified on page 7.



*Map taken from the 1993 Florida Panther Habitat Preservation Plan

Refuge Research and Management

Prescribed burning and exotic plant control will also be continued for ecosystem maintenance. Off-refuge efforts for prescribed burning, wildlife suppression, and invasive exotic species control will be enhanced. Refuge research and management will target topics that could be applied to management or have utility to other land managers within the ecosystem.

Refuge Staffing
With adequate staffing the refuge will meet Service and South Florida Ecosystem responsibilities. Education and outreach programs will be expanded. There will be increased coordination with land managers off the refuge through the initiation of conservation easements for important panther habitats. The biological and habitat monitoring program will be enhanced to include floral and faunal species that have not been monitored.

Oil and Gas Exploration
The refuge will carefully review impacts of oil and gas exploration and make every effort to gain mineral rights to oil and gas resources found on the refuge.

Management Goals

Habitat Management

1.0 Provide optimum habitat conditions on the refuge for the Florida panther.

Natural Diversity Management

2.0 Restore and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna.

Research and Monitoring

3.0 Conduct research, monitoring and evaluations to improve management of flora and fauna on the refuge and within the South Florida Ecosystem.

Public Use Management

4.0 Provide opportunities for compatible public use in accordance with the National Wildlife Refuge System Improvement Act of 1997.

Environment Education Management

5.0 Develop and implement outreach and education programs that will promote conservation and provide an understanding and appreciation of the Florida panther, fish and wildlife ecology, and human influence on ecosystems of south Florida.

Cooperative Management

6.0 Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida.

Archaeological Resources Management

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

Habitat Management

Management Goals, Objectives, and Strategies

Goal

1.0 Provide optimum habitat conditions on the refuge for the Florida panther.

Objective

1.1 Achieve and maintain vegetative conditions that are preferred by the panther.

Strategies

1.1.1 By FY 2001, develop and implement a Habitat Management Plan. (1.2.1 related)

1.1.2 Refine refuge prescribed fire program and other habitat management tools to achieve and maintain optimum vegetative conditions for panther habitation.

1.1.3 Increase staff in order to (1) maintain equipment and support facilities, and (2) accomplish other refuge strategies. Upgrade equipment as needed to support field operations. (Special Projects 1, 2; 1.2.3 related)

1.1.4 Implement cabbage palm management to restore historic habitat and to enhance habitat for panthers. (3.3.2 related)

1.1.5 Refine and implement Geographic Information System findings into Habitat Management Plan to guide management of preferred panther habitat. (3.1.3-3.1.5 related)

Objective

1.2 Achieve and maintain optimum prey densities for the Florida panther.

Strategies

1.2.1 Follow the approved Fire Management Plan and incorporate into the Habitat Management Plan to maintain/enhance deer habitat. Conduct mosaic burns within fire-evolved habitats, burning a minimum target goal of 25 percent of these habitats annually. Update the plan as new information becomes available. Use prescribed fire to achieve optimum availability and nutritional quality of native forage for deer by 2002.

1.2.2 By 2002, establish a minimum of 10 small ponds on the refuge in areas where water is seasonally absent or scarce. (3.3.1 related)

1.2.3 Secure additional base maintenance funds by 2002 to address arduous terrain conditions that adversely impact heavy equipment and other off-road vehicles, restricting capabilities to provide optimum habitat conditions for the panther. (Special Project 1)

1.2.4 Reestablish food plots as appropriate to raise the nutritional level for deer. Amend the Croplands Management Plan as necessary within the scope of the Habitat Management Plan. (3.3.5 related)

1.2.5 Implement cabbage palm management to restore/enhance forage composition and growth for deer and other wildlife. Experimental sites where cabbage palm encroachment is documented will be evaluated pre- and post-palm removal to determine forage nutrient benefits for deer. Utilize results to guide further restoration of areas containing heavy cabbage palm infestations. This evaluation will occur by 2005. (3.3.2 related)

Natural Diversity Management

Goal

2.0 Restore and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna.

Objective

2.1 Implement management techniques to enhance other threatened and endangered species.

Strategies

2.1.1 By 2001, construct a greenhouse, with sterile flasking facility, on the refuge and fund the propagation and reintroduction of orchids to the refuge and other depleted habitats. (Special Project 3)

2.1.2 By 2001, construct and erect, within suitable refuge habitats, a minimum of 10 nesting boxes for Big Cypress fox squirrels.

2.1.3 Improve feeding areas for wading birds (i.e., endangered wood stork) near nest and roost habitat. By 2002, using approved hydrologic manipulation/restoration, mechanical means and herbicides, restore and enhance wetlands as foraging habitat for wading birds in Lucky Lake Strand. Other potential sites on the refuge will be identified and enhancement activities implemented by 2005.

2.1.4 Continue to utilize the refuge as a reintroduction site for Eastern indigo snakes acquired through rehabilitation and confiscations. By 2002, establish and implement a protocol to radio-instrument selected specimens for monitoring habitat use, dispersal and survival.

2.1.5 By 2008, establish, if feasible, three red-cockaded woodpecker colonies on the refuge. (3.3.4 related)

Objective

2.2 Minimize the impact from oil and gas exploration and extraction on the refuge.

Strategies

2.2.1 Explore the potential of acquiring mineral rights on the refuge.

2.2.2 Carefully review oil exploration plans to ensure that adverse impacts to refuge natural and cultural resources are minimized. Refuge staff must ensure the plan employs Best Management Practices. Oil and gas extraction, seismic work, and associated construction will be conducted in a manner that minimizes impacts to wildlife and other refuge resources.

2.2.3 Hire a temporary biologist to accompany seismic work crews and monitor oil well road installation to minimize adverse impacts.

2.2.4 Mitigate for direct and indirect exploration impacts to refuge fauna and habitats through restoration projects.

Objective

2.3 By 2002, fully develop and implement a prescribed fire program to restore and maintain healthy fire dependent communities.

Strategies

2.3.1 Implement the 1998 Fire Management Plan, with annual reviews and updates to incorporate applied research findings. (3.2 related)

2.3.2 Develop fire prescriptions and techniques to enhance prairie orchids and protect the fire sensitive epiphytic orchids.

Objective

2.4 By 2005, initiate the restoration of at least two native plant communities.

Strategies

2.4.1 By 2001, develop a refuge Habitat Management Plan that incorporates the following key restoration and management strategies.

2.4.1.1 By 2000, restore approximately 800 acres of wetlands in cooperation with the South Florida Water Management District, and partially restore the winter hydroperiod to Lucky Lake and Stumpy strands with the installation of a water control structure in Merritt Canal. This action will reduce the spread of invasive exotic and drier successional plant species that are invading the strands and reinvigorate historic wetland plant species to the benefit of wading birds and other wildlife. (2.7.1 related)

2.4.1.2 Restore a 513-acre fallow farm field in Fire Compartments 44 and 42 that was clear-cut prior to refuge establishment. Plant cypress, maple, etc., in scattered domes to enhance edge habitat and provide potential browse to benefit deer and other wildlife.

2.4.1.3 Restore a 40-acre fallow farm field in Fire Compartment 12 that was clear-cut prior to refuge establishment. Plant cypress, maple, etc., in scattered domes to enhance edge habitat and provide potential browse to benefit deer and other wildlife.

Objective

2.5 By 2003, develop a control and eradication plan for invasive exotic species and implement segments as identified in the following strategies. (Special Project 4)

Strategies

2.5.1 By 2000, identify the most problematic species and areas of infestation. For plant species, apply mechanical and herbicide techniques to these areas first.

2.5.2 By 2002, identify the most effective herbicide type, application, dosage, and season of use for refuge problematic plant species.

2.5.3 Work with neighbors, public and private, to control exotic seed sources that threaten the refuge. Develop cooperative initiatives by 2003 to address problem areas.

2.5.4 By 2003, develop and implement a control program for invasive exotic fish, reptiles, and amphibians.

2.5.5 Continue to host and coordinate an annual Southwest Florida Invasive Exotic Plant Workshop for area land managers. The workshop will focus on new invaders to the area, control techniques, opportunities for control equipment and labor cooperation, and other exotic plant issues.

Objective

2.6 Implement management techniques to enhance other refuge endemic fauna.

Strategies

2.6.1 Restore a 100-acre disturbed site adjacent to SR 29 as a moist soil management area. The area would be managed for waterfowl, wading birds, and shorebirds by water level management and tilling practices. (Special Project 5)

2.6.2 Develop littoral zones and restore native vegetation along pond edges at Colding and Pistol ponds to enhance habitat for fish, birds, and other fauna.

2.6.3 Develop and implement a nesting box program for wood ducks and prothonotary warblers.

Objective

2.7 Manage refuge hydrologic conditions to maximize benefits to endemic flora and fauna.

Strategies

2.7.1 Collaborate with South Florida Water Management District to complete the Lucky Lake Strand project to restore the hydrologic regime to the west side of the refuge. (2.4.1.1 related)

2.7.2 By 2004, establish and implement a water management strategy for the refuge.

2.7.3 By 2001, develop a plan that addresses the management of water levels of I-75 canals and the refuge for wood storks and other wading birds. By 2005, implement the plan, with concurrence from the Department of Transportation, South Florida Water Management District, and the Department of Environmental Protection.

Research and Monitoring

Goal

3.0 Conduct research, monitoring and evaluations to improve management of flora and fauna on the refuge and within the south Florida ecosystem.

Objective

3.1 Identify and characterize panther responses to habitat management and human activities. Hire a Geographic Information System specialist to work on panther issues as well as southwest Florida watershed analysis. (Special Project 6)

Strategies

3.1.1 Continue to monitor panthers, relying primarily on the Florida Fish and Wildlife Conservation Commission flight location data. Explore the availability/development of effective methods to monitor panthers over a 24-hour period.

3.1.2 Expand the collection of information on panther prey activities using telemetry or other methods. In addition, expand data on panther den use, activity patterns and habitat use.

3.1.3 Have GIS specialist in place by 2002 to digitize panther movements and habitat types in regard to management activities on the refuge.

3.1.4 By 2004, compile regional GIS data on panther responses to habitat management and human activities. Share research findings with other agencies and the public.

3.1.5 Work with other resource agencies to develop GIS data information layers for southwest Florida. With the aid of historic use data, identify characteristic preferred panther habitat (i.e., denning, day bedding, hunting travel corridors, important habitat linkages, etc.). By 2004, analyze and use data to evaluate and support management decisions.

Objective

3.2 Conduct prescribed fire research and evaluations on the refuge to improve management of natural resources.

Strategies

3.2.1 Determine panther response to prescribed fire management through ongoing funded research with U.S. Geological Survey, Biological Resource Division, University of Tennessee. By the end of 2001, obtain results and incorporate findings into the Fire Management Plan.

3.2.2 Refine refuge prescribed fire program and other habitat management tools to achieve and maintain optimum vegetative conditions for panther habitation.

3.2.3 Continue fire research on the effects of burning frequency, seasonality, and spatial distribution in the refuge's pine flatwoods, hammocks, cypress, mixed swamp, and wet prairie systems. By 2005, produce at least 2 peer-reviewed scientific papers on applied fire ecology.

3.2.4 Obtain funding by the year 2000 to investigate the impacts of prescribed fire on the growth and fruiting of saw palmetto *(Senora repens)*. By 2004, evaluate findings and amend the Fire Management Plan as necessary. *(Special Project 7)*

3.2.5 By 2008, obtain funding to investigate the impacts of prescribed fire on reptile populations through the use of radio-telemetry or other methods. *(Special Project 8)*

3.2.6 Evaluate research results from the University of Florida Deer Forage Study. Utilize these and other existing data to amend the Fire Management Plan to guide the frequency, placement, and number of winter versus summer mosaic burns. (1.1.2 related)

Objective

3.3 Conduct research and evaluations on the refuge to improve flora and fauna management.

Strategies

3.3.1 By 2000, evaluate the feasibility and potential value of establishing small ponds in areas where water is seasonally absent or scarce. (1.2.2 related)

3.3.2 Establish experimental sites on the refuge where cabbage palm encroachment is documented. By 2005, evaluate pre- and post-palm removal to determine forage nutrient benefits for deer. Utilize results to guide further restoration of areas containing heavy cabbage palm occurrence. (1.1.4 related)

3.3.3 By 2002, establish and implement a protocol to radio-instrument Eastern indigo snakes for monitoring habitat use, dispersal and survival. By 2009, evaluate results of data to determine the feasibility of the refuge as a repository for this species.

3.3.4 Determine the feasibility of reintroducing red-cockaded woodpeckers to suitable refuge habitats by 2004, including evaluation of using Naples stock sources.

3.3.5 Reestablish experimental food plots based on existing information contained within the Croplands Management Plan, and continue to evaluate the nutritional significance of plots through the use of radio-instrumented deer and other measurements. Evaluate data by 2003, and amend the food plot management program as appropriate. (1.2.4 related)

Objective

3.4 Implement monitoring programs to assess ongoing management practices on the refuge.

Strategies

3.4.1 Monitor wildlife and vegetative responses to management actions using GIS technology and historic data.

3.4.2 Continually monitor and evaluate prey responses to the refuge burning program.

Objective

3.5 Conduct inventories of flora and fauna on the refuge and incorporate the information into research, monitoring and management strategies as necessary.

Strategies

3.5.1 Inventory refuge deer *(Special Project 9)* and feral hog populations in order to establish baseline indices. By 2001, implement techniques developed from a current University of Florida study to index deer abundance and conduct hog monitoring surveys.

3.5.2 By 2007, determine the distribution and population status of the swallow-tail kite, Big Cypress fox squirrel, Everglades mink, wood stork, snail kite, Eastern indigo snake, long-tailed weasel, and other declining species. Incorporate the information into GIS and implement management actions as deemed appropriate.

3.5.3 By 2008, contract with biologists to census populations of amphibians and invertebrates to determine baseline levels and trends. *(Special Project 10)*

Objective

3.6 Evaluate and monitor hydrologic conditions on the refuge for developing and implementing strategies to restore and maintain healthy water regimes.

Strategies

3.6.1 Recruit a hydrologist by 2001 to compile historic data, assess current water quality and quantity parameters, determine the refuge water budget, and analyze the watershed needs of the refuge complex. *(Special Project 11)*

3.6.2 Develop and implement a hydrologic monitoring program to assess surface and ground water levels, surface flow, hydroperiod, and quality.

3.6.2.1 Evaluate water parameters of Barron River Canal on the east side of the refuge for possible increased refuge use.

Public Use Management

Goal

4.0 Provide opportunities for compatible public use in accordance with the National Wildlife Refuge System Improvement Act of 1997.

Objective

4.1 By 2002, develop an interpretive trail to allow access and enhance public understanding of the panther and the refuge. *(Special Project 12)*

Strategies

4.1.1 Construct a 1- to 1.5-mile interpretive foot trail at the northwest corner of the I-75/SR 29 interchange. The trail will utilize low-impact design, be self-guiding, and feature interpretive signs.

4.1.2 Utilize partnerships (Friends of the Panther Refuge and others) to fund, construct, and maintain the trail, interpretive exhibits and associated facilities.

Objective

4.2 Develop a wildlife viewing area for the moist-soil management area located adjacent to SR 29. Facilities will include a gravel parking area, bathroom, viewing platforms, and interpretive signs. *(Special Project 5)*

Strategy

4.2.1 By 2000, coordinate with a public use specialist and other agencies on the design and layout of interpretive displays and public use facilities.

Objective

4.3 Determine compatibility and feasibility of fishing at Pistol Pond.

Strategies

4.3.1 By 2000, determine the mercury level of fish in Pistol

Pond by enlisting the cooperation of the Service's Ecological Services Division on sampling and contaminants analysis. *(Special Project 13)*

4.3.2 Inventory fishery resources in Pistol Pond by employing electro-shocking techniques through cooperation of the Service's Fisheries Division.

4.3.3 Evaluate the costs, logistics, and safety considerations in creating suitable sites for fishing in Pistol Pond. The evaluation will consider options of partnership assistance to defray costs and/or gain assistance for site development. *(Special Project 14)*

4.3.4 Determine if public use at Pistol Pond will be compatible with the future extension of SR 29 panther fence and crossing.

Environment Education Management

Goal

5.0 Develop and implement outreach and education programs that will promote conservation and provide an understanding and appreciation of the Florida panther, fish and wildlife ecology, and human influence on the ecosystems of south Florida.

Objective

5.1 By 2007, develop facilities and associated amenities to promote public education of the ecosystem, the panther, and the refuge program.

Strategy

5.1.1 Develop partnerships for a Multi-Agency Visitor and Environmental Education Center along I-75 in Collier County (site to be determined by agencies). Develop high quality exhibits and progressive interactive media displays to feature South Florida Ecosystem management, agency restoration activities, and visitor use opportunities. The center will provide an outdoor classroom in the Big Cypress Watershed for students in Collier County and south Florida. *(Special Project 15)*

Objective

5.2 By 2003, increase local awareness of the south Florida ecosystem, the refuge, and the panther through the development and implementation of an outreach program.

Strategies

5.2.1 Add three new personnel to the Florida Panther National Wildlife Refuge complex staff. These include: 1) Media specialist to coordinate news events, press releases, and information transfer to local, state, and national news outlets *(Special Project 16)*; 2) Public use specialist stationed at the refuge to coordinate activities at the I-75 visitor center, refuge interpretive displays, school outreach, and refugevolunteer activities; and 3) Administrative assistance to help process and coordinate the added functions of this initiative. *(Special Project 15)*

5.2.2 Encourage the growth of the "Friends of the Panther Refuge" support group (target of 100 members by 2000). Promote quarterly introspective evaluations of the effectiveness of the group's support efforts. The group will assist with education programs on and off the refuge.

5.2.3 Collaborate with various support groups; i.e., Conservancy of Southwest Florida, State of Florida agencies, National Park Service, Florida Wildlife Federation, Natural Resource Conservation Service, Southwest Florida Environmental Coalition, Native Plant Society, Audubon Society, Sierra Club etc., to support refuge outreach activities. Participate in at least two events (National

Wildlife Refuge Week, International Migratory Bird Day, Earth Day, etc.), per year.

5.2.4 Develop at least three refuge specific lesson plans for local school teachers and community organizations for outreach programs. Subjects to include the panther, refuge management, and South Florida Ecosystem issues and restoration efforts.

5.2.5 By 2004, develop teacher workshop material (lesson plans) and host an annual teacher workshop for various school districts.

Objective

5.3 Increase communication and share knowledge on land use management techniques with adjacent managers, landowners, other resource agencies, and the public.

Strategies

5.3.1 Coordinate and host an annual seminar for southwest Florida land managers (private and public) on habitat management, current research and monitoring, and watershed issues.

5.3.2 Initiate a periodic newsletter on panther/habitat management.

5.3.3 By 2000, expand Internet Web Page for the refuge, panther management, and current issues.

5.3.4 By 2000, create a citizen's group of interested parties to promote private and governmental cooperation for the management of the refuge.

Cooperative Management

Goal

6.0 Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida.

Objective

6.1 Expand the refuge through easement, written agreement, or fee title with cooperating landowners that will protect habitat or lead to improved natural resource management of the ecosystem.

Strategies

6.1.1 By 2005, strive to achieve perpetual protection of approximately 10,000 acres of panther habitat north of the refuge through easement or fee title acquisition.

6.1.2 By 2010, strive to achieve limited and perpetual protection of approximately 360,000 acres through conservation easement or fee title acquisition to protect critical panther habitat identified in the 1993 Panther Habitat Protection Plan. *(Special Project 17)*

6.1.3 Participate in multi-agency mitigation banks to protect panther habitat. These land banks provide for the restoration and protection of key panther habitat. The refuge would coordinate the formation of these banks and manage the land after restoration has been completed.

Objective

6.2 Inform private landowners of federal cooperative programs that will enhance or protect wildlife habitat and enlist their participation in these programs.

Strategies

6.2.1 Support a private lands biologist to implement and coordinate the various programs.

6.2.2 Start an outreach effort to inform landowners of the variety of federal and state programs available including, but not limited to, "Partners For Wildlife," "Wetland Reserve Program," "Conservation Reserve Program," and "Forest Stewardship Program."

Objective

6.3 Facilitate partnerships to manage cultural resources with the National Park Service, the State Historic Preservation Office, professional archaeologists, Native American communities, and the general public.

Strategies

6.3.1 Procure from the National Park Service copies of reports describing archaeological, anthropological, and historical investigations at Everglades National Park and Big Cypress National Preserve. (Regional Archaeologist)

6.3.2 Enter into a Memorandum of Understanding with the National Park Service and Florida Department of Environmental Protection to enhance law enforcement of the Archaeological Resources Protection Act, the Native American Grave Protection and Repatriation Act, and Section 50 of the Code of Federal Regulations, as well as facilitate investigations of the Archaeological Resources Protection Act violations and unpermitted artifact collection on the refuge. (Regional Archaeologist)

6.3.3 Approach the Miccosukee and Seminole nations for information on and input into the management of significant cultural and sacred sites located within the refuge. (Regional Archaeologist)

6.3.4 Work with local Native American communities to develop an education program regarding their cultural heritages. (Regional Archaeologist)

6.3.5 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)

6.3.6 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. (Regional Archaeologist)

6.3.7 Work with the State Historic Preservation Office to ensure confidentiality of cultural resource data within the refuge and the State of Florida. (Regional Archaeologist).

Archaeological Resources Management

Goal

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

Objective

7.1 By 2005, conduct a refuge-wide archaeological survey.

Strategies

7.1.1 Develop a scope of work for a comprehensive archaeological survey of the refuge, a cost estimate, and ranking factors for contractor selection (Regional Archaeologist). Secure funding by 2001.

