



Draft Hunting Management Plan / Environmental Assessment



March 2012

HOW TO COMMENT ON THIS PLAN

Comments on this *Hunting Management Plan* / Environmental Assessment are welcome and will be accepted for 30 days from its release. During the comment period, comments may be submitted by any of the following methods:

NPS Website (*preferred method*)

Go to <http://parkplanning.nps.gov> and select Big Cypress National Preserve. Comments can be provided electronically via the online comment form.

Mail

Superintendent
Big Cypress National Preserve
33100 Tamiami Trail East
Ochopee, Florida 34141-1000

Public Meetings

Comments can be made verbally or in writing at the public meetings that will be held for this project in March 2012.

Note: Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

EXECUTIVE SUMMARY

INTRODUCTION

This *Hunting Management Plan/* Environmental Assessment (EA) has been prepared for the Big Cypress National Preserve (the “Preserve”) /Wildlife Management Area (WMA) by Big Cypress National Preserve under the jurisdiction of the National Park Service (NPS), U.S. Department of the Interior. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) [42 U.S. Code (USC) § 4321] and implementing regulations [40 Code of Federal Regulations (CFR) 1500-1508], and NPS Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* and the associated handbook (NPS 2011a).

Big Cypress National Preserve is one of 397 units of the national park system administered by the NPS. Big Cypress National Preserve was created by Congress on October 11, 1974 [Public Law 93-440] as one of the first two national preserves in the national park system, with 582,000 acres. The Big Cypress National Preserve Addition Act (Public Law 100-301) was subsequently passed on April 29, 1988, authorizing the addition of 147,000 acres to the Preserve. Most of the acquisition of this additional 147,000 acres, referred to as “the Addition,” was completed in 1996.

A general management plan (GMP) was completed in 1991, which addressed management of the original 582,000 acres of the Preserve. The *Big Cypress National Preserve – Addition Final General Management Plan / Wilderness Study / Off-Road Vehicle Management Plan / Environmental Impact Statement* (Addition GMP) was subsequently completed in 2010, which addressed management of the 147,000 acres in the Addition.

Both the general management plan completed for the original Preserve in 1991 and the general management plan completed for the Addition in 2010 articulated the need to

manage hunting within the Preserve. Hunting is currently permitted within the original boundaries of the Preserve and is managed cooperatively by the NPS and Florida Fish and Wildlife Conservation Commission (FWC) through the *NPS/FWC Cooperative Partnership Agreement*. The Addition has never been open to public hunting either before or after its acquisition. In accordance with the GMP and the Addition GMP, the goal of this document is to develop a hunting management plan for the entire Preserve, including the Addition, and to analyze the impacts associated with three alternatives for managing hunting in the Preserve¹.

PURPOSE OF THE PROJECT

The purpose of this action is:

To develop a hunting management plan for the Big Cypress National Preserve / Wildlife Management Area that allows the superintendent of the Preserve to provide for hunting opportunities in the Preserve in a manner that is in the best interest of the Preserve’s resources and the public, while meeting the requirements set forth by the NPS, the Preserve’s enabling legislation, the NPS/FWC Cooperative Partnership Agreement, and all applicable federal, state, and local laws and regulations.

NEED FOR ACTION

The need for action is that:

A hunting management plan is needed for the Big Cypress National Preserve / Wildlife Management Area:

- *to provide clear and informational guidance for safe and responsible*

¹ The “Preserve” refers to the entire Preserve which encompasses the original boundaries and the Addition, unless otherwise noted.

- hunting within the Preserve to the public*
- *to provide for a visitor use experience that complies with the enabling legislation for the Preserve*
- *to manage the resources present in the Preserve*
- *to provide a framework for hunting management within the Preserve that meets the requirements set forth by the NPS, the Preserve's enabling legislation, the NPS/FWC Cooperative Partnership Agreement, and all applicable federal, state, and local laws and regulations*

- may have an effect on hunting within the Preserve*
- 4. *Provide the public with clear and understandable information regarding:*
 - *hunting management within the Preserve*
 - *safe and responsible hunting practices*
- 5. *Manage opportunities for a positive visitor use experience for hunters and nonhunters.*
- 6. *Manage an array of access options to allow for a diversity of hunting opportunities within the framework of existing regulations and funding.*

OBJECTIVES IN TAKING ACTION

The objectives in taking action are to:

1. *Provide guidelines for hunting within the Big Cypress National Preserve / Wildlife Management Area that satisfy all NPS regulations, the Preserve's enabling legislation, the NPS/FWC Cooperative Partnership Agreement, and all applicable federal, state, and local laws and regulations.*
2. *Provide a programmatic framework for facilitating agency communications and goal-setting that provides guidance over a number of years.*
3. *Utilize science-based resource management (e.g., habitat, wildlife, and protected species) for adaptive decision-making for:*
 - *the NPS and the FWC to collaborate and cooperate on the rule-making process regarding hunting*
 - *the NPS to take action independently, with notification to the FWC and U.S. Fish and Wildlife Service (USFWS) as soon as practicable, for resource protection or public safety in certain cases (i.e., high water events, fires, threatened and endangered species issues), which*

ALTERNATIVES

Alternative 1 – No Action – Apply Current Management to the Addition

Under alternative 1 (no action), management of hunting in the entire Preserve would occur in accordance with the *NPS/FWC Cooperative Partnership Agreement*.

Alternative 2 – Minimum Management – No Hunting in the Addition

Under alternative 2, current hunting management would continue within the original Preserve boundaries, using the guidance outlined in the *NPS/FWC Cooperative Partnership Agreement*. In the Addition, public hunting would be prohibited.

Alternative 3 – New Adaptive Management Strategy

Under alternative 3, the NPS and the FWC, in consultation with the USFWS, would cooperate to implement an adaptive management strategy to manage hunting in the Preserve.

NPS PREFERRED ALTERNATIVE

The NPS uses a selection and ranking process during all projects and actions called Choosing By Advantages (CBA). In the CBA process, the NPS asks “what and how large are the advantages of each of the alternatives?” proposed for a project, “how important are the advantages of each of the alternatives?,” and “are those advantages worth the associated cost?” A CBA workshop was conducted on November 1, 2011, at the Preserve for the purpose of determining the preferred alternative. Workshop participants consisting of NPS (Preserve, Denver Service Center, and contractor) staff and cooperating state (FWC) and federal (USFWS) agency participants reviewed the project alternatives to determine which alternative best meets the project purpose, need for action, and objectives.

It was determined by the CBA process that alternative 3 provides the greatest total importance of advantages to the NPS and the public.

GUIDE TO THIS ENVIRONMENTAL ASSESSMENT

The contents of this document are as follows:

Chapter 1: Purpose and Need for Action – The first chapter includes a discussion of the background of the NPS, the purpose and significance of the Big Cypress National Preserve, the purpose and need for action, project objectives, the relationship to laws and other plans, the impact topics that were selected for detailed analysis, and the impact topics that were dismissed from further analysis.

Chapter 2: Alternatives – This chapter describes the action alternatives and the no-action alternative. It also discusses alternatives considered but dismissed.

Chapter 3: Affected Environment – This chapter describes existing environmental conditions in the areas potentially affected by the alternatives. This section addresses the following impact topics: vegetation and habitat (native vegetative communities and habitat, protected plant species, and nonnative invasive plant species); wildlife (protected wildlife species, major game species, and nonnative/invasive wildlife species); wilderness; preserve management and operations; visitor use and experience / recreational opportunities; noise / soundscapes; public health and safety; and socioeconomics.

Chapter 4: Environmental Consequences – This chapter presents the methods and analysis of the potential impacts for each topic under each of the alternatives (no action and action). This chapter also includes the mitigation measures and cumulative impacts analyses for each of the alternatives.

Chapter 5: Consultation and Coordination – This chapter summarizes the consultations undertaken in the preparation and review of this document, including the scoping process, public involvement, and agency and tribal coordination. It also includes a list of document preparers who have contributed to this EA.

Chapter 6: References – This chapter lists the references cited in this document and defines the acronyms and abbreviations used in this document.