7.1.2 Develop and implement a plan to protect identified sites in consultation with federally recognized Native American nations, the State Historic Preservation Office, and the professional archaeological community.

7.1.3 Develop a GIS layer for the refuge's archaeological and historic sites. The archaeological/historic layer will mesh with such existing layers for habitat type, vegetative cover, hydrology, and soils being developed by the refuge staff. Layer parameters will be defined by 2000. (Regional Archaeologist)

7.1.4 Work with the State Historic Preservation Office to formally establish which refuge management actions are considered "undertakings" requiring its review and comment by 2000. (Regional Archaeologist)

7.1.5 By 2001, 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)

7.1.6 By 2000, all refuge law enforcement officers will have taken the Archaeological Resources Protection Act training course.

Objective

7.2 Determine the significance of known cultural resources.

Strategies

7.2.1 Determine site limits, chronology, and the integrity of archaeological deposits. (Regional Archaeologist)

7.2.2 The Regional Archaeologist, consulting with the State Historic Preservation Office and the Keeper's Office, will determine each site's eligibility for listing on the National Register of Historic Places.

Plan Implementation

The future of this refuge, like most national wildlife refuges, is dependent upon a public constituency that is knowledgeable of refuge resources and mandates as well as environmental issues, and is willing to work towards resolving them. The expanded educational, recreational, and partnership opportunities proposed 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 with appropriate government agencies. Cooperating landowners within the refuge watershed will be offered incentives and/or compensated through cost-sharing agreements for applying conservation and environmental farming practices and for creating, maintaining, or enhancing habitat for wildlife. Annual management workshops and periodic newsletters will enhance the cooperative management within the Big Cypress Watershed.

Little blue heron
Photo © Larry W. Richardson

Annual Work Plans

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

Step-Down Plans

This plan provides conceptual guidance for future expansion, management, and development of the refuge. Before implementing strategies and projects, additional step-down plans will need to be prepared. These range from habitat management and site development plans to updating the fire management plan. The refuge staff will look for innovative partnerships with local professional and business groups to assist in preparing and implementing detailed step-down plans.

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

Plan Required		Completion Date
Habitat Management		
Fire Management Plan		FY00
Goal 2.0	Restore and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna.	
Habitat Management Plan		FY01
Goal 1.0	Provide optimum habitat conditions on the refuge for the Florida panther.	
Goal 2.0	Restore and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna.	
Goal 6.0	Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida.	
Additionally, there will be a series of detailed plans to address management and monitoring of refuge expansion areas; i.e., easement, mitigation bank and fee title. These plans will be developed by FY 2001.		
Public Use		
Refuge Visitor Services/Interpretive Plan		FY01
Goal 4.0	Provide opportunities for compatible public use in accordance with the National Wildlife Refuge System Improvement Act of 1997.	
Goal 6.0	Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida.	

Green-backed heron
USFWS Photo by Nick Milam

Funding

The refuge was allocated $953,000 in FY 1998, to manage Florida Panther and Ten Thousand Islands National Wildlife Refuges. The fire program represents almost 40 percent of the dollars allocated to the refuge. Without this program, the refuge could not function because general operating funds are not keeping up with staff and basic operating costs of the refuge.

The increased funding required by this plan will come through a variety of internal and external sources. New projects will be identified in the Refuge Operating Needs System. The refuge staff will look for ways of leveraging and matching dollars through new and innovative sources (both public and private). The full implementation of this plan will be dependent upon Congressional allocations and new sources of funding as a result of partnerships and grants.

Summary of Refuge Projects

These projects will be listed in the Refuge Operating Needs System which is prioritized each year. As different funding opportunities become available, subsequent project funding or initiation will follow.

Project 1. Additional Base Maintenance Funds

Additional base funding is needed to address the arduous terrain conditions of the refuge that adversely impact equipment and vehicles. Habitat management, research, biological monitoring, law enforcement, and public access depend upon the successful maintenance of 4 swamp buggies, 5 all-terrain vehicles, 2 tractors, 1 dozer, 1 dozer transport, 1 dump truck, 1 front-end loader and numerous assorted 2- and 4-wheel drive vehicles. In addition, this station maintains 1 airboat and 3 boats (18-22 ft.) with 200 horsepower outboards for Ten Thousand Islands National Wildlife Refuge. Three new staff positions are needed for this project. An automotive mechanic is needed to maintain and repair engines on the various pieces of equipment and a maintenance worker is needed to address the minor repairs and scheduled maintenance needs of the equipment. These additional maintenance, biological, and management programs would require the recruitment of an assistant refuge manager to manage and facilitate these programs. The estimated cost for these three full-time employees is approximately $300,000 per year including employee benefits. In addition, $100,000 is needed in base maintenance funds to address equipment breakdowns, scheduled maintenance, and preventive maintenance needs.

Project 2. Roger Roth Work Center Rehabilitation

Equipment storage and maintenance support facilities are performed out of an old house containing a rotting, wooden frame which presents unsafe conditions for staff and visitors. The Service will contract ($200,000) for the construction of 2 metal buildings, 25'x30', for logistical support and facilitation of maintenance operations and equipment storage. Part of the project would include the construction of new bathroom facilities and septic system to accommodate staff additions. Approximately $30,000 is needed for annual maintenance needs for the work center.

Night-scented orchid
Photo © Larry W. Richardson

Project 3. Rare Orchid Restoration

More than 46 species of orchids have been documented in the Fakahatchee Strand. These plants contribute in making southwest Florida a truly unique natural environment. Many of these orchids have been pilfered by humans and are now rare. Through a combination agency and organization partnership, this project would restore rare orchid species to suitable, historic habitats in southwest Florida. Cooperating land management entities include Florida Panther National Wildlife Refuge, Big Cypress National Preserve, Fakahatchee Strand State Preserve, Picayune Strand State Forest, CREW lands, and National Audubon Society's Corkscrew Sanctuary. The project is supported by state and federal agencies, Florida Native Plant Society, and Florida Orchid Society. The project would focus on the creation of a small greenhouse at the refuge where orchids would be grown for eventual transplantation. Land managers would provide seed pods from a select list of rare orchids. The seeds would be flasked by an orchid grower and grown at the refuge greenhouse until ready for transplantation to selected native habitats. The plants would be mapped using GPS technology and monitored for health and survival. One-time funding of $20,000 is needed for the greenhouse building and equipment costs. In addition, recurring funding ($20,000) for a temporary greenhouse caretaker is needed.

Project 4. Invasive Exotic Plant Species Control

Invasive exotic plants are a major threat to the native plant communities of south Florida. Brazilian pepper, melaleuca, cogon grass and climbing fern are the refuge problem species. This project will help stop the encroachment of these invasive plants by supporting a control program containing the following elements: the acquisition of a 4-wheel drive,

75hp tractor ($50,000) to pull a herbicide spray rig; the recruitment of a 12-person crew to address invasive plants on both refuges and other areas in southwest Florida ($470,000); maintenance funds for spray equipment and personnel safety ($20,000); and $15,000 for herbicide costs. In addition, $3,000 per year is needed for Service sponsorship of an annual Invasive Exotic Plant Workshop. The workshop would provide a forum where state, federal, and private land managers of southwest Florida could 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 $558,000 for the first year, with recurring costs of $508,000/year.

Snowy egret with young
USFWS Photo by David Hall

Project 5. Develop Waterbird Habitat and a Wildlife Viewing Area

On the east side of the refuge, adjacent to SR 29, lies a 513-acre disturbed area that was farmed prior to refuge establishment. The cypress and other mixed swamp tree species were cut to accommodate farm fields. The area is now a mixture of wetland grasses and shrubs. This project proposes to manage approximately 50-100 acres of the area as moist-soil impoundments. Three or four cell units surrounding a hardwood hammock would be managed at different water levels to benefit migrating and resident waterfowl, wading birds, and shorebirds. The area would be accessible to the public for viewing these birds as well as the successful management operation. Collier County has limited opportunities for safe wildlife viewing and such an area would be a tremendous asset for southwest Florida. Because the area is so wet, it has limited use by panthers. Initial costs include the restoration of farm field levees ($30,000), water pumping facilities ($80,000), construction of parking area ($25,000), vault bathroom ($12,000), and interpretive signs ($15,000). The project would require recurring maintenance costs of $20,000/year.

Project 6. Enhance Habitat Assessment through Geographic Information System Analysis

To meet the refuge goal of assessing panther responses to habitat management and watershed analysis, a GIS specialist is needed. This specialist would digitize panther movements and habitat types on and off the refuge, and assist other staff members and cooperating agencies with their GIS needs. New hardware will be required including digitizing equipment, computer, printer and plotter. The estimated hardware costs are $100,000, and the estimated cost of the GIS specialist is $100,000 including employee benefits.

Project 7. Research Effects of Prescribed Fire on Saw Palmetto

The saw palmetto is a very important plant for wildlife in south Florida. Not only does its fruit provide food for a multitude of animals, but the dense thickets of this plant provide resting and denning cover for panthers. Research is needed to determine the effects of fire on this plant's growth and fruit production. Research results would be helpful to refuge managers as well as other land managers in south Florida. The study would be under contract to a university or the federal biological research division for 3 years at $50,000/year. The end products would result in management recommendations to benefit the panther, and a peer-reviewed paper in a biological periodical.

Prescribed burn at Florida Panther Refuge
USFWS photo by Larry W. Richardson

Prescribed fire
USFWS photo

Project 8. Project 8. Research Effects of Prescribed Fire on Reptile Populations

The refuge contains a large reptile population. One endangered species, the Eastern indigo snake, is present on the refuge. Prescribed fire effects on reptile populations is not well known. Basic research is needed to evaluate how prescribed burning parameters such as season, ignition methods, and burn rotation affects refuge reptiles. Research results would help refuge managers and other land managers in south Florida. The study would be under contract to a university or the federal biological research division for 3 years at $50,000/year. The end product would result in management recommendations to benefit reptiles on the refuge, and a peer-reviewed paper in a biological periodical.

Project 9. Refuge Deer Study

White-tailed deer are an important prey species for the panther. The Habitat Management Plan for the refuge will include many strategies specifically designed to enhance refuge deer numbers. Better knowledge of the refuge deer population is needed to assess present and future management strategies. Current deer populations are based on very rough estimates from intermittent track counts in very wet terrain. Helicopter capture attempts have proven unsuccessful due to the overabundance of trees on the refuge, making it easy for deer to duck the capture net. This project proposes to expand our knowledge of the population and biology of the refuge deer population by devoting more staff and funding to the effort. A biologist with expertise in large mammal biology will be recruited to work exclusively on this issue. This biologist will have the responsibility of radio-collaring at least 20 refuge deer and following their movements for at least 3 years. The biologist will refine deer census techniques, document deer responses to variable prescribed burn regimes, and add knowledge to existing south Florida deer biology. The biologist will work with other state and federal agencies to design refuge deer studies that will benefit land management for deer on both public and private lands in south Florida. The total recurring funding for this project is $189,000, which includes $70,000 for the biologist's salary, benefits, and training; $78,000 for flight time to follow the deer; and, $41,000 for equipment costs including vehicle, radio collars, receivers, antennas, etc.

Project 10. Baseline Populations of Amphibians and Invertebrates

Knowledge on the animal diversity of an area is critical to habitat management assessment and planning. These are the last of the animal groups that have yet to be inventoried on the refuge. The plan proposes to temporarily hire personnel to conduct inventories of these animals to determine baseline levels. Data collection would include species lists and a reference study collection which would take place over a period of a year for each group. The estimated cost for these surveys is $30,000.

Project 11. Recruit Hydrologist to Analyze Watershed Needs

It is clearly evident, as a result of information received during the planning process, that watershed protection and a coordinated watershed management effort are needed to protect the natural resources of southwest Florida. The two Service refuges in Collier County are located within the Big Cypress Watershed and are closely involved in all planning for the watershed. A hydrologist is needed to fully assess the impacts of various surface projects planned on and off the refuge within the watershed. One planned project is the re-hydration of the South Golden Gate Estates, which will affect both refuges. The hydrologist would also provide information to adjacent land managers as well as county, state, and federal land planning efforts for south Florida. This position would be shared with Ten Thousand Islands refuge. The estimated cost for this position is $100,000/year including employee benefits.

Project 12. Develop an Interpretive Foot Trail

Through a combination of volunteer partnerships, multi-agency coordination, and cost-share funding opportunities, construct a 1- to 1.5-mile interpretive foot trail on the refuge. The trail would be located in the southeast corner of the refuge where limited panther activity has occurred. The trail would feature low-impact design and self-guiding interpretive exhibits that would enhance public understanding of the panther and refuge programs. The trail would not have any impacts to wetlands or hydrology. The trail would be based on upland habitat grades or on constructed boardwalks over wetland areas. Portions of the trail that are wet would have boardwalks constructed over them. A gravel parking area and vault bathroom facilities would be constructed at the trail head. The estimated cost of this project is $40,000, with $10,000/year maintenance costs after the first year.

Project 13. Research Mercury Levels of Fish in Pistol and Colding Ponds

Past fish collections from Pistol and Colding ponds have indicated varying mercury levels, but all were high and some records exceeded human consumption standards. To better understand the contamination level, more sampling is prudent. This will be a cooperative effort requiring fishery assistance (electro-shock boat) from either a state or federal agency. In addition, $5,000-10,000 is needed to run the mercury tests.

Project 14. Evaluate the Safety and Feasibility of a Fishing Program for Pistol Pond

This study would also assist management in making a compatibility determination regarding fishing on the Florida Panther National Wildlife Refuge. Pistol Pond is not a natural lake. It is actually a pit created after fill material was excavated for SR 29. The banks are not gradual, but steep sided, with nearly a vertical drop of 10-15 feet around the entire bank. This presents an extremely hazardous bank fishing situation, especially if small children are involved. To remedy this hazard the bank slope would have to be cut or filled. Another measure may include the construction of a fishing pier. In addition, the existing fishery is extremely limited, thus the reason for the shock boat requirement in Project 13. Refuge staff will assess these various factors and determine if a fishing program is compatible and economically feasible. No additional costs will be incurred with this evaluation project.

Project 15. Develop Education Facilities

As information from the public clearly pointed out during the planning process, the key to success will be public education and support of refuge programs and the panther recovery effort. The Service has no education/interpretation facilities in Collier County. Two sites are planned for refuge exhibits and environmental information materials and both should be multi-agency centers. One site will be dedicated to the Florida Panther National Wildlife Refuge and located along I-75 in Collier County. The other will facilitate outreach for Ten Thousand Islands National Wildlife Refuge and be located along U.S. 41, east of Naples, in Collier County. For the Florida Panther National Wildlife Refuge location, a Multi-Agency Interpretive and Education Center is planned that will display the various land management programs and restoration efforts underway for south Florida and highlight the panther as the ecosystem flagship species. The Service will need an estimated $100,000 to create 4-8 exhibits. The I-75 site could also serve as an environmental education center for the youth of Collier County. A public use specialist would be recruited to plan, maintain, and coordinate staffing of the Multi-Agency Interpretive and Education Center, as well as coordinate volunteer activities on the refuge. The extra administrative duties would also require an additional clerical position for the refuge. These two positions would cost an estimated $175,000/year including employee benefits.

Snowy egreta and Glossy ibis
USFWS Photo by Diane Borden-Billiot

Project 16. Initiate a Panther and Ecosystem Outreach Program

Educating the public about refuge management, the plight of the panther, and recovery efforts is clearly the key to a successful program. To implement such a program will require a coordinated, cooperative effort between federal, state, and private entities. The Service proposes to enhance the refuge program by adding a media specialist to keep the news outlets informed of current and planned events. In addition, the public use specialist identified in Project 15 would develop and distribute panther information to school program coordinators. The media specialist is estimated to cost $100,000/year including employee benefits and will be a shared position with Ten Thousand Islands National Wildlife Refuge.

Project 17. Panther Habitat Protection

Recovery goals for the south Florida panther population will not be met if panther habitat on private lands is not protected. This project proposes to protect 370,000 acres of panther habitat in Collier and Hendry counties. The refuge would work in collaboration with other agencies and private landowners on a voluntary basis to protect Priority One and Priority Two Panther Habitat (1993 Florida Panther Habitat Preservation Plan) through conservation easements, tax breaks, mitigation banks, donation, fee title sale, or some other monetary incentive to keep critical panther habitat in a natural state. One part of the program would protect 10,000 acres immediately north of the refuge and identified in the Fakahatchee Strand Environmental Assessment of 1985. The other part of the program would target at least 360,000 acres as identified in Figure 8. Protected areas under easement or fee title would be monitored or managed by Florida Panther National Wildlife Refuge. Two easement biologists would be recruited to initiate and monitor refuge acquisitions and collaborate the effort with other agencies. The biologists' salary, benefits, and equipment needs would require $200,000 per year. The estimated cost of the easements is $150 million.

Figure 9. Project Cost Summary

Projects	*One Time Cost*	*Recurring Cost*	*First Year Need*
1. Additional Base Maintenance Funds	$0	$400,000	$400,000
2. Roger Roth Work Center Rehabilitation	200,000	30,000	230,000
3. Rare Orchid Restoration	20,000	20,000	40,000
4. Invasive Exotic Plant Species Control	50,000	508,000	558,000
5. Develop Waterbird Habitat and Viewing Area	162,000	20,000	182,000
6. Geographic Information System Analysis	100,000	100,000	200,000
7. Research Fire Effects on Saw Palmetto	150,000	0	150,000
8. Research Fire Effects on Reptile Populations	150,000	0	150,000
9. Refuge Deer Study	0	189,000	189,000
10. Baseline Populations of Amphibians and Invertebrates	30,000	0	30,000
11. Recruit Hydrologist to Analyze Watershed Needs	0	100,000	100,000
12. Develop an Interpretive Foot Trail	40,000	10,000	50,000
13. Research Mercury Levels of fish in Pistol and Colding Ponds	10,000	0	10,000
14. Evaluate Feasibility of Fishing Program on Pistol Pond	0	0	0
15. Develop Education Facilities	100,000	175,000	275,000
16. Initiate a Panther and Ecosystem Outreach Program	0	100,000	100,000
17. Panther Habitat Protection	**	**	**
Totals	*$1,012,000*	*$1,652,000*	*$2,664,000*

** This project will need $150 million and $200,000 recurring expenses

Staff

A staff of thirteen permanent and six temporary/seasonal positions has been approved for the Florida Panther National Wildlife Refuge Complex. Ten additional positions (three of which will be shared with Ten Thousand Islands National Wildlife Refuge) are proposed to work specifically on implementing this comprehensive conservation plan. These positions include two easement biologists, assistant refuge manager, auto mechanic, maintenance worker, public use specialist, administrative assistant, GIS specialist (shared), hydrologist (shared), and a media specialist (shared). Figure 10 displays the organizational structure for the management of Florida Panther National Wildlife Refuge.

Volunteers

Volunteer assistance to the refuge grew appreciably during the last three years due to substantial contributions of AmeriCorps volunteers and to various individuals working on biological projects. Not considering Americorps' assistance, a total of 30 volunteers contributed 5,405 hours in 1998; i.e., resource management, administration, and public use support. Most assistance was gained in wildlife monitoring.

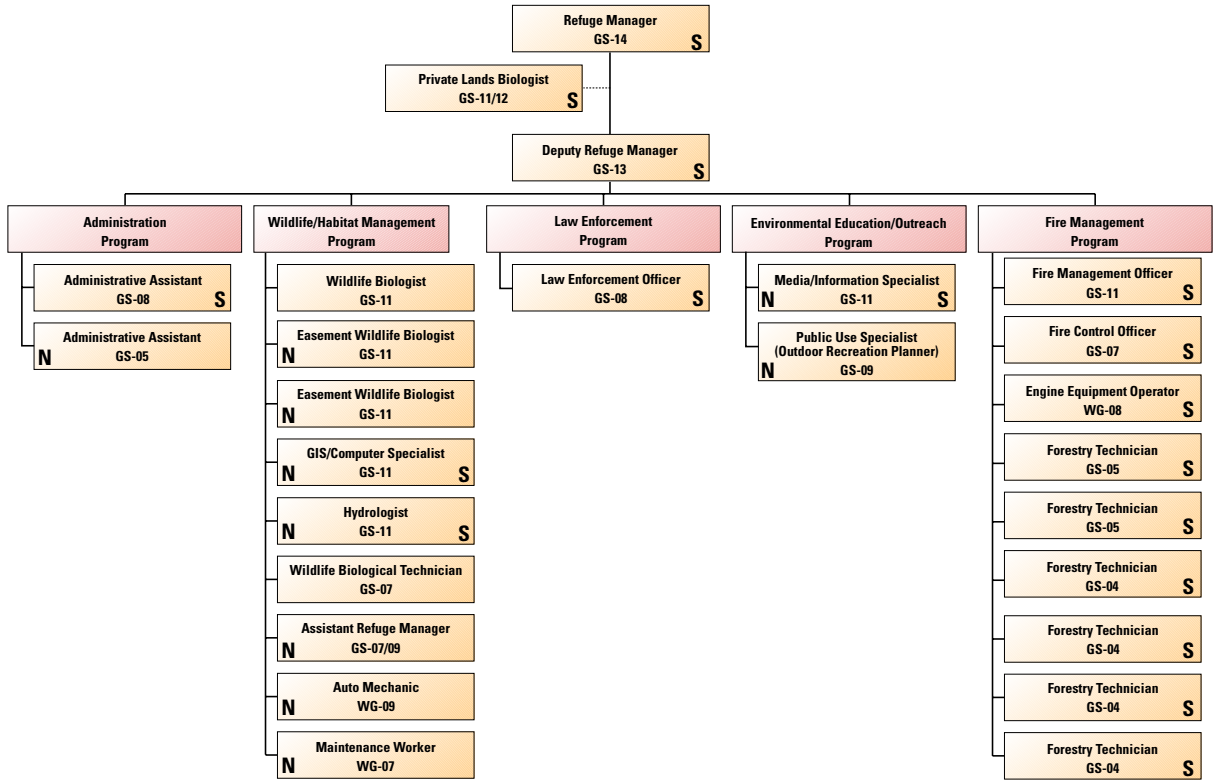
Volunteers will continue to play a critical role in assisting staff with fulfilling the future vision of the refuge. In addition, while not required of all those who participate in the group "Friends of the Panther Refuge," many of these interested citizens will be enlisted as volunteers to perform various refuge activities.

Monitoring and Evaluation

Extensive research and monitoring of natural resources have always been a major part of the management of the refuge. Some of the studies target the collection of baseline data on the environmental parameters of the area. This knowledge will give managers a data base on which to judge how habitat management, changes in water quantity and quality, or other environmental changes have impacted refuge resources. A major objective of research studies is that the products will benefit not only the refuge but other land managers as well. Most research has centered on panthers, deer, and the effects of the prescribed burning program on habitat and wildlife.

The plan will be augmented by detailed step-down management plans to address management actions in support of refuge goals and objectives and to implement the identified strategies. Every five years the plan will be revisited to document progress and reassess direction. Public involvement in evaluating progress and plan implementation will be encouraged.

Figure 10. Organizational Structure for Management of Florida Panther National Wildlife Refuge



N - *Indicates a new position*
S - *Indicates a position shared with Ten Thousand Islands NWR*

Finding of No Significant Impact

Florida Panther 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 implementationof the Florida Panther 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 continue to be managed under its current management direction. The refuge has been closed to public access except for limited, small group tours. Essentially, the refuge is managed as inviolate sanctuary for the endangered Florida panther;
2. Alternative B (Ecosystem Approach) meets the needs of the resources and allows some access to the public for wildlife observation and environmental education. The Service would study the compatibility and feasibility of allowing fishing to occur on the refuge; and,
3. Alternative C (Maximize Public Use Programs on the Refuge) emphasizes public use and environmental education programs on the refuge. Those activities would be allowed, coupled with research to determine their impact on the endangered Florida panther.

The alternative selected for implementation is Alternative B; implement the Florida Panther National Wildlife Refuge Comprehensive Conservation Plan and establish refuge management direction pursuant to the goals, objectives, and strategies contained in the plan. This alternative was selected because it best meets the primary purposes for which the refuge was established--protecting and enhancing panther habitat while maintaining natural diversity. 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.

Implementation of the agency's decision would be expected to result in the following environmental, social, and economic effects: This alternative will provide the public with limited access to the refuge, which has been a major issue. This access will benefit refuge programs by informing the public about refuge programs, the plight of the panther, and other wildlife that use the refuge. The conservation easement program will facilitate the protection of panther habitats in south Florida and involve only willing private landowners. The program should prove to be a major step in the conservation of critical resources within the South Florida Ecosystem.

Visitation will be monitored for its impacts on flora and fauna of the refuge. Development of new refuge facilities will cause minimal disturbance to refuge lands. It will not adversely impact threatened or endangered species or adversely impact wetlands, neither will it harm nor cause the loss or destruction of archaeological or historical resources. The preferred alternative will restore 40 acres of disturbed wetlands in refuge compartment No. 12; 513 acres of disturbed wetlands within refuge compartment Nos. 42 and 44; 800 acres of wetlands within Lucky Lake and Stumpy Strands; and, achieve protection of 370,000 acres of priority panther habitat in southwest Florida. This alternative will have a positive effect on visitor use, environmental education, conservation of natural resources, and local communities.

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 will 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.

Finding of No Significant Impact
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 of the Comprehensive Conservation Plan.

Copies of the Environmental Assessment are available by writing:
U.S. Fish and Wildlife Service
1875 Century Boulevard
Atlanta, Georgia 30345

It is my determination that the preferred alternative will 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.9B(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 will not have a significant effect on the human environment. (Environmental Assessment, page 70.)
2. The actions will not have a significant effect on public health and safety. (Environmental Assessment, pages 70-80.)
3. The project will 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, page 70.)
4. The effects on the quality of the human environment are not likely to be highly controversial. (Environmental Assessment, page 70.)
5. The actions do not involve highly uncertain, unique, or unknown environmental risks to the human environment. (Environmental Assessment, pages 70-80.)
6. The actions will not establish a precedent for future actions with significant effects nor does it represent a decision in principle about a future consideration. (Environmental Assessment, pages 73-77.)
7. There will be no cumulatively significant impacts on the environment. Cumulative impacts have been analyzed with consideration of other similar activities on adjacent lands, in past action, and in foreseeable future actions. (Environmental Assessment, page 70 and 80.)
8. The actions will not significantly affect any site listed in, or eligible for listing in, the National Register of Historic Places, nor will they cause loss or destruction of significant scientific, cultural, or historic resources. (Environmental Assessment, page 70.)
9. The actions are not likely to adversely affect threatened or endangered species, or their habitats. (Environmental Assessment, page 70.)
10. The actions will not lead to a violation of federal, state, or local laws imposed for the protection of the environment. (Environmental Assessment, page 80.)

Supporting References:
Environmental Assessment
Comprehensive Conservation Plan

Introduction

Purpose and Need for Action

The Fish and Wildlife Service proposes to imlement a Comprehensive Conservation Plan to guide the management of the Florida Panther National Wildlife Refuge, Collier, County, Florida, over the next ten to fifteen years.

Cigar orchid
USFWS photo by Larry W. Richardson

The purpose of this Environmental Assessment is to analyze and evaluate the environmental effects of implementing various alternative management scenarios for the refuge. The Service intends to implement Alternative B: Ecosystem Approach, as described in the Management Direction section 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 Comprehensive Conservation Plan. Implementation of the plan will necessitate further coordination and cooperation with these entities.

The following issues, concerns, and opportunities were addressed during the planning process. (See Appendix C for a discussion.)

- Public Access
- Cooperative Land Management and Partnerships within the Big Cypress Watershed
- Public Awareness of the Panther and Refuge Programs
- Panther Habitat Protection on Private Lands
- Refuge Research and Management
- Refuge Staffing
- Oil and Gas Exploration

Alternatives

Wood storks
Photo by John and Karen Hollingsworth

The following alternatives address the major issues regarding Florida Panther National Wildlife Refuge. Each alternative was analyzed for its appropriateness in meeting the needs of the public and purpose/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

Public Access

In this alternative, the plan would advocate that the refuge continue to be managed under its current management direction. The refuge has been closed to public access except for limited, small group tours. Essentially, the refuge is managed as an inviolate sanctuary for the endangered Florida panther.

Due to the sensitive nature of the endangered species associated with the refuge, the environmental education and public use programs would not be expanded. No interpretive or recreational trails would be developed, and there would be no hunting or fishing program. The refuge currently offers access for limited small group tours and outreach opportunities for school groups off the refuge. This alternative advocates more of an "off-refuge" approach which would still meet interpretive and educational goals.

Cooperative Land Management and Partnerships within the Big Cypress Watershed

Currently, there are limited partnering opportunities with adjacent landowners and government agencies to cooperatively manage the watershed for the protection of hydrologic, ecological, and environmental values of the system.

The refuge manager is a trustee for the Corkscrew Regional Ecosystem Watershed, a 50,000-acre proposed natural area north of the refuge. He serves as an ex-officio member of the Natural Resources Committee for the University of Florida Institute of Food and Agricultural Sciences in Southwest Florida; serves on the Big Cypress Basin Science Workshop Steering Committee; and serves on the Oversight Committee for Ecological Monitoring of the Proposed Hydrologic Restoration of the South Golden Gate Estates. The refuge manager has also been a member of the State of Florida Big Cypress Basin Ecological Management Area Team and the Big Cypress Basin Project Coordination Team for South Florida Ecosystem Restoration.

Public Awareness of the Panther and Refuge Programs

The refuge would remain closed to public access. Due to the lack of a visitor contact station at the refuge, the public would have limited means of obtaining important information on the panther, its habitat, or refuge programs. Opportunities for increased environmental education would not be promoted, and partnering for better watershed management and habitat conservation would not be pursued.

Wood storks and Great egrets
Photo © Larry W. Richardson

Panther Habitat Protection on Private Lands

No incentives would be provided to encourage private landowners to sell their land or maintain important panther habitat beyond the boundaries of the refuge.

Refuge Research and Management

Research projects such as panther monitoring, prescribed fire impacts, and plant, animal and hydrological baseline monitoring exist. Current management practices would continue, but would not be modified or expanded. Day-to-day operational activities would continue to revolve around intensive field work regarding management of habitats for the panther and other species of concern such as the wood stork. The refuge is currently used as a control site (non-hunting area) for studies that are ongoing and planned in the future to determine the impacts of human activities on the panther.

Routine field work includes monitoring and observing panther activities, ecosystem assessments of water quality issues, prescribed burning, and habitat manipulation to improve deer forage. There would be no public use program.

Refuge Staffing

The refuge cannot successfully meet its Service or South Florida Ecosystem responsibilities at current staffing levels. These responsibilities go beyond habitat management on the refuge for the panther.

Oil and Gas Exploration

Most of the refuge's subsurface minerals are not owned by the Government. Surface mineral exploration has not occurred since the refuge was established. Special Use Permits have not been issued for exploration or seismic work. However, a draft plan for seismic work and oil well exploration from Collier interests has been submitted to the refuge. The Service had questions, comments and concerns with the draft plan, and is awaiting responses. Exploration will have an impact on the resources of the refuge.

Management Goals, Objectives and Strategies under Alternative A

Habitat Management

Goal

1.0 Provide optimum habitat conditions on the refuge for the Florida panther.

Objective

1.1 Achieve and maintain vegetative conditions that are preferred by the panther.

Strategies

1.1.1 By FY 2001, develop and implement a Habitat Management Plan. (1.2.1 related)

1.1.2 Refine refuge prescribed fire program and other habitat management tools to achieve and maintain optimum vegetative conditions for panther habitation.

Objective

1.2 Achieve and maintain optimum prey densities for the Florida panther.

Strategy

1.2.1 Follow the approved Fire Management Plan and incorporate into the Habitat Management Plan to maintain/enhance deer habitat. Conduct mosaic burns within fire-evolved habitats, burning a minimum target goal of 25 percent of these habitats annually. Update the plan as new information becomes available. Use prescribed fire to achieve optimum availability and nutritional quality of native forage for deer by 2002.

Natural Diversity Management

Goal

2.0 Restore and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna.

Objective

2.2 Minimize the impact from oil and gas exploration and extraction on the refuge.

Strategies

2.2.2 Carefully review oil exploration plans to ensure that adverse impacts to refuge natural and cultural resources are minimized. Refuge staff must ensure the plan employs Best Management Practices. Oil and gas extraction, seismic work, and associated construction will be conducted in a manner that minimizes impacts to wildlife and other refuge resources.

2.2.4 Mitigate for direct and indirect exploration impacts to refuge fauna and habitats through restoration projects.

Objective

2.3 By 2002, fully develop and implement a prescribed fire program to restore and maintain healthy fire dependent communities.

Strategies

2.3.1 Implement the 1998 Fire Management Plan, with annual reviews and updates to incorporate applied research findings.

2.3.2 Develop fire prescriptions and techniques to enhance prairie orchids and protect the fire sensitive epiphytic orchids.

Objective

2.5 By 2003, develop a control and eradication plan for invasive exotic species and implement segments as identified in the following strategies.

Strategies

2.5.1 By 2000, identify the most problematic species and areas of infestation. For plan species, apply mechanical and herbicide techniques to these areas first.

2.5.2 By 2002, identify the most effective herbicide type, application, dosage, and season of use for refuge problematic plant species.

2.5.5 Continue to host and coordinate an annual Southwest Florida Invasive Exotic Plant Workshop for area land managers. The workshop will focus on new invaders to the area, control techniques, opportunities for control equipment and labor cooperation, and other exotic plant issues.

Objective

2.7 Manage refuge hydrologic conditions to maximize benefits to endemic flora and fauna.

Strategies

2.7.1 Collaborate with South Florida Water Management District to complete the Lucky Lake Strand project to restore the hydrologic regime to the west side of the refuge.

2.7.2 By 2004, establish and implement a water management strategy for the refuge.

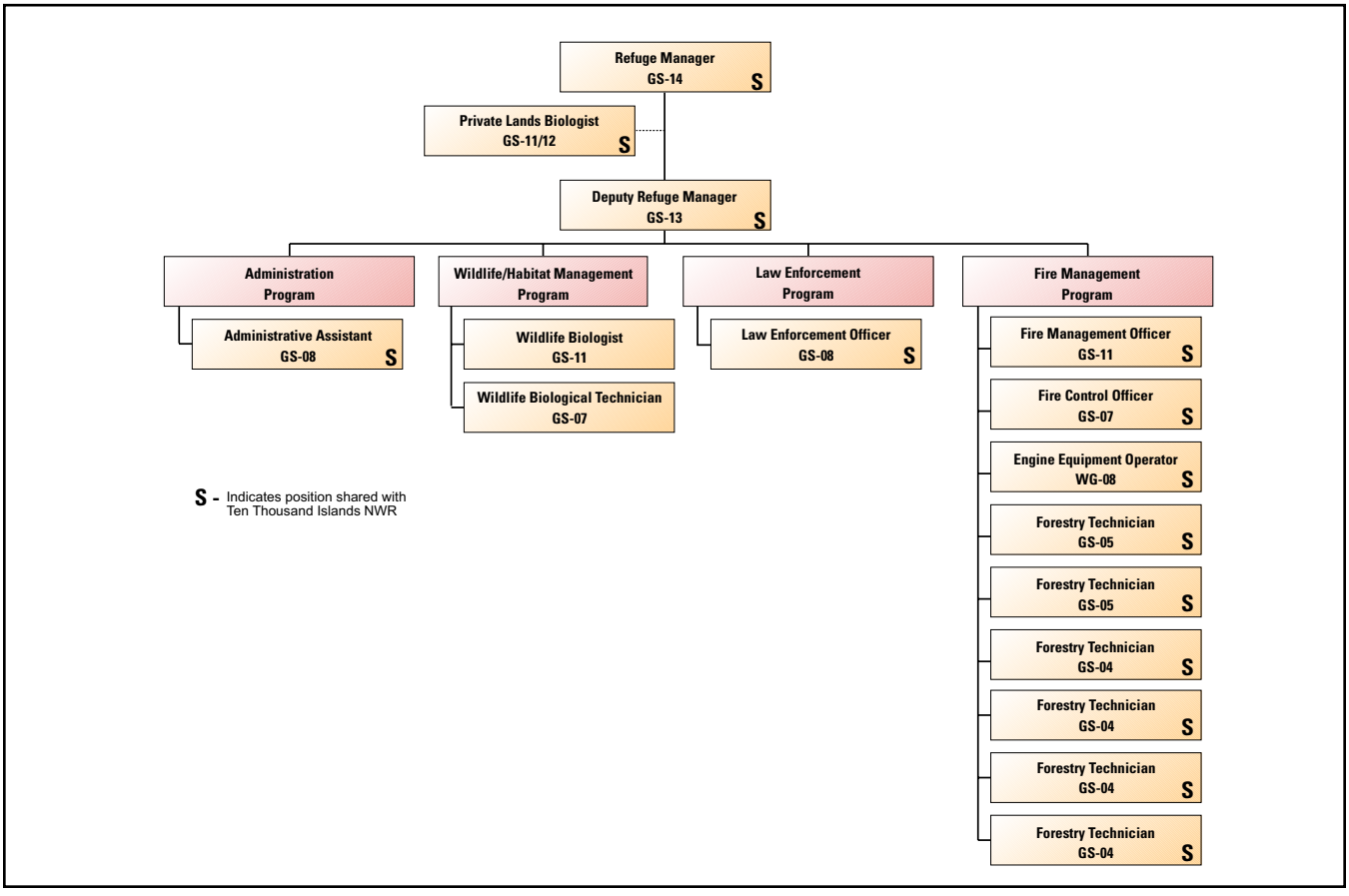
Funding under Alternative A

A total of $953,000 was allocated in FY 1998 to manage Florida Panther and Ten Thousand Islands National Wildlife Refuges. The fire program represents almost 40 percent of the dollars allocated to the refuge. General operating funds do not meet staffing and basic operating needs.

Project Cost Summary under Alternative A

There are no projects to support Alternative A.

Figure 11. Organizational Structure for Management of Florida Panther National Wildlife Refuge under Alternative A.



Alternative B: Ecosystem Approach *(Alternative to be Implemented)*
A description of the Ecosystem Approach to managing the refuge may be found in the Comprehensive Conservation Plan, pages 16-33.

American aligator
USFWS photo by Larry W. Richardson

Alternative C: Maximize Public Use Programs on the Refuge

Public Access

Public use and environmental education programs would be stepped up considerably. Facilities such as parking lots, paved roads, trails, auto loops, and restrooms would be developed on the refuge to accommodate increased public use. Secondary uses, such as hunting, fishing, and camping would also be allowed and coupled with some research to determine if those uses are compatible with the purpose of the refuge. Secondary uses on the refuge would risk inflicting adverse impacts on the panther and/or jeopardizing habitat needs of the panther. Research and monitoring would be minimized because they would conflict with public use management. There would be no need or regard for additional research except for that which would aid management in determining whether to disallow or increase secondary uses and activities on the refuge.

Waterfowl
Photo © Larry W. Richardson

Cooperative Land Management and Partnerships within the Big Cypress Watershed

Less emphasis than Alternative B would be placed on working with the local community, private landowners, and other jurisdictions. General partnerships on management and cooperation with various watershed entities that would lead to overall land and watershed protection and stewardship of the resources would be pursued. More communication and coordination with other land managers within the watershed would occur.

Public Awareness of the Panther and Refuge Programs

Activities designed to educate the public would be limited to on-refuge programs only. Plans to develop a multi-agency visitor center would be pursued.

Panther Habitat Protection on Private Lands

There would be no efforts to protect the panther on private lands. All management efforts would be focused towards on-refuge activities.

Refuge Research and Management

Current research practices would continue with the development of some new partnerships for research to benefit refuge management specifically targeting the effects of secondary use activities.

Refuge Staffing

Additional staff would be needed to enhance the education and outreach program on the refuge.

Oil and Gas Exploration

Resources would be managed to minimize the adverse impacts of oil and gas exploration on the refuge.

Management Goals, Objectives and Strategies under Alternative C

Public Use Management

Goal

4.0 Provide opportunities for compatible public use in accordance with the National Refuge System Improvement Act of 1997.

Objective

4.1 By 2002, develop an interpretive trail to allow access and enhance public understanding of the panther and the refuge. (Special Project 12)

Strategies

4.1.1 Construct a 1- to 1.5-mile interpretive foot trail at the northwest corner of the I-75/SR 29 interchange. The trail will utilize low-impact design, be self-guiding, and feature interpretive signs.

4.1.2 Utilize partnerships (Friends of the Panther Refuge and others) to fund, construct, and maintain the trail, interpretive exhibits and associated facilities.

Objective

4.2 Develop a wildlife viewing area for the moist-soil management area located adjacent to SR 29. Facilities will include a gravel parking area, bathroom, viewing platforms, and interpretive signs. (Special Project 5)

Strategy

4.2.1 By 2000, coordinate with a public use specialist and other agencies on the design and layout of interpretive displays and public use facilities.

Objective

4.3 Determine compatibility and feasibility of fishing at Pistol Pond.

Strategies

4.3.1 By 2000, determine the mercury level of fish in Pistol Pond by enlisting the cooperation of the Service's Ecological Services Division on sampling and contaminants analysis. (Special Project 13)

4.3.2 Inventory fishery resources in Pistol Pond by employing electro-shocking techniques through cooperation of the Service's Fisheries Division.

4.3.3 Evaluate the costs, logistics, and safety considerations in creating suitable sites for fishing in Pistol Pond. The evaluation will consider options of partnership assistance to defray costs and/or gain assistance for site development. (Special Project 14)

4.3.4 Determine if public use at Pistol Pond will be compatible with the future extension of SR 29 panther fence and crossing.

Cooperative Management

Goal

6.0 Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida.

Objective

6.2 Inform private landowners of federal cooperative programs that will enhance or protect wildlife habitat and enlist their participation in these programs.

Strategies

6.2.1 Support a private lands biologist to implement and coordinate the various programs.

6.2.2 Start an outreach effort to inform landowners of the variety of federal and state programs available including, but not limited to, "Partners for Wildlife," "Wetland Reserve Program," "Conservation Reserve Program," and "Forest Stewardship Program."

Objective

6.3 Facilitate partnerships to manage cultural resources with the National Park Service, the State Historic Preservation Office, professional archaeologists, Native American communities, and the general public.

Strategies

6.3.1 Procure from the National Park Service copies of reports describing archaeological, anthropological, and historical investigations at Everglades National Park and Big Cypress National Preserve. (Regional Archaeologist

6.3.2 Enter into a Memorandum of Understanding with the National Park Service and Florida Department of Environmental Protection to enhance law enforcement of the Archaeological Resources Protection Act, the Native American Grave Protection and Repatriation Act, and Section 50 of the Code of Federal Regulations,as well as facilitate investigations of the Archaeological Resources Protection Act violations and unpermitted artifact collection on the refuge. (Regional Archaeologist)

6.3.3 Approach the Miccosukee and Seminole nations for information on and input into the management of significant cultural and sacred sites located within the refuge. (Regional Archaeologist)

6.3.4 Work with local Native American communities to develop and education program regarding their cultural heritages. (Regional Archaeologist)

6.3.5 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)

6.3.6 Negotiate an agreement with the Florida State Museum or other appropriate facilities for the permanent curation of archaeological collections and associate documentation derived from archaeological investigations on the refuge. (Regional Archaeologist)

6.3.7 Work with the State Historic Preservation Office to ensure confidentiality of cultural resource data within the refuge and the State of Florida. (Regional Archaeologist).