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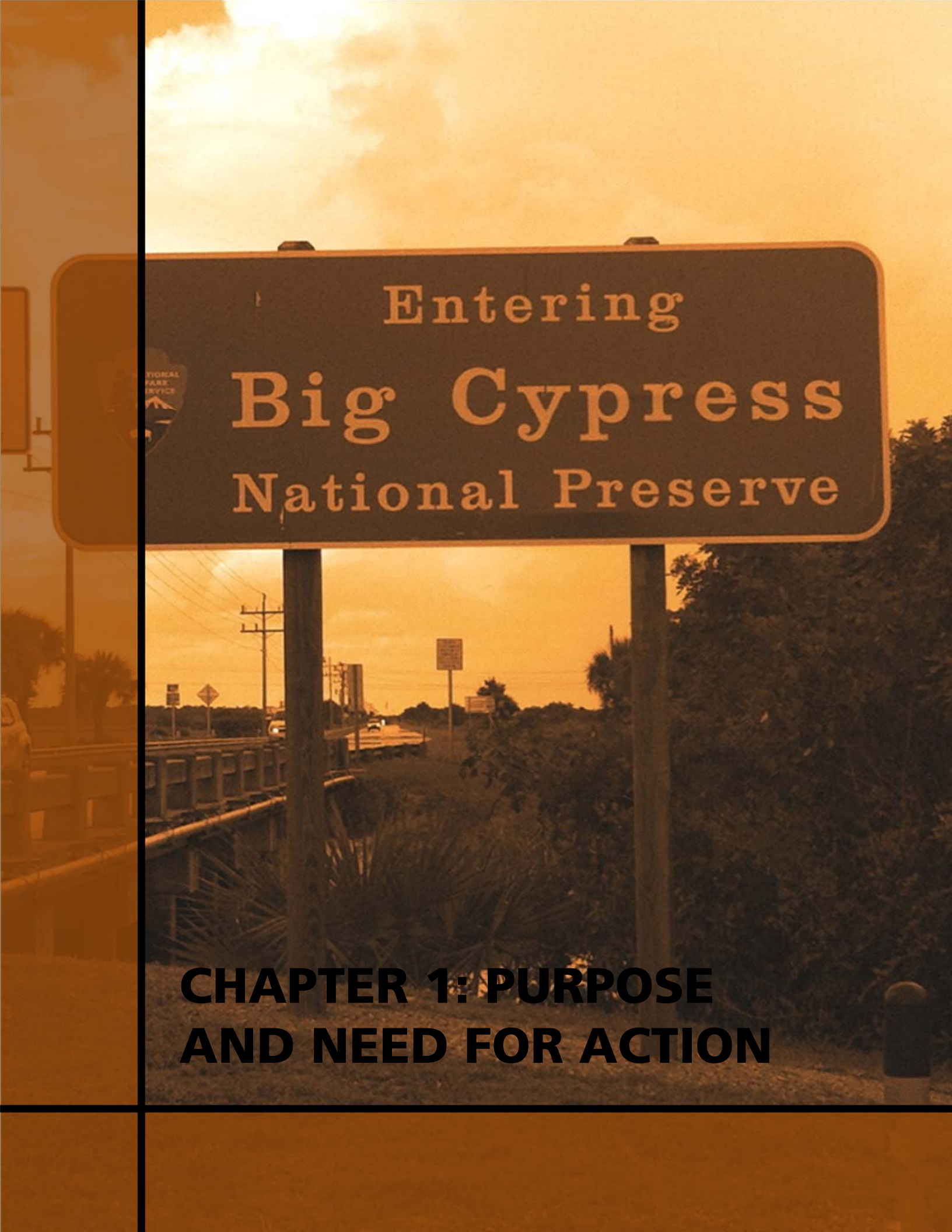
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Entering
Big Cypress
National Preserve

CHAPTER 1: PURPOSE AND NEED FOR ACTION

INTRODUCTION AND BACKGROUND

INTRODUCTION

This *Hunting Management Plan/* Environmental Assessment has been prepared for the Big Cypress National Preserve/Wildlife Management Area by Big Cypress National Preserve under the jurisdiction of the National Park Service, U.S. Department of the Interior. This EA has been prepared in accordance with the National Environmental Policy Act (42 U.S. Code § 4321) and implementing regulations (40 Code of Federal Regulations 1500-1508), and NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* and the associated handbook (NPS 2011a).

BACKGROUND

General Preserve Background

Big Cypress National Preserve is one of 397 units of the national park system administered by the NPS. Big Cypress National Preserve was created by Congress on October 11, 1974 [Public Law (PL) 93-440] as one of the first two national preserves in the national park system, with 582,000 acres. The Big Cypress National Preserve Addition Act (PL 100-301) was subsequently passed on April 29, 1988, authorizing the addition of 147,000 acres to the Preserve. Most of the acquisition of this additional 147,000 acres, referred to as "the Addition," was completed in 1996. See appendix A for a copy of the enabling legislation (PL 93-440, as amended by PL 100-301) in its entirety.

A general management plan was completed in 1991, which addressed management of the original 582,000 acres of the Preserve. The *Big Cypress National Preserve – Addition Final General Management Plan / Wilderness Study / Off-Road Vehicle Management Plan / Environmental Impact Statement* was subsequently completed in 2010, which addressed management of the 147,000 acres in the Addition.