Figure 12. Project Cost Summary under Alternative C

Projects	*One Time Cost*	*Recurring Cost*	*First Year Need*
5. Develop Waterbird Habitat and Viewing Area	162,000	20,000	182,000
12. Develop an Interpretive Foot Trail	40,000	10,000	50,000
13. Research Mercury Levels of fish in Pistol and Colding Ponds	10,000	0	10,000
14. Evaluate Feasibility of Fishing Program on Pistol Pond	0	0	0
Totals	*$212,000*	*$30,000*	*$142,000*

Figure 13. Organizational structure for management of Florida Panther National Wildlife Refuge under Alternative C.

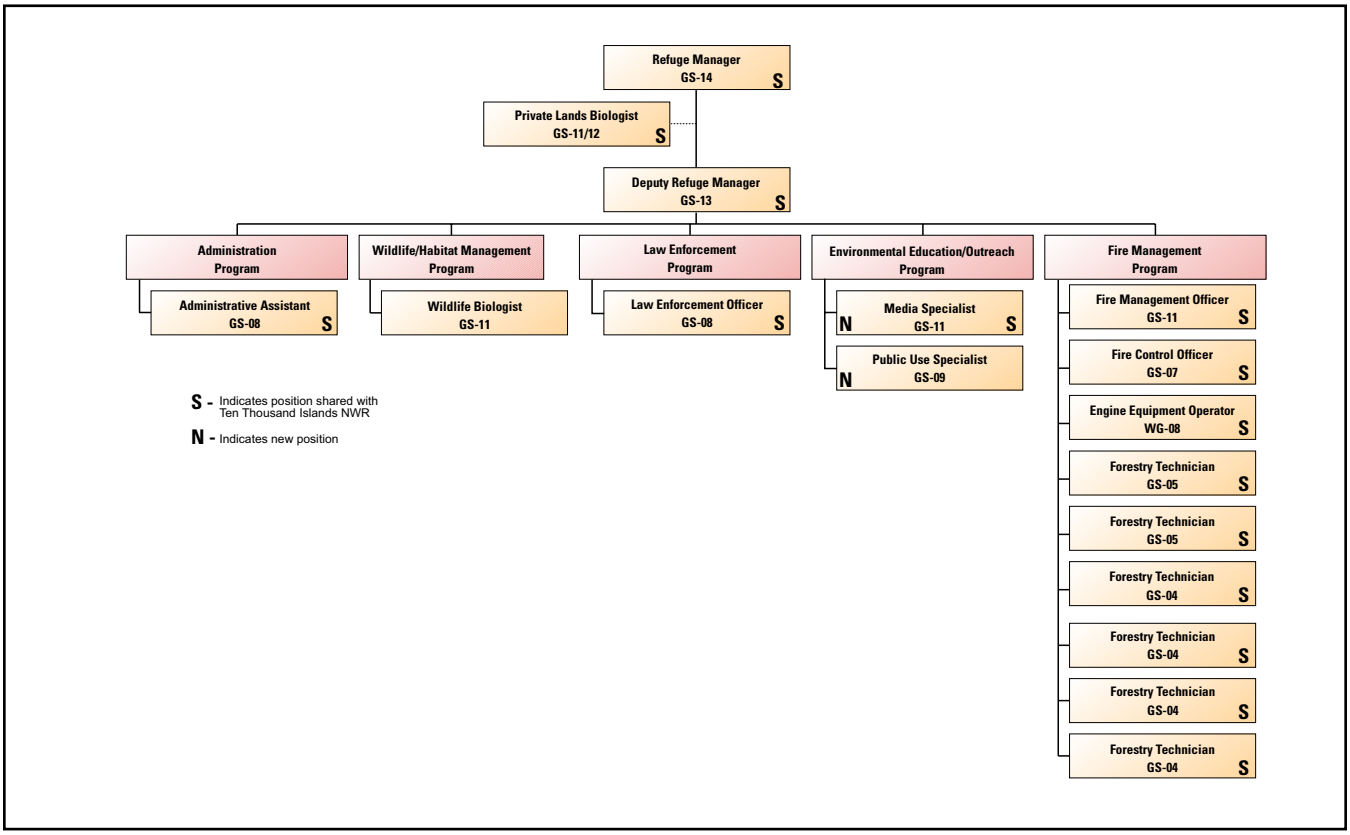


Figure 14. Issues and Alternatives Matrix

Issue	*Alternative A No Action*	*Alternative B Ecosystem Approach*	*Alternative C Maximum Public Use*
Public Access	Limit to current levels of small group tours	Increase access a) develop interpretive trail b) develop waterbird viewing area	Increase access a) develop interpretive trail b) develop waterbird viewing area c) develop additional hiking with interpretation c) develop additional wildlife viewing areas along I-75 and SR 29
	No hunting or fishing	Study compatibility of fishing	Study compatibility of hunting and fishing
Outreach	Limited on-refuge and off-refuge activities	Increased education efforts on-refuge and off-refuge	Limited to on-refuge education
	No multi-agency visitor center	Develop multi-agency visitor center	Develop multi-agency visitor center
Cooperative Management and Partnerships	Limited partnering for panther habitat protection, watershed protection, and ecosystem restoration	Develop partnerships to co-op; manage watershed to protect panther habitat, hydrology, ecology, and environmental values of the system	Develop partnerships to protect panther habitat on refuge
	No conservation easement program	Maximum conservation easement program; 10,000 acres adjacent to refuge; 360,000 acres in southwest Florida	No conservation easement program
	Limited off-refuge ecosystem restoration	Develop off-refuge ecosystem restoration projects	Limited off-refuge ecosystem restoration projects
Research and Management	Continue existing research to refine management programs on the refuge	Implement new research and develop new partnerships to continually enhance refuge research projects and management programs on and off the refuge	Continue existing research to refine management programs on refuge
Rufuge Staffing	Maintain current staffing	Increase staffing	Increase staffing
Oil and Gas	Manage resources to help minimize the adverse impacts of gas and oil exploration	Acquire mineral rights to protect refuge surface resources	Manage resources to help minimize the adverse impacts of gas and oil exploration

Florida black bear
USFWS photo by Larry W. Richardson

Affected Environment

The refuge encompasses the northern origin of the Fakahatchee Strand, which is the largest cypress strand in the Big Cypress drainage basin. Orchids and other rare swamp plants grow within the swamp's interior. The refuge contains a diverse mix of pine forests, cypress domes, marl prairies, hardwood hammocks, and lakes surrounded by swamps.

In addition to the panther, 20 other species of animals are found in the refuge vicinity that are either state or federally listed as threatened, endangered, or as species of special concern. The Florida black bear, alligator, wood stork, roseate spoonbill, limpkin, eastern indigo snake, Florida grasshopper sparrow, Everglades mink, and Big Cypress fox squirrel are a few examples. Other resident wildlife include white-tailed deer and feral hogs, which are important panther prey species. Turkey and bobwhite quail are also found on the refuge.

Climate

The subtropical climate is directly 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 the areas of standing water during the rainy season. Temperatures occasionally fall below freezing in winter and rise above 90°F during the summer with an average annual temperature of about 73°F.

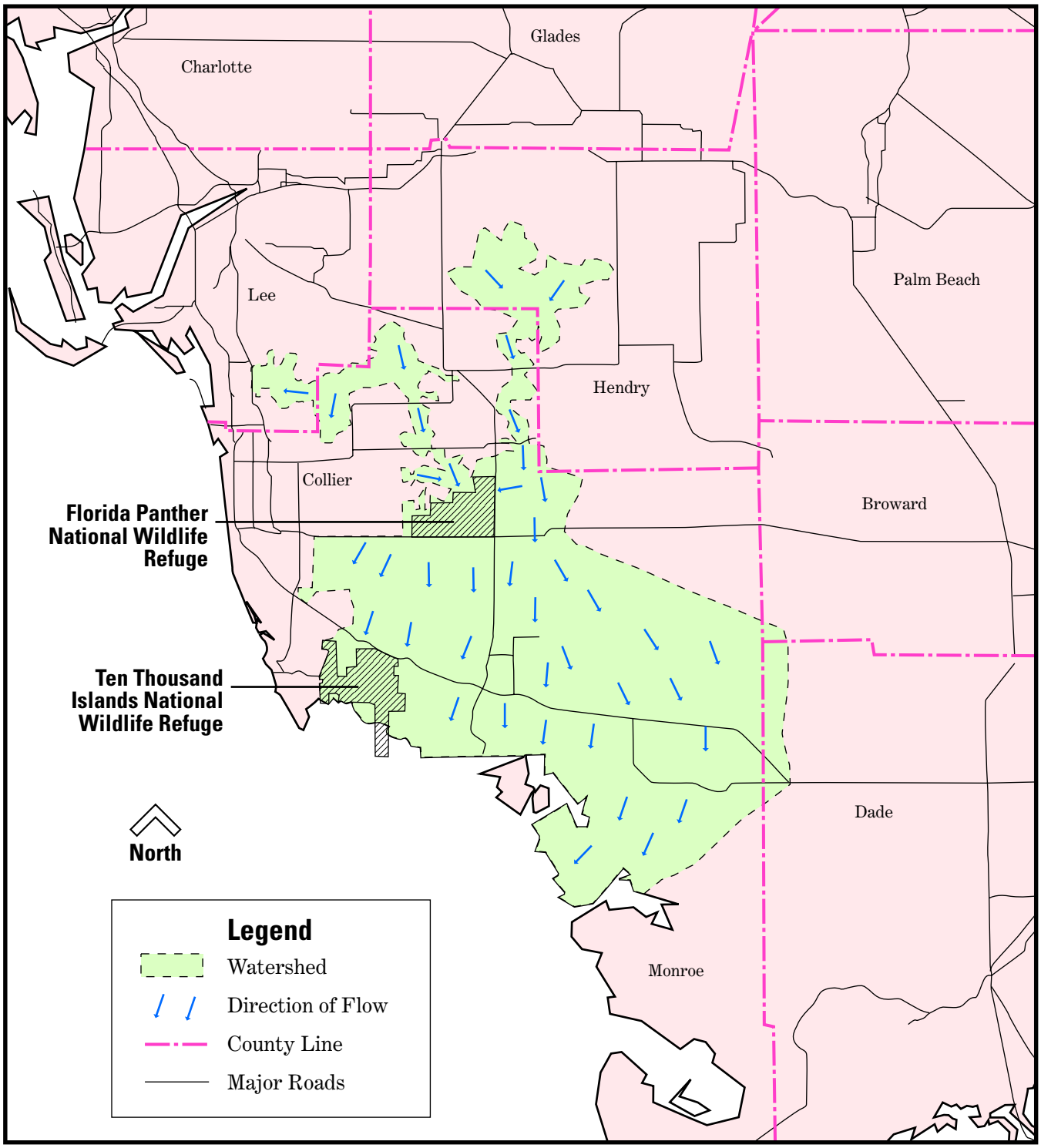
Physiography and Hydrology

The refuge lies within the Big Cypress Swamp physiographic region of Florida. The Swamp covers more than 2,400 square miles of subtropical area in southwest Florida. "Swamp" is a misnomer, for the land contains a variety of wet and dry habitat types. However, the cypress tree is the predominate tree of the area. The Tamiami Limestone formation underlies all of the refuge and is approximately 6 million years old. The formation is capped by hard rock under which are found sand, silts and clays, shell marks, and shell-free, greenish clay. A thin layer of sand, sandy marl, clay and fine shell cover prairie and flatwood areas, while a thicker organic peat ranging in thickness to 7 feet can be found in the hammocks and strands. The refuge is relatively flat, ranging from 11 to 16 feet above mean sea level, with drainage from north to south.

More than 75 percent of the rain normally falls during the 6-month wet season of May through October. Summer rains are usually intense, frequent, and short in duration. Winter is a drier period, where rains are usually the result of large frontal systems and are longer in duration, but less intense. Rainfall averages 55 inches per year. 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.

The refuge lies within the center of a major watershed that has importance to man and the environment *(Fig. 15)*. The Corkscrew Regional Ecosystem Watershed and the Okaloacoochee Slough form the two northern origins of the watershed. Water from these wetlands flows through the refuge and south through the Fakahatchee and Picayune strands into the Ten Thousand Islands coastal 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

Figure 15. U.S. Fish and Wildlife Refuges within the Big Cypress Watershed



water. In addition, they provide 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 be found in this system. Subtropical palms, orchids and other selected tropical plants in this area are found no where else in the United States.

A major agricultural area lies just north of the refuge. Large tracts of land have been cleared to produce vegetables and citrus. The quantity and quality of the water draining from these operations are undergoing long-term monitoring to determine their impacts on the refuge. Questions persist as to how much of the watershed in private ownership can be developed into agriculture, ranching, or urbanization before major functions and attributes of the wetland ecosystem are lost.

Soils

Soils are predominantly organic peats in the mixed hardwood strand areas ranging in thickness up to 7 feet. A thin layer of mineral soil, especially marl and sand, is dominant on the prairies.

Wood storks
USFWS photo by Larry W. Richardson

Vegetative Habitats

The Service and other interested parties are concerned for the refuge's long-term environmental health and wildlife productivity. Nationwide studies have documented a declining status of numerous vegetative and wetland-dependent wildlife populations. These declines have been attributed to habitat loss and alteration. While the refuge was logged 40 to 50 years ago, cypress forests have regrown. However, the adjoining land use has exerted influences to alter refuge habitats. Ditching for residential and agricultural development near the refuge has altered refuge hydrology and has promoted generally drier soils which has promoted an expansion of cabbage palms. More and more it is recognized that the long-term biological health of the refuge is highly dependent upon the ecological health of the watershed.

Eight major habitat types have been described for the refuge (Fakahatchee Strand Environmental Assessment 1985). These include:

Mixed Hardwood Swamp Forests

This community is dominated by diverse hardwoods, including red maple, sweet bay, pop ash, wax myrtle, cocoplum, dahoon holly, myrsine, willow, red bay, and swamp bay. Pure stands of pond apple may grow in the wettest areas, while live oak may dominate on higher ground.

Cypress Forests

This community type consists of strand, dome, and cypress prairie forests. Pond cypress may dominate, but bald cypress does occur. The strands are common where there is sufficient water and flow to generate a depression channel, but the gradient is low and actual water flow is seldom observed. The strands are elongated, contiguous stands of cypress. Many hardwood species (red bay, swamp bay, wax mrytle, cocoplum) may be interspersed. Domes are characterized by dense, tall pond cypress. Domes occupy depressions in the mineral soil underlain by marl and limestone bedrock. Peat accumulates in the depressions and provides a substrate for the cypress. Similar hardwood species occurring in the strands are also found in the domes. The cypress prairies are also called hatrack or dwarf cypress, because the cypress trees have a stunted growth form and are widely spaced. Rainfall is the most significant source of water for the prairies where vegetation density and diversity are low. Sawgrass, muhly grass, and other herbs and grasses make up the ground vegetation of this prairie.

Prairies

Prairies are associations of mixed grasses, sedges and other herbaceous plants with few trees. Common species in wet prairie include maiden cane, blackhead rush, star dichhromena, muhly, water dropwort, and sawgrass. Common species in dry prairies include saw palmetto, and some of the grasses and sedges found in the pine forest.

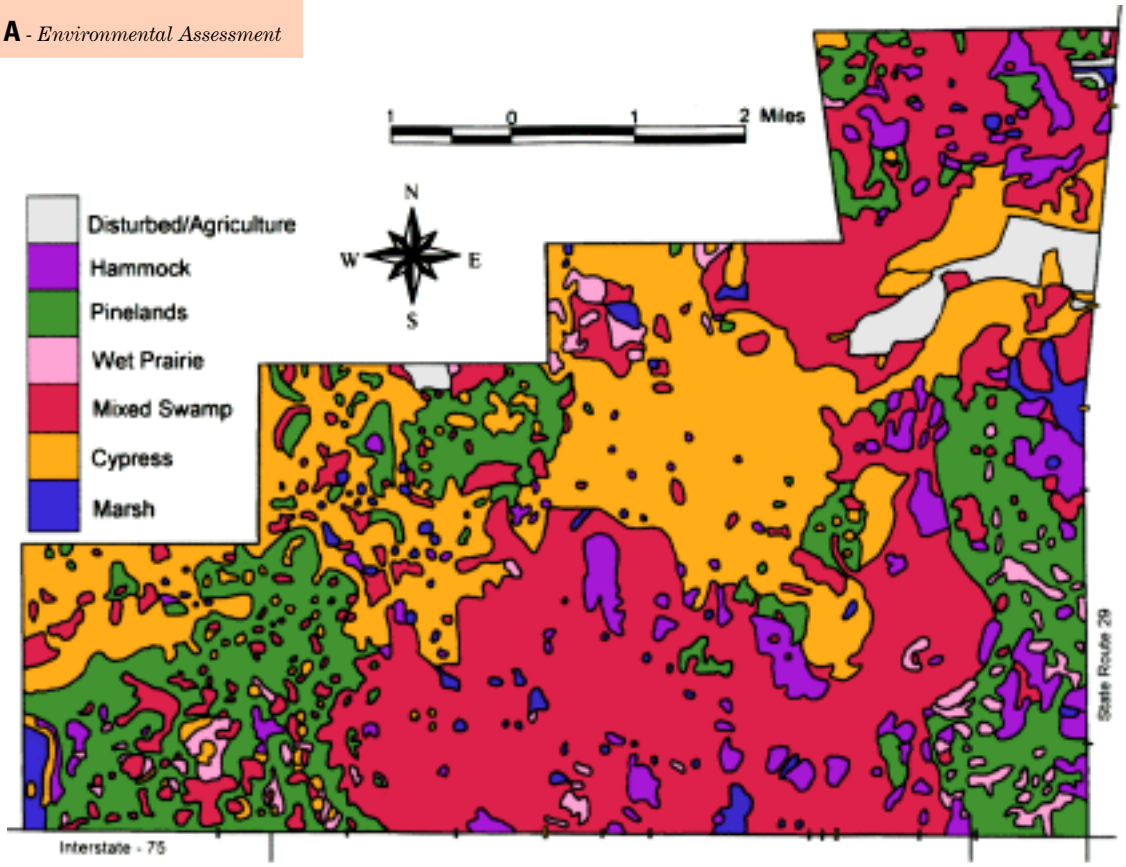


Figure 16. Map of Vegetative Habitats

Hammocks

Hammocks are composed of dense forests of hardwood trees, palms, shrubs, vines, ferns, and numerous epiphytes. They represent climax vegetation on the region and generally possess more tropical species than any of the other community types. Individual hammocks are generally characterized by maple and laurel oak in lower areas, with live oak and cabbage palm on higher areas. Subtropical hammocks support the greatest number of rare and threatened plants. Most of these are epiphytes from the bromeliad, orchid, and fern families.

Mixed Pine and Cypress Forests

These are open forests of pine, cypress, and cabbage palm. These forests have mixed understory vegetation that ranges from herbaceous plants to hardwood trees.

Pine Forests

These communities are open forests of southern slash pine, cabbage palm, saw palmetto, and scattered hardwood shrubs and trees.

Pop Ash or Pond Apple Sloughs and Ponds

These plant communities occur in the deepest drainage area that meanders through the center of the Fakahatchee Strand where, under natural conditions, there would be some water standing year round. The dominate trees are pop ash, pond apple, cypress, willow, and the bays. Plants in the shrub and ground cover zones include buttonbush, leather fern, alligator flag, whitevine and morning glory.

Lakes

Many small (1-20 acre) lakes are scattered throughout the refuge. The lakes or ponds are shallow (1-4 feet deep), except for Colding and Pistol ponds which have depths of 20-25 feet. These two ponds were artificially excavated for SR 29 road base material. Some common vegetation include pickerel weed, alligator flag, floating lemna and wolffiella, and submergent bladderwort and naiad. A few have emergent stands of giant cutgrass.

American alligator
USFWS Photo by Diane Border-Billiot

Water Resources

The refuge has no water control structures or means for water control at this time. However, the Service is involved in a water management project for the west side of the refuge. Lucky Lake Strand and Stumpy Strand are two wetland features comprised of more than 3,000 acres of cypress swamp, mixed swamp, wet prairies, marshes and ponds. The strands receive water from direct rainfall, and runoff from surrounding uplands and Camp Keais Strand to the north. Natural drainage of these strands changed with the construction of the Golden Gate Estates east of Naples in the 1960s. This project included the excavation of 183 miles of canals to drain wetlands for residential development. South of the refuge, Merritt Canal is one of four canals which drain South Golden Gate Estates into the Faka Union system. In addition to draining large areas along the canal south of I-75, the canal's northern origin is the southern terminus of the Lucky Lake Strand. This resulted in chronic drainage of both Lucky Lake and Stumpy strands north of the highway.

The Service has entered into an agreement with the South Florida Water Management District to proceed with the construction of a low-head water control structure on the south side of I-75 at the origin of Merritt Canal. This control structure will be designed to slow the drainage within these two strands to closely match their original hydroperiods. The restoration of this wetland system will enhance the Lucky Lake and Stumpy strands for endangered species, colonial wading birds and waterfowl.

Wildlife Resources

The Florida Panther National Wildlife Refuge is known for its diversity and abundance of wildlife. A total of 126 breeding and non-breeding bird species have been identified; an additional 35 species probably occur on the refuge. Forty-six species of reptiles and amphibians are known to occur on the refuge and another fifteen species are known to occur in close proximity to the refuge. Twenty-two species of mammals are known to occur on the refuge and another eleven species are known to occur in close proximity to the refuge. A variety of fish species, representing 13 families, occurs in the area.

The Wildlife Inventory Plan, completed in August 1990, is in need of revision to remove ineffective or logistically impractical surveys and inventories and replace them with more accurate and cost effective techniques. Trend data from surveys is still being run and will be evaluated to assist with revisions to the inventory plan that are necessary to help meet the mission of the refuge.

Some of the more common species of wildlife found on the refuge include:

Neotropical Birds

More than 116 species of neotropical migrants have been recorded in the South Florida Ecosystem. Both resident and migratory passerine birds utilize refuge habitats. The refuge is home to at least 25 species year round with the great crested flycatcher, Carolina wren, northern mockingbird, red bellied woodpecker, and cardinal being the most common species. More than 30 migratory species comprise the majority of passerines that frequent the refuge. Common migrants include tree swallows, American robin, white-eyed vireo, black and white warbler, yellow rumped warbler, palm warbler, and blue-gray gnatcatcher.

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. To further assess the species composition and the abundance of neotropical migrants, the refuge has established a standardized survey across a mostly wooded section of the refuge. This survey is coordinated with the Florida Fish and Wildlife Conservation Commission to contribute to the Partners-in-Flight Program. The survey route is monitored for a minimum of six weeks during the spring and fall migrations. Though this survey route largely traverses woodland habitats, the refuge has enlisted both researchers and volunteers to document as many as 18 other migrant passerines that are thought to occur on the refuge.

Wood ducks
USFWS Photo

Waterfowl

Staff frequently see wood ducks in the ponds, swamps, and flooded buggy trails on the refuge. Due to extensive logging of cypress in the Fakahatchee Strand in the 1940s, there is a lack of nesting cavities. Ducks Unlimited funded a nest box program in 1991 and the station purchased 25 cypress box kits, poles, and other materials. Since their installation in 1991, no wood ducks have used the boxes; however, they have been used by other birds such as screech owls and hooded mergansers.

Marsh and Water Birds

The refuge includes approximately 18,000 acres of wetlands that support a variety of colonial and other wading birds. The most abundant species include wood storks; great blue, little blue, tricolored, and green-backed herons; black and yellow-crowned night-herons; great, snowy, and cattle egrets; white ibis; anhingas; and double-crested cormorants. Approximately six rookeries with 10-50 nests were active in 1999 with a full complement of colonial species, mostly great egrets. Other small rookeries occurred east and southwest of the Hog Pond rookery and in small ponded areas in remote locations on the refuge.

Raptors

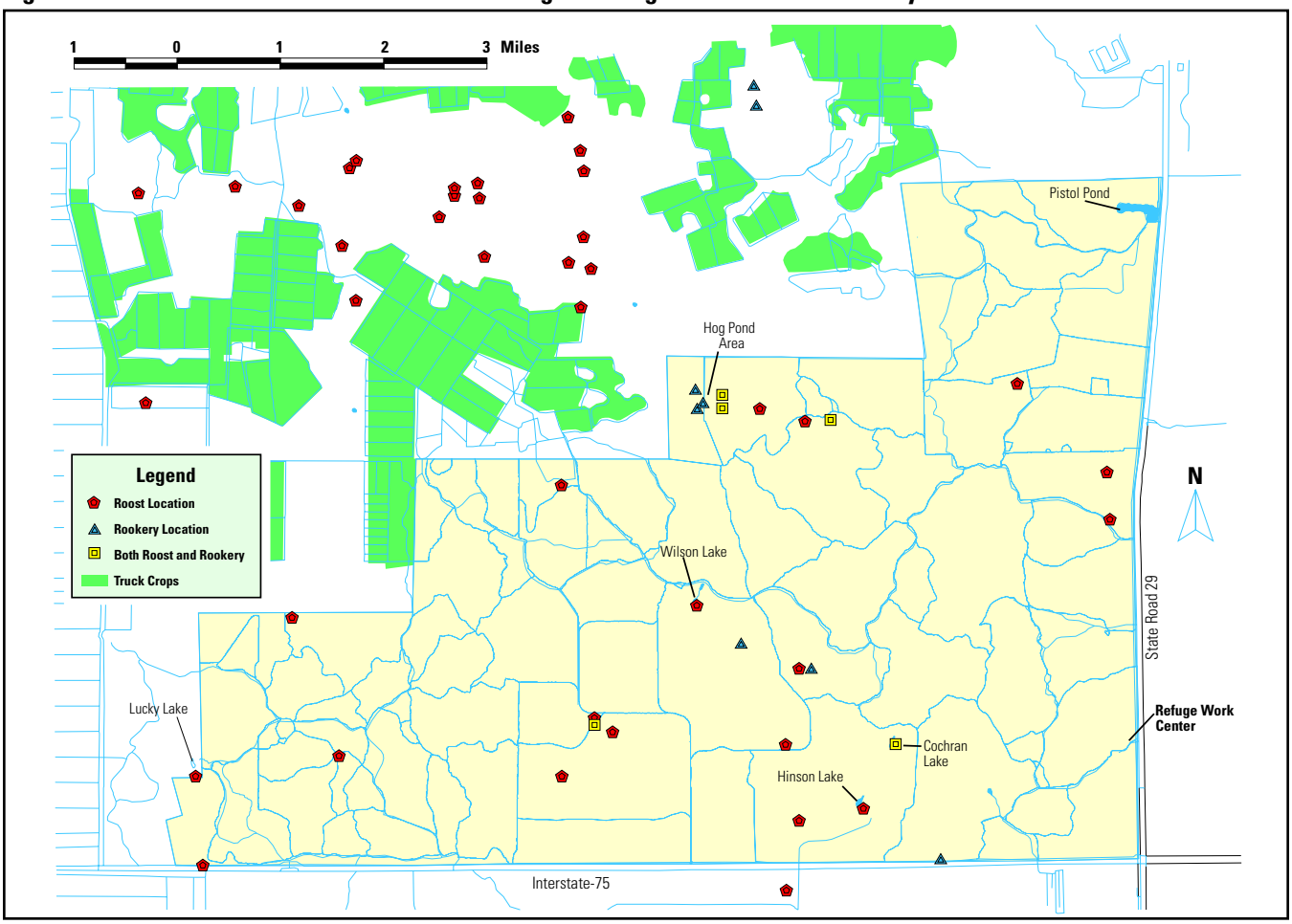
Black and turkey vultures are the refuge's most common raptors. Three hundred or more have been observed roosting in trees surrounding a colonial bird roost site on the north end of the refuge. Staff regularly observe red-shouldered and red-tailed hawks, and barred owls are heard. Another noteworthy raptor is the swallow-tailed kite; this species typically utilizes the refuge for nesting as does the red-shouldered hawk. Other raptors that use the refuge during migration, or winter here, include the peregrine falcon, broad-winged hawk, the accipiters, and the northern harrier.

The bald eagle and osprey are residents to the area and are occasionally observed searching for prey.

Other Resident Birds

The turkey remains a conspicuous game bird on the refuge. Additionally, the Bobwhite quail is found throughout the area but is less conspicuous.

Figure 17. Florida Panther National Wildlife Refuge Wading Bird Roost and Rookery



Raccoons
USFWS photo by Ronald Bell

Mammals

White-tailed deer and feral hogs are the most conspicuous game animals on the refuge. Deer and hogs are preferred panther prey species. Hog numbers appear to be stable on the east side of the refuge where they were once hunted by former lessees. Signs of rooting are seen fairly frequently. Groups of and solitary hogs are commonly seen while driving through the eastern side of the refuge. They are infrequently seen at or near the work center off of SR 29.

Raccoons, cottontail rabbits, and nine-banded armadillos are also common. In other areas of south Florida, where deer and hogs are less abundant, these species make up the bulk of the panther's diet. Bobcats and black bears are common on and off the refuge. In the last couple of years, coyotes have begun moving into southwest Florida. So far, tracks on the refuge are infrequently seen. About 33 species of mammals are likely to occur within the refuge; 22 species have been verified by refuge staff.

Fish

The bulk of the aquatic animal biomass in the Fakahatchee Strand is composed of a variety of fish species representing 24 families. The most common species are mosquitofish and flagfish, and the least common is killifish. This fishery is a major link in the food chain in the Fakahatchee Strand.

Population densities fluctuate dramatically from low-density, widely distributed wet season populations to highly concentrated populations found in "gator holes" and other scattered permanent water areas during the dry season. Significant wading bird predation occurs on larger fish during the dry season. The endangered wood stork occasionally utilizes concentrated fish populations as a major food source.

Sport fishing for larger fish species is limited due to the isolation and inaccessibility of fishable waters. Fishing that does occur is directed to accessible canals and road ditches where catfish, sunfish, and largemouth bass can be found. Generally, no significant commercial or subsistence fishing occurs on the project area. At least 5 species of exotic fish are found on or near the refuge including black acara, oscar, and the mayan cichlid.

American alligator
USFWS Photo by Diane Border-Billiot

Amphibians and Reptiles

Nearly all amphibians depend on aquatic habitats for reproduction and overwintering, and many species are specifically adapted and restricted to the aquatic environments. The greater siren is the largest salamander on the refuge. Other aquatic salamanders common in the area include the two-toed amphiuma and peninsular newt. The most commonly encountered frogs are the green treefrog, Florida cricket frog, and the southern leopard frog.

The American alligator is the largest reptile on the refuge. The black racer, banded water snake, and cottonmouth are probably the most abundant snakes. The most commonly encountered turtle is the peninsula cooter. Although reptiles are generally less dependant on water, a clear preference to aquatic systems is displayed by many turtles, snakes, and alligators. About 61 species of reptiles and amphibians are likely to occur within the refuge; 46 species have been verified by refuge staff.

Threatened and Endangered Species

In addition to the Florida panther, the following additional threatened and endangered species use the refuge. Status designation for each species is shown in parentheses. The Florida grasshopper sparrow, Everglades mink, and red-cockaded woodpecker have not been observed on the refuge, but have been observed in the ecosystem.

Mammals

- Florida panther, *Felis concolor coryi* (E^1, E^2)
- Bobcat, *Lynx rufus* (CITES II)
- Everglades mink, *Mustela vision evergladensis* (T^1)
- Florida black bear, *Ursus americanus floridanus* (T^1)
- Big Cypress fox squirrel, *Sciurus niger avicennia* (T^1)

Birds
- Southeastern American kestrel, *Falco sparverius* (T^1, CITES II)
- Wood stork, *Mycteria americana* (E^1, E^2)
- Florida snail kite, *Rostrhamus socialbilisplumbeus* (E^1, E^2)
- Bald eagle, *Haliaeetus leucocephalus* (T^1, T^2)
- Florida grasshopper sparrow, *Ammodramus savannarum* (E^1, E^2)
- Little blue heron, *Egretta caerulea* (SSC)
- Limpkin, *Aramus guarauna* (SSC)
- Northern harrier, *Circus cyaneus* (CITES II)
- Red-cockaded woodpecker, *Picoides borealis* (T^1, E^2)
- Roseate spoonbill, *Ajaja ajaja* (SSC)
- Florida sandhill crane, *Grus canadensis* (T^1)
- Snowy egret, *Egretta thula* (SSC)
- Tricolored heron, *Egretta tricolor* (SSC)
- White ibis, *Eudocimus albus* (SSC)

Reptiles
- American alligator, *Alligator mississippiensis* (SSC)
- Eastern indigo snake, *Drymarchon corias couperi* (T^1, T^2)

Federal and State designations of listed species in Florida
E^1 State designated endangered species
E^2 Federally designated endangered species
T^1 State designated threatened species
T^2 Federally designated threatened species
SSC State species of special concern
CITES I and II - Appendix I and II species of the Convention on International Trade in Endangered Species of Wild Flora and Fauna.

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

Cultural Resources

Archaeological investigations within the refuge have been limited. Seventeen archaeological and historic sites are recorded for the refuge. Two additional prehistoric sites have been reported but have not been verified. The three prehistoric sites are black earth middens and date to an unspecified Glades period. The middens contain a variety of ceramics, worked bone and shell tools, and faunal materials. Similar sites are seen in the Big Cypress National Preserve. Eleven of the historic sites are 20th century hunting camps. Buildings stand only at the Wilson Lake and Rock Island camps. The Lee Tidewater Cypress Company purchased the Fakahatchee Strand in 1906 for its large virgin stands of cypress. Logging operations did not begin until the late 1940s. Miccosukee and Seminole bands may have utilized the refuge in the 19th and early 20th centuries. However, no sites or camps have been found or reported on the refuge which can be attributed to either group.

Today, the only visible evidence are the all terrain vehicle roads which crisscross the refuge. The roads were the railbeds of the lumber railroad. A shell rock mining and crushing company operated near Pistol Pond as evidenced by the scatter of rusting equipment. The Colding House, located at the refuge maintenance complex, originally stood near the fire tower. It was moved to its current location in 1950. None of the historic sites are considered eligible for the National Register of Historic Places.

Socioeconomic Environment

Collier County was established in 1923 by the Florida State Legislature from a portion of Lee and Monroe counties. It is located on the southern Gulf coast of the Florida peninsula due west of the Miami-Ft. Lauderdale area. Naples, located in the western coastal area of Collier County, is the largest incorporated city and serves as the county seat. Everglades City, the only other incorporated city within the county, lies south and east of Naples. Modern-day settlement of the county evolved in isolated pockets during the 1870s while the region was still a part of Monroe County. In 1887, it became part of Lee County and remained such for 36 years until July 7, 1923, when Collier County was established.

Settlement began in the county in the mid 1870s, and in 1995 the county's population was 186,504. According to the Growth Management Plan, Collier County contains approximately 2,025.45 square miles of land area, and is one of the largest counties east of the Mississippi River. It is larger than the State of Rhode Island and the State of Delaware.

Of all the Florida counties, Collier is the least known. 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 North 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.

However, this rural lifestyle is destined to change in the coming years, 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. 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.

For business owners and employees alike, Collier County offers an opportunity without comparison. For residents and tourists, the as yet unspoiled southwest Florida coast offers a myriad of living and recreational opportunities. 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's residents and visitors as well.

Refuge Management Programs

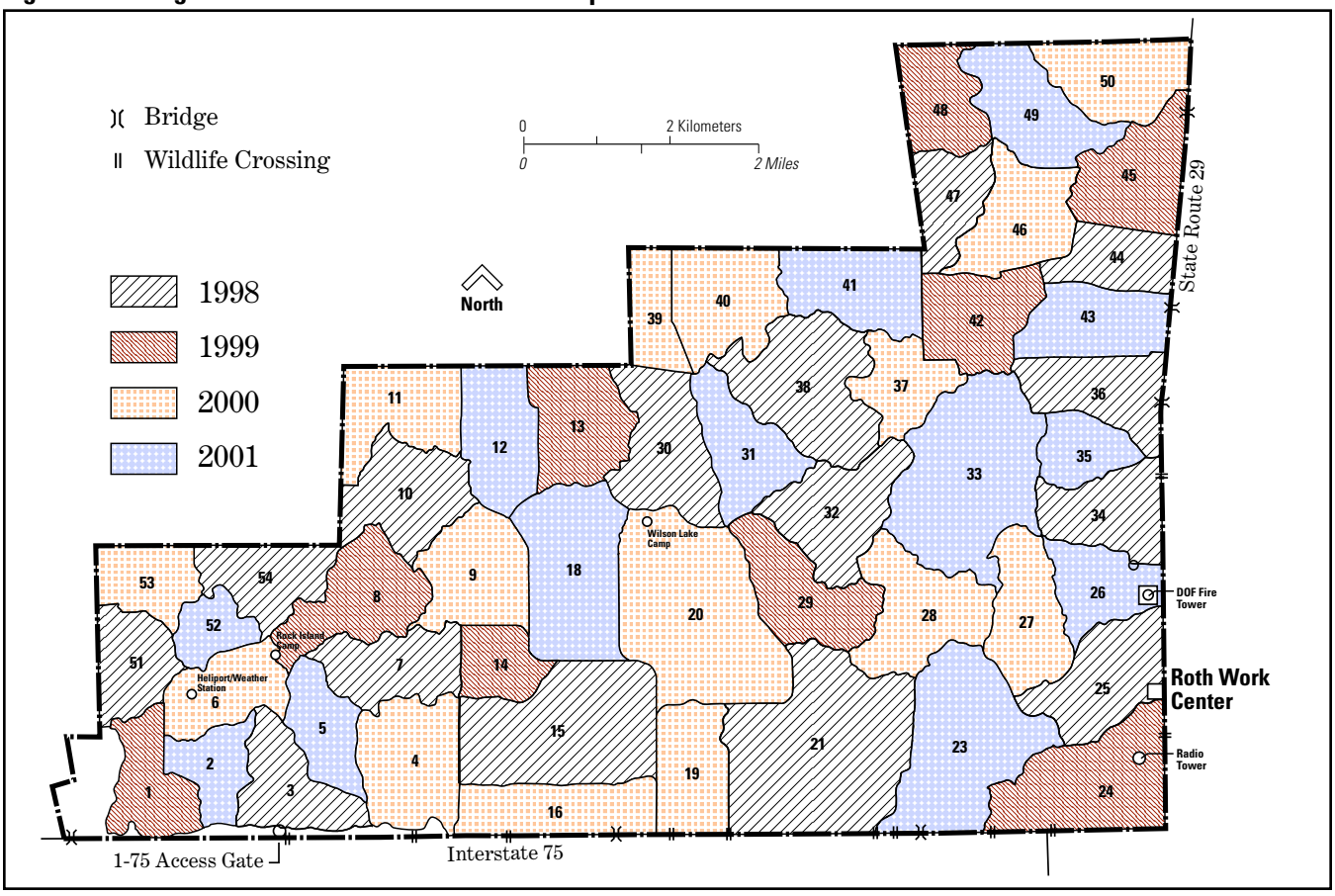
Prescribed Burning

Prescribed burning is the primary refuge management tool used to maintain native plant communities. Historically, this area was burned by wildfires ignited by lightning or infrequent prescribed burns set by Native Americans and later individuals who sought to improve habitat conditions for hunting and for cattle. Prescribed fire is a well established and effective habitat management tool. Proper use of prescribed fire in appropriate plant communities will maintain existing subclimax successional stages and maximize overall productivity. The burns also produce an abundance of green browse and other improved forage conditions that greatly benefit white-tailed deer, the primary prey species of the panther. Also, the use of prescribed fire significantly reduces the size and intensity of wildfires in the area.

Controlled burn
Photo by Elise Smith

Due to the limited burning of the refuge prior to establishment, fuel loads were initially quite heavy. Fuel loads of 100- to 300-tons-per-acre in the pine/palmetto habitat complex were common. These types of loads produce hot, dangerous, and difficult fires to control. Initial refuge burns were conducted during the winter months, when temperatures, relative humidity, and water levels facilitated the prescriptions. Warm season prescribed burns are being implemented and evaluated as to their benefits.

Figure 18. Refuge facilities and Prescribed Fire Compartments with Rotation-Year



Deer Forage Enhancement

Another management technique is food plots for deer forage enhancement. The refuge white-tailed deer population is estimated to be approximately 3 deer per-square-mile. This number is lower than other habitats north of the refuge and other parts of the southeast. We believe this condition is a reflection of the refuge's poor forage quality due to impoverished nutritional conditions of the soil.

Whitetail deer
Photo by Fred Youngblood

The refuge is researching several methods of supplemental feeding of deer and other wildlife. There are three primary objectives to the research: (1) production/provision of supplemental forage and grain to augment native diets and thereby enhance wildlife populations; (2) research and documentation of farming practices that benefit wildlife; and (3) improvement of soils through incorporation of organic matter and nitrogen. Planting food plots and distributing grain (shelled corn) through automated feeders are the primary methods of implementing the study. Through these methods the refuge will determine the benefits of supplemental feeding and share this information with other land managers wanting to improve panther prey numbers.

Exotic Plant Control

Invasive exotic plants are controlled to protect native habitats. The refuge is fortunate to not have established melaleuca populations. However, each year a few new trees are found and immediately cut down and treated with herbicides.

Brazilian pepper, on the other hand, is well established on the refuge. Control rather than eradication is the realistic goal for dealing with this aggressive alien invader. Cogon grass, old world climbing fern, and torpedo grass have also been treated with herbicides.

Public Use

Because of specific efforts to optimize conditions for the panther, the refuge has remained closed to general public access and use. Occasional swamp buggy tours are given to small groups. Additionally, refuge staff participate in environmental education programs at local schools and public events.

Roseate spoonbill
USFWS Photo

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 affect on public health and safety. Alternatives A and B will not affect the unique characteristics of the geographic area or ecologically critical areas, however, Alternative C may have an adverse impact on the use of the refuge by panthers and other wildlife. Although some projects identified in the Comprehensive Conservation Plan have generated substantial comments, most reviewers have been in support of Alternatives A and B. Alternative C could generate substantial controversy on a national level. 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 panther. 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 affects are noted, they will be mitigated or deleted.

The following discussion assesses the environmental impacts associated with the approval and implementation of a comprehensive conservation plan for the refuge. Each alternative is discussed separately. The issues identified in the Affected Environment section, as well as some of the issues identified in the planning process for the plan, are considered below.

Alternative A: No Action

Climate

This alternative would have no impact on the climate.

Air Quality

Basically, this alternative would have no impact on air quality. Some short-term impacts would continue to occur due to the continued implementation of prescribed burning that this alternative advocates. Burning is required for habitat improvement to reduce the invasion of exotic plants and dense woody vegetation and maintain those plant communities that are fire dependent. Although burning would 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.

Soils

The soils of the refuge could be subjected to accelerated soil loss under this alternative. The loss of water to drainage, redirection, or agricultural use will tend to dry-out the soils of the refuge and facilitate soil loss to oxidation and erosion. The causes for drier soil are due to current ditching practices being completed for residential and agricultural areas adjacent to the refuge. These ditching practices have altered natural water flow through the refuge thus promoting drier soils and expansion of cabbage palms.

White-tail deer fawn
Photo by the U.S. Forest Service

Vegetative Habitats and Habitat Management

Under the No Action Alternative, habitat management would remain focused on the refuge for the Florida panther. Additionally, prescribed burning would continue to be the primary habitat management tool. Proper use of this tool and the extent to its effectiveness would not be totally understood due to lack of research and data analysis. Presently, the refuge fire program is sufficient enough to provide adequate green browse for white-tailed deer which is the primary prey species for the panther.

This alternative would continue to provide an important habitat for various songbirds and other wildlife but at levels considerably below their potential. Encroachment of invasive exotic vegetation would continue to the detriment of native cypress swamp lands, and give way to increased levels of undesirable vegetation.

- Prescribed Burning
  Under this alternative, refuge habitats would continue to be prescribed burned on a 3-to 4-year rotation. Burning within this scheme has a beneficial effect on those habitats that are fire dependent. In addition, burning indirectly benefits the panther by improving the habitat for white-tailed deer, the panther's primary prey. Burning also reduces the accumulation of fuel materials and prevents the likelihood of intense wildfires. However, the burning program would be stifled by the lack of staff, maintenance and funding to address this program's needs. In addition, fire research identified in Alternative B would not be accomplished, which would leave unanswered important questions and management needs.

- Deer Forage Enhancement
  Lack of staff, maintenance and equipment funding would continue and prevent a full assessment of this management activity. Some forage enhancement may occur, but it would be extremely limited. A full assessment could not occur. This would result in the failure to assess various forage enhancement techniques that could benefit the refuge deer population.

- Exotic Plant Control
  Lack of staff, maintenance and equipment funding would continue and prevent successful treatment of invasive exotic plants. Brazilian pepper, old world climbing fern, cogon grass and melaleuca would continue to invade and become established on the refuge. Some control would occur, but it would be extremely limited. This would result in the continued invasion of exotic plant species, which would lead to reduced habitat qualities for deer, panthers and other wildlife.

Wildlife Diversity

Panthers would remain the primary focus and, presumably, would continue to use the refuge in high numbers due to active management practices. Due to the loss of historical habitat conditions on the landscape, biological diversity would not be appropriately managed under this alternative. Native cypress swamp would continue to be lost to encroaching invasive exotic plants and woody vegetation.

Missed opportunities to improve habitat, wildlife, and overall biological diversity on non-refuge lands would result because there would be no strategies developed to coordinate with other jurisdictions and private landowners.

Water Resources

Under the No Action Alternative, the quantity and quality of the water could be negatively impacted over the long run. Currently, the refuge has no water management guidelines to aid in setting management objectives.

The Service has entered into an agreement with the South Florida Water Management District to proceed with the construction of a low-head water control structure on the south side of I-75 at the origin of Merritt Canal. This control structure will slow the drainage within these two strands closely matching their original hydroperiods. The restoration of this wetland system will enhance the Lucky Lake and Stumpy strands for endangered species, colonial wading birds, and waterfowl.

Other than the current agreement with the water district, this alternative would not provide any direction for the refuge to actively develop partnerships and cooperative agreements with other jurisdictions and private landowners to protect the water resources in the Big Cypress Watershed. Additionally, no measures to protect the watershed from development activities would be pursued, therefore, agricultural and residential development around the refuge would continue to be a threat that could seriously impact water quality.

Threatened and Endangered Species

Certain species of concern would benefit under this alternative, namely, the panther. As noted, most management projects would revolve around the protection and enhancement of the panther and its habitat.

Because management would primarily focus on the panther, it would result in missed opportunity to achieve cumulative enhancement of biological diversity and for threatened and endangered species management. Populations of the remaining species of concern, including the wood stork, Florida snail-kite, bald eagle, Florida grasshopper sparrow, red-cockaded woodpecker, and eastern indigo snake, would probably remain at current levels because management would focus more on the panther.

Again, 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 to the overall health of the watershed. If unsound land and water use practices were employed, threatened and endangered species on the refuge would 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 not be allowed and would conflict with the goals of this plan of action. The refuge would continue to be closed to the public except for occasional refuge tours for a limited number of people. This is viewed by a portion of the public in a negative context. However, the potential negative effects of incidental wildlife disturbance that accompanies public use would not exist.

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 efforts would be made to install educational materials or displays at the refuge and thousands of people traveling I-75 would miss an opportunity to learn about the panther, refuge, and refuge system. Another missed opportunity to work in conjunction with interest groups on an interpretive trail would also result.

Cultural Resources

Under this alternative, the current program does not provide for the implementation of specific cultural resource protection strategies. Lack of 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 use would remain at minimal levels. The refuge would be unable to improve the local environmental and refuge awareness substantially due to the small public outreach program. Public goals for endangered panther preservation and enhancement would not be achieved.

Blue-winged teal
USFWS Photo by Ted Hever

Alternative B: Ecosystem Approach (Alternative to be Implemented)

Climate

This alternative will have no effect on the climate.

Air Quality

Some short-term impacts are likely to occur due to the continued implementation of prescribed burning that this alternative advocates. Burning is required for habitat improvement to reduce the invasion of exotic plants and dense woody vegetation and allow for maintaining a mosaic pattern of native landscapes. Although burning would 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.

Soils

The management activities described in the Ecosystem Approach would have minimal effects on the geology and soils of the refuge. Any mechanical control methods used to remove or open up dense stands of woody, invader vegetation could negatively impact refuge soils. However, restoring these areas to their native vegetative state would ultimately result in reduced soil loss. Because fire historically played an important role in maintaining native vegetation, any implemented prescribed burns should have minimal effects on refuge soils. To prevent soil loss and erosion after burning, slope factors would be carefully considered.

There are no proposed developments such as trails, roads, or buildings on the refuge that would affect refuge soils. Recreational uses such as hiking are expected to be minimal and would not result in significant, if any, impacts to the soils. Existing refuge roads would continue to be maintained with little or no impacts.

Vegetative Habitats and Habitat Management

Habitat management is planned and desirable and would result in more natural, diverse habitats which in turn would affect overall increased biological diversity on the refuge. Habitat management practices would be employed that would restore various habitats (particularly green browse and other forage conditions) that greatly benefit white-tailed deer, the primary prey species of the panther. Encouraging native vegetation would provide an increased forage and cover base for native wildlife and would also increase infiltration rates and reduce runoff and evaporotranspiration rates. All of this would assist in maintaining water flows that fish and other wildlife depend on for their survival.

Under this alternative, orchids and other plants, as well as large expanses of cypress and mixed grass prairies and aquatic habitats, would continue to be managed and protected with beneficial results. As mentioned previously, water management strategies would be developed as a result of the computer model. Additionally, partnerships with private landowners and other agencies such as the South Florida Water Management District that promote sound use of the watershed would be implemented. Construction of low-head water control structures would slow drainage of wetland areas. Routine maintenance work such as removing non-native species would ensure continued water flows.

- Prescribed Burning
  Under this alternative, refuge habitats would continue to be prescribed burned on a 3- to 4-year rotation. Off-refuge efforts for prescribed burning and wildfire suppression would be expanded. Burning within this scheme has a beneficial impact on those habitats that are fire dependent. In addition, burning indirectly benefits the panther by improving the habitat for white-tailed deer, the panther's primary prey. Burning also reduces the accumulation of fuel materials and prevents the likelihood of intense wildfires. Additional fire research projects would benefit the natural resources by identifying burning techniques that enhance the ecosystem. This alternative promotes the most active prescribed burn action, which will benefit those native communities in southwest Florida that are fire dependent.

- Deer Forage Enhancement
  Deer forage and research on methods to increase deer forage would be optimized under this alternative. Native plants relished by deer and of high nutritional content would be promoted as specified in the comprehensive conservation plan. Artificial plantings may displace other native plants, but would range in less than 100 acres and have no impact on the native plant community of the refuge. Forage enhancement could have a positive effect on deer herd health and indirectly on panthers that prey on the deer.

- Exotic Plant Control
  Invasive exotic plant species would be targeted for control under this alternative. Exotic plants that threaten the refuge's native ecosystems would be reduced. The refuge's increased staff and resources would join other agencies to control problem exotic plant areas in southwest Florida. Invasive exotic plants have been identified as one of the biggest threats to native ecosystems in south Florida.

Wildlife Diversity

The Ecosystem Approach is designed to enhance 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. Strategies would be developed in conjunction with landowners (public and private) to preserve a mosaic pattern of native landscapes that would support diverse, flourishing communities of plant and animal species. It also calls for management practices that would optimize historical habitat characteristics to improve wildlife diversity. Water development and enhancement, vegetation thinning, prescribed burning, and restoration of native cypress and mixed-grass prairies would all further enhance species richness.

Water Resources

The water quantity and quality under the Preferred Alternative would be further protected. Strategies would be developed to ensure sound use of the surface and ground water. It is anticipated that the water quality would remain the same or improve under this alternative. In creating partnerships and working cooperatively with private landowners in the Big Cypress Swamp watershed and the United States, strategies would be employed that would minimize existing impacts of land and water use practices that currently affect water resources.

Computer modeling in cooperation with the South Florida Water Management District would aid significantly in developing water management guidelines for the refuge and calls for regular monitoring of baseline information (pH, total dissolved oxygen, contaminants). Ultimately, the model would be able to predict the impacts that development would have on the surface and ground water, so that a plan of action can be strategically developed to protect the valuable water supply.

Threatened and Endangered Species

Threatened, endangered, and species of concern would benefit under this alternative. Currently, there are 21 species of mammals, birds, and reptiles found in the vicinity of the refuge that fit into this category. Active management practices would be centered around the recovery and enhancement of these species, with major emphasis on the panther.

Management strategies to aid in panther recovery would include cooperating with other agencies and landowners, managing existing habitats and populations, determining biological requirements of the panther, protecting historical habitat, assessing habitats for reintroduction into historic ranges, controlling invasive exotic plants, and developing information and education programs about the panther.

Along with the management framework strategies for the panther, management strategies for the other federally listed species would be incorporated to provide improved nesting habitat and vegetation manipulation for the wood stork, construction of nesting structures for the bald eagle, investigation of varied prescribed burning patterns for the Florida grasshopper sparrow and other passerines, transplantation and habitat improvement for the red-cockaded woodpecker, and continued releases of confiscated Eastern indigo snakes. Although the Florida snail kite is an occasional visitor to the refuge, no plans have been made to directly improve its habitat. However, the species would benefit from other plan management strategies.

Public Use, Compatibility, and Environmental Education

The refuge was established to provide habitat for the endangered Florida panther. Secondary access, such as hunting, fishing, and interpretive and recreational trails on the refuge would depend greatly on their impact on the panther and other resources.

If hunting were permitted, it would include white-tailed deer, turkey, and hog species. These activities would be coordinated with the Florida Fish and Wildlife Conservation Commission and would have to be based upon population survey data. Seasonality of the activity would be a component of the compatibility analysis as well as Section 7 consultation based biological evaluations. Additionally, should these activities be determined compatible and not in conflict with the Endangered Species Act, and should the Service decide to implement them, additional National Environmental Policy Act analysis may be necessary.

In addition, increased use of the refuge may conflict with existing and planned research and management programs. These programs would take precedence over secondary use activities because the programs directly support the purpose of the refuge.

Currently, there is no public access to the refuge. Activities such as hunting, fishing, and interpretive and recreational trails on the refuge would depend greatly on their potential impacts to the panther, other resources, and refuge programs. A decision to allow or disallow these types of uses should be based on the results of research and management activities that are presently occurring on the refuge or being proposed for the refuge.

The development of a short interpretive foot trail and waterbird viewing area, placed in areas of least use by panthers, would not adversely affect the animal and would greatly promote awareness of refuge programs and the plight of the panther and other refuge resources. Some temporary wildlife disturbance may result from these visits, however, the proposed trail and waterbird viewing areas are spatially limited to small areas on the eastern edge of the refuge. This form of access would be allowed and developed immediately.

The Service, in partnership with other agencies, is seeking to offer a Multi-Agency Interpretive and Education Center at the I-75 and SR 29 interchange. Strategies have been developed in the plan to pursue the installation of such a facility.

Opportunities for environmental education would be promoted in an “off refuge” approach due to the sensitive nature of threatened and endangered species on the 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.

It is not anticipated that any of the proposed projects will have a major impact on water flow on the refuge or adjacent areas.

Cultural Resources

Implementation of the Ecosystem Approach would result in compliance with all Service and other applicable federal laws to provide the fullest protection possible to the cultural resources of the refuge. It would ensure that all appropriate measures are taken to protect the resources prior to any undertakings that could potentially impact them. Visitor use and associated effects would be monitored through appropriate law enforcement efforts. Any new cultural resource sites and objects found on the refuge would be reported immediately to the Regional Historic Preservation Officer in order to ensure investigation in a timely manner.

Socioeconomic Environment

The adoption of the Ecosystem Approach alternative is not anticipated to have significant negative effects to the socioeconomics of the area.

The Service expects an overall benefit to the local economy based on implementation of this alternative. It establishes added flexibility with respect to the overall compatible uses of the area. These features would probably result in visitors choosing to stay longer in the Naples area thereby benefitting local merchants and commerce in general.

Additionally, the Service proposes to investigate the feasibility of expanding refuge hours and the development of cooperative ventures with the local Chamber of Commerce. All of these proposed changes to the refuge program would encourage increases in tourism in a structured and strategic manner. The controlled-access system would allow the refuge to effectively monitor increases and then make management adjustments based on visitation levels. The refuge program, in combination with the public visitation program at the Big Cypress National Preserve, and other state managed areas, provides strong support to the economics of the local community.

Alternative C: Maximize Public Use Programs on the Refuge

Climate

This alternative would have no impact on the climate.

Air Quality

This alternative would temporarily impact the air quality as a result of implementation of intense prescribed burns to restore native vegetation habitats. No long-term impacts would occur.

Soils

This alternative would call for more developed facilities to accommodate increased public use on the refuge. The construction of facilities such as a visitor station, trails, parking areas, and restrooms would have significant impacts to the soil on the refuge. Soils would be disturbed by the construction of dikes, roads, parking areas, and other visitor facilities. Drainage, hydroperiod, and sheetwater flow may also be adversely impacted by visitor access routes. This may cause soils to dry out or become waterlogged depending upon the circumstance.

Vegetative Habitats and Habitat Management

Under this alternative, intensive habitat management practices would be widely employed to restore historic native vegetation. Wetland habitats would be extensively developed and recreated to maximize the water resources for the benefit of native wildlife. Panther habitat and native ecosystem restoration on the refuge would be maximized. This would be achieved through thinning and opening of the dense vegetative areas, prescribed burning, and aggressive exotic plant control.

- Prescribed Burning
  Burning would continue under this alternative, but the increase in public use may hamper the execution of burns and present safety problems for visitors to the refuge during the winter, spring and early summer months when prescribed fires occur. Smoke from burns may linger and cause visual problems for refuge visitors. In addition, fire research identified in Alternative B would not be accomplished, which would leave many important questions unanswered.

- Deer Forage Enhancement
  This activity would not occur or would be extremely limited under this alternative. Public use activities would conflict with research proposed under this project. The proposed beneficial impacts of this project would be lost.

- Exotic Plant Control
  Invasive exotic plants would most likely increase as a result of this alternative. The transport of seeds attached to personal clothing and vehicles would be facilitated by increased access to the refuge. The increased public use would hamper the use of herbicides or mechanical control. The control of invasive exotic plants would be more difficult under this alternative.

Wildlife Diversity

Wildlife using the refuge would benefit from the enhanced management and research programs. The refuge would experience increased diversity of avifauna such as waterfowl, shorebirds, and other waterbirds. With restoration of historic vegetation, overall biological diversity would increase and biological values would considerably increase. However, these increases may or may not positively impact the panther.

Wildlife diversity would be expected to decline in areas off the refuge without programs to cooperatively manage and protect watershed resources.

Water Resources

Under this alternative, the quantity and quality of the water could be negatively impacted over the long run. No water management guidelines to aid in setting management objectives would be pursued.

Other than the current agreement with the water district, this alternative would not provide any direction for the refuge to actively develop partnerships and cooperative agreements with other jurisdictions and private landowners to protect the water resources in the Big Cypress Watershed. Additionally, no measures to protect the watershed from development activities would be pursued, therefore, agricultural and residential development around the refuge would continue to be a threat that could seriously impact water quality.

Threatened and Endangered Species

This alternative's habitat management practices should have beneficial impacts to threatened and endangered species on the refuge. Most of these species, including the Florida panther, wood stork, Florida snail kite, bald eagle, Florida grasshopper sparrow, red-cockaded woodpecker, and eastern indigo snake, that rely on the wetlands for their survival, would expand their populations due to increased refuge habitats.

Increased public use may have a detrimental effect on panthers; subsequent studies would document the impacts. In addition, panthers and other endangered species would be expected to decline in areas off the refuge without programs to cooperatively manage and protect watershed resources.

Public Use, Compatibility, and Environmental Education

Public use would benefit most under this alternative. More of the refuge would be open to public access. The public visitation and experience would be enhanced with improved roads, wildlife viewing areas, restrooms, trails, and parking areas. The public would learn firsthand the natural wonders of the refuge, including its many habitat types and wildlife species.

The main impact from this alternative would be from intense development of facilities to accommodate increased visitation by the public. This would require a significant increase in base funding and staff in order to effectively manage the program. Building of the facilities would 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 hunters and wildlife observers.

The environmental education program would be actively promoted and developed on the refuge. Self-guided trails and auto loops would be developed with appropriate interpretive material displayed along the way. Tours of the refuge would be given to groups interested in the management of native habitats and their associated fish and wildlife species.

Increases in public use and environmental education programs could negatively impact refuge resources. The refuge would be susceptible to trampling of aquatic, riparian, and other habitats due to increased foot traffic, as well as littering and disturbances to native wildlife. Another threat is the possibility of exotic fish introductions which have occurred in the past.

Cultural Resources

This alternative would provide for greater public interpretation of historic and archaeological resources on the refuge. Refuge interpretation would mostly be in conjunction with the exhibits associated with historic uses, however, other cultural resource sites associated with the refuge would be opened up for interpretation as well. This would require the development of roads, trails, exhibits, and displays. Increased visitation to the 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

This alternative would have significant impacts on socioeconomic aspects related to the local community. Increased visitation to the refuge would bring increased revenues to the local contractors for construction of extensive aquatic/wetland developments and public use and educational facilities. With the enhancement of environmental education programs, the refuge would be able to meet its public outreach goals and objectives.

Figure 19. Summary of Environmental Consequences by Alternative

Environmental Impact Areas	*Alternative A No Action Alternative*	*Alternative B (Proposed) Ecosystem Approach*	*Alternative C Maximum Habitat Development and Public Use Programs*
Climate			
Air Quality			
Soils	*x*		
Vegetative Habitats and Habitat Management	*x*	*xx*	*xx*
Wildlife Diversity	*x*	*xx*	*x*
Water Resources	*x*	*xx*	
Threatened and Endangered Species	*x*	*xx*	*x*
Public Use, Compatibility, and Environmental Education		*xx*	*xx*
Cultural Resources		*xx*	*x*
Socioeconomic Environment	*xx*	*x*	*xx*

x - minimal positive effects
xx - maximum positive effects

Cumulative Impacts

All of the alternatives were evaluated as to their cumulative impacts. Cumulative impacts include impacts on the environment which result from incremental effects of the proposed action when added to other past, present, and 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 any 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 to the No Action Alternative.

Photo by D. W. Pfitzer

Where site development activities are to be proposed during the next 5 to 10 years, each activity would be given the appropriate National Environmental Policy Act consideration. At that time, any required mitigation activities, if necessary, would be designed in 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 Management Action

No mitigation would be necessary in the adoption and implementation of the management action. Site development activities to be proposed during the next 15 years 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 any 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 any 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.

Introduction

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 of the Service, and moves toward those guidelines that apply specifically to the Florida Panther National Wildlife Refuge.

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

All the legal, policy, and administrative planning guidelines provide the framework within which management activities are proposed and developed. This guidance also provides the framework for the enhancement of cooperation between the refuge and other surrounding jurisdictions in the ecosystem.

Administration of the refuges takes into account a myriad of bills passed by the United States Congress and signed into law by the President of the United States. These statutes are considered to be the law of the land as are Executive Orders promulgated by the President. The following is a list of most of the pertinent statutes establishing legal parameters and policy direction to the National Wildlife Refuge System. Included are those statutes and mandates pertaining to the management of the 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.

Summary 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).
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]

[1] Bean, Michael J., 1983. *The Evolution of National Wildlife Law*, Praeger Publishers, New York.
[2] Ibid., pp. 181.

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 an 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]

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]

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

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).

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 endangered and threatened, 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 insure 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 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 of 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.

[7] Ibid., pp. 227.

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. Executive Order 12996.
46. National Wildlife Refuge System Improvement Act of 1997.

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. The earliest national wildlife refuges and preserves are examples of this commitment. Pelican Island, 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. The 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 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 broadening 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 agencies, state agencies, tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the refuge system.

Public Involvement

The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our national wildlife refuges.

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 with 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.

Public Scoping

In compliance with the National Environmental Policy Act, community participation continues to be an integral component of the planning for this refuge. Initial planning efforts for 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 to 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 on March 27 and April 3, 1997. 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 *(Fig. 20)*. 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 including business, tourism, conservation, recreation, and historical perspectives (see Part 3 for a list of stakeholders). The role of the stakeholder group was to assist in developing the key component 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 key issues, concerns, and opportunities expressed through the survey 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 as a result of the scoping process, the input from the stakeholders, and the series of meetings and community forums held for the stakeholders and the various publics to prepare the draft and final plans. The meetings occurred as follows:

Workshop #1 - August 12, 1997, Comfort Inn, Naples, Florida
Workshop #2 - September 2, 1997, Comfort Inn, Naples, Florida
Community Forum #1
Workshop #3 - September 30, 1997, Comfort Inn, Naples, Florida
Workshop #4 - November 5, 1997, Comfort Inn, Naples, Florida
Community Forum #2
Workshop #5 - December 2, 1997, Comfort Inn, Naples, Florida

All meetings and community forums, listed above, were facilitated by Jim Stansbury of Stansbury Resolutions by Design, Inc., in Bradenton, Florida.

Figure 20. Survey Form

FLORIDA PANTHER NATIONAL WILDLIFE REFUGE
PUBLIC COMMENT SURVEY FORM

NAME/AFFILIATION_____

ADDRESS_____

CITY/STATE_____ZIP CODE_____

Managed by the U.S. Fish and Wildlife Service (Service), Florida Panther National Wildlife Refuge was established in 1989. The refuge contains approximately 26,400 acres. The refuge forms the core of several panthers' home range and also functions as a travel corridor for panthers traveling between the northern regions of Big Cypress National Preserve and the Fakahatchee Strand State Preserve. During any given month, the refuge may be visited by 5 to 11 different panthers. The refuge was established to provide optimum habitat conditions for the panther and other endangered species.

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. Would you like to see more public access to this refuge? _____
If yes, what type of access would you be in favor of?

_____
_____
_____
_____
_____

2. What land use practices do you feel pose a threat to panthers? Do those same practices threaten wetland linkages in southwest Florida watersheds?

_____
_____
_____
_____
_____

3. Would you like to know more about the US Fish and Wildlife Service, the Florida panther, endangered species, prescribed burning, and/or other refuge programs? Please explain.

_____
_____
_____
_____

4. How can the refuge be more effective educating the public about the need to protect the panther and other important natural resources?

_____
_____
_____

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

6. Prescribed burning is a land management tool used on the refuge to maintain fire dependent vegetation communities. Do you have any comments on or alternatives to this form of management?

7. Please list any other comments, issues, or concerns you have regarding the refuge. (Add additional sheets 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 from the public and the stakeholder group; responses from the Service follow the comments.

1. Public Access

The refuge has been closed to public access except for limited, small group tours. This was by far the biggest issue during the planning process for the refuge. Comments ranged the full spectrum, from maintaining the refuge as an inviolate sanctuary to proposals for multi-recreational pursuits.

Issues, Concerns, and Opportunities Regarding Access

- Survey responses were split: 50 percent wanted more access; 50 percent did not
- Allow a limited-hunter deer and turkey hunt
- Allow sport fishing on Colding and Pistol ponds
- Establish hiking trails and camping opportunities
- Adjacent public areas allow multiple public use - keep the refuge an inviolate sanctuary
- Allow foot access only
- Provide more tours or interpretive trails
- Allow off-road vehicle use
- Need for bird watching and photography areas
- Refuge was established for panthers, increasing public use or harvesting panther prey will violate refuge purpose

Stakeholder Consensus and Recommendations

Except for an interpretive foot trail, disallow any new public uses at the start. Within a 5-year period, use research to evaluate hunting, fishing, hiking, camping and other potential uses to determine if they are compatible with the purpose of the refuge.

Service Responses

Before allowing any secondary use to occur on a national wildlife refuge, the Service must consider first and foremost the purpose of the refuge. This refuge was established to provide habitat for the endangered Florida panther. The panther is one of the most endangered large mammals in existence in the United States. Because of this critical endangered status, management decisions must be oriented towards providing optimum conditions for the panther. Therefore, hunting will not be allowed on the refuge. If the Service is to err, in terms of the nature and extent of allowed use, it must be in favor of the panther. The Service must also consider what effects the other secondary uses may potentially have upon management and research activities that are presently occurring on the refuge or being proposed for the refuge.

For example, studies underway involve the radio instrumentation of deer, which requires an extensive amount of time and resources to catch and monitor the animals. Deer are very hard to catch and collar in the wooded swamps of south Florida. Data from multiple animals of various sex and age classes are needed over several years. The loss of one of these radio-collared deer to a hunt-related incident could have drastic implications to the study. Moreover, because the refuge is the only publicly owned area that receives heavy panther use and is not open to public access and hunting, it has been used as a "control site" for ongoing studies to evaluate what impact human activities (i.e., other sites such as Big Cypress National Preserve) have on the panther.

The Service agrees with all other recommendations of the stakeholder committee except for the amount of time it may take to make decisions. The committee felt that in 5 years a decision should be made on each of the other potential uses. The Service will review the program in 5 years, but decisions may take place before or after that timeframe depending on the results of existing studies and monitoring. The Service will review the

results of independent studies regarding human impact on the panther but will not pursue its on research. The Service cannot predict whether or not studies will occur in a timely manner, or if the research will produce the results needed to make decisions.

The Service does believe that some limited access can occur on this refuge and proposes the following to be developed as soon as funding and permitting processes can be completed. First, the construction of a short interpretive foot trail in the southeast corner of the refuge; second, the construction of a waterbird viewing area along SR 29. Both would be placed in areas of least use by panthers, would not adversely affect the animals, and would serve to enlighten the public of their plight and other resources of the refuge. These projects would also include educational signs informing and promoting refuge programs.

Research projects needed to make compatibility decisions require funding and technology that may not be available within the timeframe suggested.

Visitor Center and Interpretive Facilities

Many people thought that a visitor center was needed to inform people about the panther, the recovery effort, and refuge management programs. There have been discussions between state and federal agencies about locating a Multi-Agency Interpretive and Education Center on state property in the southwest corner of the I-75 and SR 29 intersection, adjacent to the refuge. The area has been disturbed as it was used as a rock quarry site for road base material. The site is covered with invasive exotic plants. Comments received after the draft comprehensive conservation plan was issued indicated that prior commitments preventing commercial development to occur within 4 sections surrounding the I-75 and SR 29 intersection were made. The Florida Department of Environmental Protection, which owns the land in discussion, continues to plan a multi-agency facility for this site. If their plans are unsuccessful, the refuge would continue to seek a site along I-75 in Collier County as a venue for a facility of this type. If these plans fall short, the Service would develop a small visitor contact station, without multi-agency involvement, at the Roger Roth Work Center.

Issues, Concerns and Opportunities Regarding a Visitor Center and Interpretive Facilities

- Visitor Center is needed to inform the public about the panther and refuge activities
- After a narrative video, provide a vehicular tour of the refuge
- Provide a facility that school groups can come to and learn about the panther
- Construct an interpretive facility somewhere along SR 29
- Set aside a small educational site near the headquarters for school groups and visitors
- Additional staffing needed for education
- Take advantage of the millions passing by on I-75
- Be careful not to construct facilities in a wetland or in vital habitat for the panther or other endangered species

Stakeholder Consensus and Recommendations

On November 5, 1997, the committee voted unanimously that a visitor center be constructed close to the I-75 corridor, be a multi-agency venture, and not on a site containing sensitive resources. It could be located either inside or outside the refuge.

Service Responses

The I-75 highway connects Naples to Miami and bisects the greatest wetlands of the United States, the Everglades and Big Cypress Swamp. Yet, no facility exists along this stretch to fully inform the public of the wonders of these wetlands or the major restoration events that are taking place. No site exists where school groups can go and learn about the dynamics of this intricate system. Interstate 75, in Collier County, east of Naples, offers a perfect venue for a multi-agency interpretive and education center to accomplish these endeavors. The Service agrees with the stakeholder group about the importance of such a facility and has included strategies in the plan to pursue the installation of such a facility.

2. Cooperative Land Management and Partnerships within the Big Cypress Watershed

Repeatedly during the scoping process, it was pointed out that the refuge was one of many public land management entities which, along with private land interests, make up the Big Cypress Watershed and that management actions in one part of the watershed may have adverse impacts to other parts of the system. Many comments favored the cooperative management of the entire watershed to ensure the protection of hydrologic, ecological, and environmental values of the system.

Issues, Concerns, and Opportunities Regarding Cooperative Land Management and Partnerships within the Big Cypress Watershed

- Land use affecting water flow poses a threat to panthers
- Land development and agriculture pose a threat to panthers
- Protect panther corridors
- Development and agriculture tend to threaten wetland linkages within the watershed
- Habitat fragmentation is occurring within the headwaters of the watershed on privately owned lands
- Public lands are not managed as well as private lands
- There is no coordination among the land management entities, both public and private

Stakeholder Consensus and Recommendations

The committee, as a whole, recognized how important this issue was and actually drafted Goal 6.0 for the plan, which is, "Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida."

Service Responses

The Service agrees with the recommendations of the stakeholder committee. More communication and coordination with the other land managers within the watershed must occur in order to effectively conserve the diverse resources of this ecosystem. The plan outlines steps needed to improve this coordination and the Service will take the lead in this effort.

3. Public Awareness of the Panther and Refuge Programs

Almost all of the survey respondents indicated they would like to know more about the panther and refuge programs. Because the refuge is closed to public access and lacks a visitor contact station, it is difficult to provide this needed information to the public. The recovery of the panther and success of the refuge program will depend on an informed public ready to support a sustainable environment.

Issues, Concerns, and Opportunities Regarding Public Awareness of the Panther and Refuge Programs

- Almost all respondents wanted more information
- Most of the survey respondents suggested that staff should give school programs
- Give more refuge tours and allow access to learn about refuge programs
- Use mass media to get the information to a broader base
- Use volunteers and support groups to help disseminate the information
- Establish a speakers' bureau for groups and public functions
- Expand public outreach programs
- Establish a web site on the Internet with panther and refuge-specific information

Stakeholder Responses

The group recognized the importance of this issue by drafting and fully supporting Goal 5.0, "Develop and implement outreach and education programs that will promote conservation and provide an understanding and appreciation of the Florida panther, fish and wildlife ecology, and human influence on ecosystems of south Florida."

Service Responses

In order to recover the panther and protect the other resources of the refuge and the South Florida Ecosystem, the public must be informed of the issues at hand and conservation efforts that are needed. The Service agrees with the stakeholder committee that significant changes are needed to enhance the environmental education program on the refuge. These changes are reflected in the strategies of the plan where additional staff are requested to inform the public of the environmental status and needs of southwest Florida.

4. Panther Habitat Protection on Private Lands

Approximately half of the habitat used by the panther is in private ownership. These private lands contain a greater percentage of upland habitats and soils consisting of greater nutrient value which tend to support healthier panthers. Most of the private landowners are not interested in selling their lands for panther conservation, yet a few of them would be interested in maintaining some areas in natural landscapes. However, they are inclined to seek at least some income off the land to assist in paying annual property taxes. Many want to pass their lands to their offspring, but fear a large inheritance tax. The solution is to protect these habitats through conservation easements, tax breaks, mitigation banks, or some type of monetary incentive for the landowner to keep important panther habitat in its natural state.

Issues, Concerns, and Opportunities Regarding the Panther Habitat Protection on Private Lands

- Loss of panther habitat to development is the biggest threat to panthers
- Cattle ranching that emphasizes native range is not a serious problem
- Private landowners are managing their areas better than the public agencies, that is why they hold more game and panthers
- Tax incentives and conservation easements are viable alternatives to fee simple purchase
- The increasing southwest Florida human population will increase habitat and people pressure problems

Stakeholder Consensus and Recommendations

When a subgroup of the committee reviewed Goal 6.0, they felt that Objective 6.2, "Inform private landowners of federal cooperative programs that will enhance or protect wildlife habitat and enlist their participation in these programs," was the most important objective listed under this goal. The committee agreed with the subgroup's analysis.

Service Responses

Loss of habitat is a principal reason the panther is endangered today. If this trend continues, the panther will be lost tomorrow. Habitat important to the panther is also critical to many other plants and animals. These areas benefit humans by being flood retention areas, water filters and drinking water recharge zones. However, many of the large landowners of important panther habitat in southwest Florida have indicated no desire to sell their land to the government. Ways must be found, however, to conserve this habitat. The stakeholders have identified this issue and we agree with their conclusion. The Service will pursue a program with willing landowners of important panther habitat to initiate a conservation easement program.

5. Refuge Research and Management

Responses received indicated that research projects and habitat management were important endeavors that needed to be continued. It was also evident that most of the public was not aware of what activities were occurring on the refuge. Most of the respondents understood that prescribed burning was a management tool needed to maintain fire dependent communities. Only two comments expressed some concern about prescribed burning.

Issues, Concerns, and Opportunities Regarding Refuge Research and Management

- Research needs to address water runoff from agriculture fields
- Studies and monitoring needed on drainage and hydroperiod changes within the watershed
- Nutrients/Contaminants in the watershed need to be monitored
- Panther health issues and secondary impacts of water-borne contaminants (especially mercury)
- Methods of increasing/strengthening the panther population
- Continue research on prescribed fire
- Study the impacts of human activity on panthers
- More knowledge is needed on panther habitat, habits, and movement
- Activity monitoring of panthers on a 24-hour basis

Stakeholder Consensus and Recommendations

The committee reviewed and helped draft the various refuge research objectives that are included in the plan. The committee wholeheartedly supports past and present research and habitat management efforts and those suggested in the plan.

Service Responses

This research will always be an important function of the refuge. Priority will be placed on applied panther research, or studies that will provide information to assist in the management of panthers or their habitats. 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.

Bio-medical evaluation conducted on captured Florida panther
USFWS photo by Larry W. Richardson

6. Refuge Staffing

The refuge was established in 1989, and is a young refuge. It was developed during a period of austere budgets and federal government downsizing. The plan recognizes this fact and describes new initiatives that are needed to successfully address the Service responsibilities for the refuge and the South Florida Ecosystem over the next 15 years. These initiatives include an expanded public education and outreach program; increased coordination with land managers off the refuge and the initiation of a conservation easement program for important panther habitats; an enhanced biological and habitat monitoring program; and expanded management program for flora, fauna, and the public. The plan identifies the following new positions for the refuge complex, which includes Ten Thousand Islands National Wildlife Refuge: two easement biologists, media specialist, easement biologist, geographic information system specialist, hydrologist, assistant manager, public use specialist, auto mechanic, maintenance worker, and an administrative assistant.

Issues, Concerns, and Opportunities Regarding Refuge Staffing

- 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 Consensus and Recommendations

The committee recognized that lack of staff was an issue for the refuge at present and for the new initiatives outlined in the plan. The committee helped draft the objectives of the plan that identified the need for additional staff.

Service Responses

The refuge is located within the center of the Big Cypress Watershed and will play a pivotal role in the success of ecosystem protection and restoration initiatives in southwest Florida. The plan outlines many new initiatives for this young refuge. The Services agrees with the stakeholder committee that additional staff is needed to carry out the plan and will support the strategies described to fill these positions. Volunteer assistance will also be sought through the existing "Friends Group" and other support groups.

7. Oil and Gas Exploration

The Service does not own the refuge subsurface mineral rights. Most of the ownership lies within various Collier interests. In November 1997, the Collier Resource Company submitted a "Plan of Operations" to conduct seismic and exploratory well activities on the refuge. This is the first time the refuge has had to coordinate and manage this type of activity. The exploration was scheduled to occur in 1998 and thereafter.

Issues, Concerns, and Opportunities Regarding Oil and Gas Exploration

- The Service needs to acquire the mineral rights to protect the surface resources.
- A plan is needed to coordinate and minimize adverse surface impacts on any exploration activity.
- Slant drilling off the refuge should be utilized to protect the panther and refuge resources.
- The Comprehensive Conservation Plan should address mineral rights and exploration.

Stakeholder Consensus and Recommendations

The committee recognized the importance of this issue and supported the drafting of Objective 2.2, "Minimize the impact from oil and gas exploration and extraction on the refuge."

Service Responses

The Service supports the stakeholder recommendation on refuge oil and gas activities. All care must be taken to minimize adverse impacts to the panther and other refuge surface resources. Acquisition of subsurface mineral rights is difficult and expensive, however, all alternatives will definitely be explored to protect this important environmental area.

Draft Review

A Draft Comprehensive Conservation Plan and Environmental Assessment was developed in October 1998, followed by Regional Office review. Availability of the draft document was published in the *Federal Register* on November 10, 1998, and in local press releases on November 19 and 26, 1998. Upon its release, the Service gave the public an opportunity to comment on the draft document. The review period ended on December 21, 1998.

Copies of the draft document were distributed to local libraries in Collier and Lee counties on November 12, 1998. Copies were also distributed to stakeholders and others on the mailing list (Parts 4 and 5). An "open house" for the public to review the draft plan with Service personnel was held on December 5, 1998, at the Comfort Inn in Naples, Florida.

At the close of the review period, the Service received 21 responses on the draft document. Of the 21 respondents, 7 requested a 60-day extension of the review period. Three of the seven respondents requesting an extension provided their comments on the draft document during the prescribed review period.

The Service continued to receive comments, largely from hunting interests, on the draft document through February 1999. Forty-three (93 percent) of the responses received after the review period supported the notion of hunting. They did not address the alternative management proposals presented in the draft document. The remaining 7 percent of respondents favored the refuge being managed as an inviolate sanctuary. The refuge manager noted comments received after the review period; however, he did not give those comments any weight in the decision-making process.

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

Summary of Public Comments and Service Responses

Comments recieved on draft CCP	*Plan Revised*	*Page No.'s*	*Service Response*
Why do we need the refuge?	No		For the protection and recovery of the endangered Florida panther and its habitat.
What are we doing with the federal dollars used to support the refuge?	No		See page 9 of the CCP "Habitat Management and Research," page 10 for a listing of current management practices, and page 48, Alternative A, which describes the current conditions of the refuge.
Some individuals felt there was inadequate pre-Service history of refuge land.	Yes	8	The Service noted the lack of information and revised the plan accordingly.
The Service needs to determine if secondary uses will be allowed on the refuge.	Yes	17	The Service has taken the position that hunting is not compatible with the purpose of the refuge for the reasons cited on page 17 of the CCP. A trail and wildlife observation area have been identified in the CCP.
Define the ecosystem approach and its fit with the multi-species recovery plan.	No		See page 15 of the CCP, "Management Direction," for a definition of the ecosystem approach to management as related to this plan.
There is a need to develop a clear set of objectives for land management.	Yes	9	The need for step-down management plans has been identified in the CCP. Once developed, they will address the management of expansion areas.
Do not limit land protection to voluntary participants.	No		Same as Above.
Will the Service condemn properties?	No		Condemnation is not a preferred method of acquiring lands for the Service.
Draft contains some unclear goals, objectives and strategies.	Yes	24 - 33	Goals, objectives, and strategies to support the management direction have been prioritized with some being rewritten to add clarity to the plan.
Project 1 in the draft CCP needs to be more specific. What are the cumulative impacts of road improvements under NEPA and the Clean Air Act?	No		There are no plans to surface roads.
Regarding project 7, why not contract for exotic plant control?	Yes	37	Contracting will be considered. Now listed as project 4.
Regarding project 9, a comment was made that this was an important task and that a hydrologist should be hired immediately.	Yes	39	Now project 11. The project list is not in priority order. The Service agrees and has included this position as one to be added as soon as funding becomes available. This would be a shared position with Ten Thousand Islands National Wildlife Refuge.

Summary of Public Comments and Service Responses

Comments recieved on draft CCP	*Plan Revised*		*Service Response*
The Service should contract for the hydrologist position.	No		A full-time hydrologist is needed to assess development projects and manage the southwest Florida ecosystem.
There was objection to a visitor center and trail, as their development violates past "no development" commitments.	No		Plans for the center will undergo environmental and governmental reviews prior to approval and development.
Poor location of trail.	No		Area was selected because of its limited use by panthers. The trail will provide opportunities to view wildlife and native habitats. In addition, the trail will provide a venue to display exhibits illustrating panther biology and recovery activities, refuge management activities, and information on other natural resources of the area.
Port of the Isles is not a suitable location for visitor education.	Yes		The site is no longer considered for a visitor center.
Not in favor of a visitor center at SR 29/I-75 interchange.	No		The Service supports such a facility at this site.
The hiring of two new positions should have low priority. Use money for research tasks instead.	No		The Service believes public awareness is key to successful management and recovery efforts of the panther. These positions rank relatively high among projects listed.
Project 11. Object to trail and visitor center development.	No		Now listed as project 15. Facilities are needed for education and interpretation.
Project 12. Restore area rather than construct a wildlife viewing area.	No		The Service developed project 5 in the CCP for habitat restoration which would be the first phase. Public use will be a benefit of habitat restoration.
Project 13. Media specialist not needed, and, if employed, how would person be used?	No		A media specialist will work full time to inform the public of refuge management issues. Now listed as project 16.
Project 14. Use research of others.	No		The Service does use the research of other agencies. The research projects identified in this plan address questions and issues that have yet to be answered.
Project 15 ensures that there will be no hunting.	Yes	17	See page 17 for the Service's position on hunting on the refuge.
Project 16. The Service should encourage peer review of studies.	Yes	40	Now project 13. The Service agrees and will take action to see that this is done.
Will effects of feral hogs be studied?	No		The number of feral hogs on the refuge is too low and will not be studied.

Summary of Public Comments and Service Responses

Comments recieved on draft CCP	*Plan Revised*	*Page No.'s*	*Service Response*
Discuss potential bear threats to resources.	No		Threats to resources are not evident.
Plan implementation costs are more than the FY97 budget. What is the funding source?	No		Now shown as 1998 costs. Funding sources will be supplemental Congressional appropriations and other initiatives as they become available. Partnerships are key sources of funding/ assistance. Volunteer groups may contribute to the funding of the refuge.
Why no additional law enforcement types added to staffing plan?	No		There are currently 3 law enforcement officers on staff. The plan identifies an additional assistant manager for the refuge. This person most likely will receive law enforcement training.
Why do you need 30 people to manage the refuge?	No		The staffing chart identifies 26 people. Many of these positions are shared with Ten Thousand Islands National Wildlife Refuge. The personnel identified will carry out the new and existing initiatives identified in the plan.
Draft Finding of No Significant Impact. Disagree with FONSI. Certain proposed actions will have an adverse impact on the panther and other species. The 370,000 acres covered in the Habitat Preservation Plan prevent the Service from making a FONSI determination.	No		The CCP considers the needs of the panther, as well as other endangered species and wildlife on the refuge. New projects have been designed to minimize impacts to the environment.
Disagree with items 1,3,4,5,6,7,9 and 10 of FONSI. Include comments from the management direction in the Environmental Assessment.	No		The FONSI identifies sections of the Environmental Assessment that reveal the environmental consequences of implementing the plan, and a determination of no significant impact.
Alternatives Including Proposed Action. Not realistic. All of the proposed alternatives are unacceptable.	No		All alternatives have undergone extensive review by stakeholders, the public, and federal, state and local agencies and all are supportive of Alternative B. This alternative is reflective of public sentiment and has been evaluated for its impact on the environment. Many of the projects in Alternative B follow guidelines established by the Florida Panther Habitat Preservation Plan, the Service's South Florida Ecosystem Plan, and the South Florida Ecosystem Restoration Task Force to protect and restore the environment of southwest Florida.

Summary of Public Comments and Service Responses

Comments recieved on draft CCP	*Plan Revised*	*Page No.'s*	*Service Response*
Alternative C is not suitable.	No		Alternative C promotes maximum public use programs on the refuge. Although many of the uses could not pass a compatibility test with the refuge, they needed to be considered. Throughout the scoping, public meeting, and plan review stages, a significant number of people noted their desire to maximize public use on the refuge. This alternative recognizes that response and addresses the environmental consequences.
Vegetative Habitats. Include more information.	No		A map of the vegetation communities is included in the final plan and will make it easier to distinguish communities.
Water Resources. Add water quality discussions and any agreements that allow the Service to get water from upstream sources and explain how the discharges could affect water quality or quantities on the refuge.	No		The Service has no agreements with upstream sources. The plan does identify a mercury study and the recruitment of a hydrologist to address contaminants and water flow respectively.
Include all plant and animal species found on the refuge.	No		This information will be provided to refuge staff to aid in managing resources.
Remove all-terrain vehicles from the refuge.	No		Personnel who enter the refuge to do manage, monitor or perform research are restricted to the established road and trail system of the refuge. The only time personnel can leave the trail system is when it is critical to the action they are undertaking.
Supplemental grain and farming practices do not belong on the refuge. Use more natural approaches. Food plots can cause the spread of exotics and result in high maintenance costs. Deer forage enhancement is not needed. Let refuge take care of itself.	No		The Service is examining supplemental deer forage as a technique to enhance the deer population. Increased deer numbers directly benefit panthers using the refuge. Florida native legumes have been the species of choice for investigation.
Water Resources. Include all water quality parameters.	No		The CCP includes maps depicting the marsh and lake areas. There are no water control structures or dams on the refuge.

Summary of Public Comments and Service Responses

Comments recieved on draft CCP	*Plan Revised*	*Page No.'s*	*Service Response*
Roads will have an impact, as they impede sheet flow.	No		The roads that are described in the CCP actually are trails and they are not elevated. The trails were established prior to the refuge being established. The trails do not impact sheet flow because the water flows over them. Refuge staff use swamp buggies to access the refuge via these trails during the wet season.
The proposed action may adversely impact the panther and other species.	No		The Service disagrees with this statement.
Mitigation and Residual Impacts. There may be mitigation. Dredging or filling in wetlands would require mitigation.	No		This a conceptual plan for the refuge manager to follow over the next 15 years. Some of the projects; i.e., trail, wetland habitat, visitor center, fishing access, etc., will require a more detailed planning effort. If the project requires wetland mitigation, the appropriate NEPA and permitting procedures will be followed.
Direct, indirect, and cumulative impacts on listed species are not adequately addressed. Consult on proposed action and form a biological opinion.	No		The Fish and Wildlife Service's Ecological Services' Office has reviewed this document. Appendix E contains the Intra-Service consultation which concurs with the management direction of the refuge and states that the CCP is not likely to affect any federally threatened or endangered species or any species proposed for listing.

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Compatibility Determination

Use:
- Increased access for wildlife observation and environmental education;
- New strategies for study and management as detailed in the Florida Panther Comprehensive Conservation Plan of 1999.

Station Name:
Florida Panther National Wildlife Refuge

Date Established:
June 21, 1989

Establishing and Acquisition Authorities:
16 U.S.C. 1534 (Endangered Species Act of 1973)
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 conservation of threatened and endangered species...and plants...." (Endangered Species Act 1973)
- "...for the development, advancement, management, conservation, and protection of fish and wildlife resources...." (Fish and Wildlife Act of 1956)
- "...for the benefit and recovery of the endangered Florida panther." (Fakahatchee Strand Environmental Assessment of 1985) and
- "...is essential to the survival of the panther and the refuge should enhance habitat conditions for the panther and the panther's prey species." (Florida Panther Recovery Plan of 1995)

Refuge Goals:
1.0 Provide optimum habitat conditions on the refuge for the Florida panther.

2.0 Restore and conserve the natural diversity, abundance, and ecological function of refuge flora and fauna.

3.0 Conduct research, monitoring, and evaluations to improve management of flora and fauna on the refuge and within the South Florida Ecosystem.

4.0 Provide opportunities for compatible public use in accordance with the National Wildlife Refuge System Improvement Act of 1997.

5.0 Develop and implement outreach and education programs that will promote conservation and provide an understanding and appreciation of the Florida panther, fish and wildlife ecology, and human influence on ecosystems of south Florida.

6.0 Promote interagency and private landowner cooperation for the protection and management of natural and cultural resources within southwest Florida.

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

In addition, the refuge will follow the Goals of the National Wildlife Refuge System (Attachment 1.)

Other Applicable Laws, Regulations and Policies:

- National Wildlife Refuge System Administration Act of 1966 as amended (16 USC 668dd-668ee).
- Antiquities Act of 1906 (16 USC 431-433; 34 Stat. 225).
- 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; 40 Stat.755).
- Bald and Golden Eagle Protection Act of 1972 (16 USC 668-668d; 54 Stat. 250) as amended.
- National Environmental Policy Act of 1969 (42 USC 4321).
- Refuge Revenue Sharing Act of 1935 (16 USC 715s; 49 Stat. 383) as amended.
- 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 Subchapter C; 43 CFR 3101.3-3).
- North American Wetlands Conservation Act of 1990.
- Management and General Public Use of the National Wildlife Refuge System, Executive Order 12996, March 25, 1996.
- National Wildlife Refuge System Administrative Act of 1997.

The following refuge specific management plans have been approved by the Fish and Wildlife Service for the refuge:

- Fire Plan
- Wildlife Inventory Plan
- Hurricane Action Plan
- Law Enforcement Plan

Description of Uses:

Human access to the refuge will be increased for the purposes of wildlife observation and environmental education. Specifically, the following measures will be developed:

- A short interpretive foot trail, 1- to 1.5-mile in length and placed in an area of least use by panthers, will be constructed. The trail will contain interpretive and educational exhibits on refuge programs and the plight of the panther. The trail will be day-use only. A parking area and waterless restroom facilities will be provided at the trailhead.
- A waterbird and other wildlife viewing area will be located adjacent to SR 29. This project includes the development of a parking area, waterless restroom facilities, interpretive exhibits, and observation decks. The wildlife viewing area will be day-use only.
- Plans will be pursued to develop a minimal visitor contact station at the Roger Roth Work Center (contingent on the failure to construct a Multi-Agency Interpretive and Education Center adjacent to the SR 29 and I-75 interchange). The contact station will be located within an area that presently contains buildings and facilities that support refuge operations. The area is disturbed, contains exotic plant species, and receives daily human use.

The 1999 Comprehensive Conservation Plan for Florida Panther National Wildlife Refuge contains seven refuge goals. Each goal has new strategies for study and management.

These uses are further defined in the Comprehensive Conservation Plan and appended Environmental Assessment.
Anticipated Biological Impacts of the Uses:
It is not anticipated that such activities will have major adverse effects on the panther 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 within the Comprehensive Conservation Plan for Florida Panther National Wildlife Refuge will be considered compatible with the purposes 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, they will be stopped or curtailed.

Justification:
Access
Wildlife observation and environmental education are important secondary uses because they create an awareness of the resources and the problems facing management. These uses will help educate the public on the plight of the panther. The status of the panther is in a critical state and this increased awareness is desperately needed.

Studies and Management
The studies and management guidelines outlined in the Comprehensive Conservation Plan have been designed to better understand and manage natural systems on and off the refuge.

Attachment 1

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.
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.

Intra-Service Section 7 Consultation

Division/Office:
Fish and Wildlife Service, Florida Panther National Wildlife Refuge

Project Biologist/Phone Number:
Jim Krakowski /(941) 353-8442 ext. 27

Date:
March, 2000

I. Proposed Action:
The proposed action is to implement the 2000 Comprehensive Conservation Plan for Florida Panther National Wildlife Refuge. The plan will increase access to the refuge and support additional studies and management projects.

II. Location (County and State/attach project area map):
Collier County, Florida

III. Description of proposed action (describe in enough detail to allow proper evaluation of project impacts):

A. Human access to the refuge will be increased for the purposes of wildlife observation and environmental education. Specifically, the following measures will be developed:

(1) A short interpretive foot trail, 1- to 1.5-mile in length and placed in an area of least use by panthers, will be constructed. The trail will contain interpretive and educational exhibits on refuge programs and the plight of the panther. The trail will be day-use only. A parking area and waterless restroom facilities will be provided at the trailhead.

(2) A waterbird and other wildlife viewing area will be located adjacent to SR 29. This project includes the development of a parking area, waterless restroom facilities, interpretive exhibits, and observation decks. The wildlife viewing area would be day-use only.

(3) Plans will be pursued to develop a minimal visitor contact station at the Roger Roth Work Center (contingent on the failure to construct a Multi-Agency Interpretive and Education Center adjacent to the SR 29 and I-75 interchange). The contact station will be located within an area that presently contains buildings and facilities that support refuge operations. The area is disturbed, contains exotic plant species, and receives daily human use.

B. The Comprehensive Conservation Plan for Florida Panther National Wildlife Refuge contains seven refuge goals. Each goal has new strategies for study and management.

Strategies that are new and have impacts on endangered species include:

1.1.4 Implement cabbage palm management to restore historic habitat and to enhance habitat for panthers.

1.2.2 By 2002, establish a minimum of 10 small ponds on the refuge in areas where water is seasonally absent or scarce.

1.2.5 Implement cabbage palm management to restore/enhance forage composition and growth for deer and other wildlife. Experimental sites where cabbage palm encroachment is documented will be evaluated pre- and post-palm removal to determine forage nutrient benefits for deer. Utilize results to guide further restoration of areas containing heavy cabbage palm infestations. This evaluation will occur by 2005.

2.1.3 Improve feeding areas for wading birds (i.e., endangered wood stork) near nest and roost habitat. By 2002, using approved hydrologic manipulation/restoration, mechanical means and herbicides, restore and enhance wetlands as foraging habitat for wading birds in Lucky Lake Strand. Other potential sites on the refuge will be identified and enhancement activities implemented by 2005.

2.1.4 Continue to utilize the refuge as a reintroduction site for eastern indigo snakes acquired through rehabilitation and confiscations. By 2002, establish and implement a protocol to radio-instrument selected specimens for monitoring habitat use, dispersal and survival.

2.1.5 By 2008, establish, if feasible, three red-cockaded woodpecker colonies on the refuge.

2.4.1.2 Restore a 513-acre fallow farm field in Fire Compartments 44 and 42 that was clear-cut prior to refuge establishment. Plant cypress, maple, etc., in scattered domes to enhance edge habitat and provide potential browse to benefit deer and other wildlife.

2.4.1.3 Restore a 40-acre fallow farm field in Fire Compartment 12 that was clear-cut prior to refuge establishment. Plant cypress, maple, etc., in scattered domes to enhance edge habitat and provide potential browse to benefit deer and other wildlife.

2.6.1 Restore a 100-acre disturbed site adjacent to SR 29 as a moist soil management area. The area would be managed for waterfowl, wading birds, and shorebirds by water level management and tilling practices.

2.7.3 By 2001, develop a plan that addresses the management of water levels of I-75 canals and the refuge for wood storks and other wading birds. By 2005, implement the plan, with concurrence from the Department of Transportation, South Florida Water Management District, and the Department of Environmental Protection.

3.1.1 Continue to monitor panthers, relying primarily on the Florida Fish and Wildlife Conservation Commission flight location data. Explore the availability/development of effective methods to monitor panthers over a 24-hour period.

3.3.2 Establish experimental sites on the refuge where cabbage palm encroachment is documented. By 2005, evaluate pre- and post-palm removal to determine

forage nutrient benefits for deer. Utilize results to guide further restoration of areas containing heavy cabbage palm occurrence.

3.3.4 Determine the feasibility of reintroducing red-cockaded woodpeckers to suitable refuge habitats by 2004, including evaluation of using Naples stock sources.

4.3 Determine the compatibility and feasibility of fishing at Pistol Pond.

6.1.1 By 2005, strive to achieve perpetual protection of approximately 10,000 acres of panther habitat north of the refuge through easement or fee title acquisition.

6.1.2 By 2010, strive to achieve limited and perpetual protection of approximately 360,000 acres through conservation easement or fee title acquisition to protect critical panther habitat identified in the 1993 Panther Habitat Protection Plan.

6.1.3 Participate in multi-agency mitigation banks to protect panther habitat. These land banks provide for the restoration and protection of key panther habitat. The refuge would coordinate the formation of these banks and manage the land after restoration has been completed.

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.

Figure 21. Species and Habitats

		Determination[2]			
Species/Critical Habitat	*Status*[1]	*NE*	*NA*	*AA*	*Response Requested*[3]
Florida Panther	E		X		
Wood Stork	E		X		
Bald Eagle	T		X		
American Alligator	T		X		
Florida Snail Kite	E		X		
Red-cockaded Woodpecker	E		X		
Eastern Indigo Snake	T		X		

[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 impact 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 impact 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 pages 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.

Florida Panther
Photo © Larry W. Richardson

Florida Panther

(1) Increased human visitation projects. The interpretive foot trail and waterbird viewing area will be located adjacent to SR 29 in areas rarely used by panthers. Plans will be pursued to develop a minimal visitor contact station at the Roger Roth Work Center (contingent on the failure to construct a Multi-Agency Interpretive and Education Center adjacent to the SR 29 and I-75 interchange). The contact station will be located within an area that presently contains buildings and facilities that support refuge operations. The area is disturbed, contains exotic plant species, and receives daily human use. These projects will have beneficial, indirect effects by educating the public on the plight of the panther and alleviating the "closed to access" stigma the refuge has attained.

(2) Other Comprehensive Conservation Plan projects. Projects 1.1.2., 1.1.4., 1.2.1., 1.2.2., 1.2.4., 1.2.5., 3.2.2., 3.2.6., 6.1.1., 6.1.2., and 6.1.3. would have a direct impact on the panther as they would either protect or improve habitat that panthers use.

Wood stork
USFWS Photo

Wood Stork, Florida Snail Kite

(1) Increased human visitation projects. The waterbird viewing area will directly benefit the endangered wood stork and Florida snail kite by providing additional feeding and roosting habitat. The trail and visitor center projects will not occur in habitats used by these species. In addition, these species will indirectly benefit from the educational exhibits or information gained at the visitor center on the plight, importance, and recovery of these species.

(2) Other Comprehensive Conservation Plan projects. Projects 2.1.3., 2.4.1.1., 2.6.1., 2.6.2., 2.7.1., 2.7.3., 3.3.1., 6.1.1., 6.1.2., and 6.1.3. would have a direct impact on these species as they would either protect or improve their habitats.

Bald eagle
USFWS Photo by Lee Emery

Bald Eagle

The bald eagle does not nest on the refuge. Prior to refuge establishment a nest did occur on what is now the east side of the refuge. Occasionally, eagles are seen flying low over the refuge. It is expected that they may feed or roost on an infrequent basis.

(1) Increased human visitation projects. The increased visitation to the peripheral areas of the refuge are not assumed to have any impact on bald eagles that may use the area.

(2) Other Comprehensive Conservation Plan projects. Projects 2.4.1.2., 2.4.1.3., 2.7.3., 3.2.2., 6.1.1., and 6.1.2 would have a direct impact on the bald eagle as they would either protect or improve habitat that may be used by the species.

Red-cockaded woodpecker
USFWS Photo

Red-cockaded Woodpecker

Refuge surveys have failed to find any red-cockaded woodpeckers on the refuge, however, habitat for them does exist on the refuge. Several state and federal biologists have suggested the translocation of Naples, Florida, birds (which are being lost to development) to the refuge.

(1) Increased human visitation projects. The increased visitation to the peripheral areas of the refuge are not assumed to have any impact on red-cockaded woodpeckers that may use the area in the future.

(2) Other Comprehensive Conservation Plan projects. Projects 1.1.4., 1.2.5., 2.1.5., 3.3.4., 6.1.1., 6.1.2., and 6.1.3. would have a direct impact on the red-cockaded woodpecker as they would either protect or improve habitat for this species. Project 3.3.4. specifically addresses the relocation of red-cockaded woodpeckers on the refuge and would greatly benefit this species.

Eastern indigo snake
USFWS Photo

Eastern Indigo Snake

(1) Increased human visitation projects. The increased visitation to the peripheral areas of the refuge are not assumed to have any impact on Eastern indigo snakes that may use the area.

(2) Other Comprehensive Conservation Plan projects. Projects 2.1.4., 2.4.1.1., 2.4.1.2., 2.4.1.3., 3.3.3., 6.1.1., 6.1.2., and 6.1.3. would have a direct impact on the Eastern indigo snake as they would either protect or improve habitat for this species. Project 2.1.4. specifically addresses the study of this species on the refuge.

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 projects and the plan will be modified to correct the situation.

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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.

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

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

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

Cultural Resources . . . . . The physical remains of human activity (artifacts, ruins, burial mounds, etc.) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, such as a sacred area of native peoples) of an area. It includes historical, archaeological and architectural 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.

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

Habitat	A place where a plant or animal naturally or normally lives and grows.
Habitat Diversity	In reference to the variety in habitat; structural and compositional variety of habitat.
Habitat Management Plan	A written plan that outlines the management strategy of a plant or animal species in the area where it naturally or normally lives and grows.
Herbicide	A chemical agent used to kill plants or inhibit plant growth.
Issue	Any unsettled matter that requires a management decision.
Mitigation	Avoiding or minimizing impacts of an action by limiting the degree or magnitude of the action; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.
Mosaic	A variety of different habitats intermixed in a relatively small area. In the same manner, several successional stages intermixed within a vegetation type.
National Environmental Policy Act	An act which encourages productive and enjoyable harmony between humans and their environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere, to stimulate the health and welfare of humans, to enrich our understanding of the ecological systems and natural resources important to our Nation, and to establish a council on environmental quality.
Native	This term describes plant and animal species, habitats, or communities that originated in a particular region or area, or those that have established in a particular region or area without the influence of humans.
National Wildlife Refuge System	All lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife, and plant resources.
Prescribed Burning	The intentional application of fire to vegetation under specific environmental conditions to accomplish specific management objectives in specific areas identified in approved prescribed fire plans.
Raptor	A bird of prey such as a hawk, eagle, or owl.
Refuge Agreements	Refuge Agreements include those agreements between the refuge and other federal, state, and local entities for the operation of a multi-agency visitors' center; law enforcement; and wildfire suppression and prescribed burning.
Refuge Goals	Statements that describe a desired condition. Refuge goals are expressed in broad, general terms. They provide direction for developing objectives.
Refuge Objectives	Concise statements that describe, in measurable terms, desired conditions, and thus provide focal points for directing management activities. They describe desired conditions in greater detail than refuge goals. Refuge goals and core problems provide the basis from which objectives are developed.
Reintroduction	A plant or animal species that is introduced by humans to a range that it formerly occupied.
RONS	Refuge Operating Needs System - A refuge planning, budgeting, and communication tool.

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

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

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

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

Strategies . . . . . Broad approaches that could be used to meet refuge goals and objectives; provide direction for defining and coordinating operational tasks to effectively perform the refuge's purpose.

Threatened Species . . . . . Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.

Vegetation . . . . . Plants in general, or the sum total of the plant life in an area.

Vegetation Type . . . . . A category of land based on potential or existing dominant plant species of a particular area.

Watershed . . . . . The entire land area that collects and drains water into a stream or stream system.

Wetland . . . . . Areas such as lakes, marshes, and streams that are inundated by surface or ground water for a long enough period of time each year to support, and do support under natural conditions, plants and animals that require saturated or seasonally saturated soils.

Wildlife Diversity . . . . . A measure of the number of wildlife species in an area and their relative abundance.

Wildlife Management . . . . . The art of making the land produce wildlife.