What is a National Preserve?

The diversity of national park system units is reflected in the variety of titles given to them. These include designations such as national park, national preserve, national monument, national memorial, national historic site, national seashore, etc. Although some titles are self-explanatory, others require further clarification (NPS 2010a).

Generally, a national park contains a variety of resources and encompasses large land or water areas to help provide adequate protection of the resources (NPS 2010a). National preserves are defined as "areas having characteristics associated with national parks, but in which Congress has permitted continued public hunting, trapping, [and] oil/gas exploration and extraction" (NPS 2000a).

As with all units of the national park system, the enabling legislation that accompanies the authorization of a particular park system unit describes its purpose and provides the direction for its establishment and management. Big Cypress National Preserve was established to protect the watershed values of the Big Cypress Swamp while allowing for the continuation of traditional uses [such as hunting, fishing, off-road vehicle (ORV) use, and mineral extraction] in the area. The national preserve designation of Big Cypress presents unique opportunities to integrate multiple uses with conservation and preservation (NPS 2010a).

What is a Wildlife Management Area?

Florida's WMA system is managed by the FWC to sustain the widest possible range of native wildlife in their natural habitats. This system includes more than 5.8 million acres of land established as WMAs or wildlife and environmental areas in the state. These lands are typically more rugged than parks, with fewer developed amenities. On the majority of these lands (about 4.4 million acres), such as

the Big Cypress WMA, the FWC is a cooperating manager working with other governmental or private landowners to conserve wildlife and provide public use opportunities. The Big Cypress WMA consists of 565,848 acres within the 720,566-acre Preserve, which includes most of the original Preserve and currently does not include the Addition lands. The FWC currently cooperatively manages the Big Cypress WMA with the NPS by managing species restoration, conducting habitat management and restoration activities, conducting surveying and monitoring activities, setting regulations and seasons for hunting and fishing, and conducting outreach and education activities, among other activities.

Project Site Location

The Preserve² is located in southern Florida in Collier, Miami-Dade, and Monroe counties, and is situated between the major cities of Miami and Naples. The original Preserve, which consists of 582,000 acres, extends from the northern boundary of Everglades National Park on the south edge to seven miles north of 1-75 on the northern edge. The Addition, a portion of the Preserve, is approximately 147,000 acres in size and consists of two separate areas – the Northeast Addition and the Western Addition (see figure 1). Most of these lands, approximately 128,000 acres in the Northeast Addition, are located northeast of the original Preserve boundary. The Western Addition is an approximately 1-mile strip of land (approximately 19,000 acres) between State Road (SR) 29 and the western boundary of the original Preserve. When unspecified, the “Addition” refers to lands in both areas. The Addition also includes private lands (inholdings), some of which are exempt from NPS acquisition (NPS 2010a).

See figure 1-1 for a map depicting the limits of the original Preserve boundaries and the Addition.

² From this point forward in the document, the “Preserve” refers to the entire Preserve which encompasses the original boundaries and the Addition, unless otherwise noted.

Hunting Management Background

The NPS and the FWC have been partners in fulfilling the legislative mandate that created the Preserve, namely, the preservation of traditional uses along with continual conservation of important natural resources within the Preserve boundaries. Resource management decisions, particularly those related to public hunting and recreational access, have evolved over the more than 30 years since the Preserve was created, and some of those changes have been directed toward improving conditions for the endangered Florida panther and its prey. Some of these changes include a reduction in modern gun hunting from 58 to 49 days; buck-only harvest with at least a 5-inch antler; elimination of dogs for deer and hog hunting; and mandatory hunter check-in/check-out system coupled with quota permits. In addition, elimination of quotas that were not being filled and allowance for take of Conditional Reptiles were considered expansion of hunting opportunities.

Scope of the Analysis

Both the GMP completed for the original Preserve in 1991 and the Addition GMP completed in 2010 articulated the need to manage hunting within the Preserve. Hunting is currently permitted within the original boundaries of the Preserve and is managed cooperatively by the NPS and FWC through the *NPS/FWC Cooperative Partnership Agreement* (see appendix B). The Addition has never been open to public hunting either before or after its acquisition. In accordance with the GMP and the Addition GMP, the goal of this document is to develop a hunting management plan for the entire Preserve, including the Addition, and to analyze the impacts associated with three alternatives for managing hunting in the Preserve.

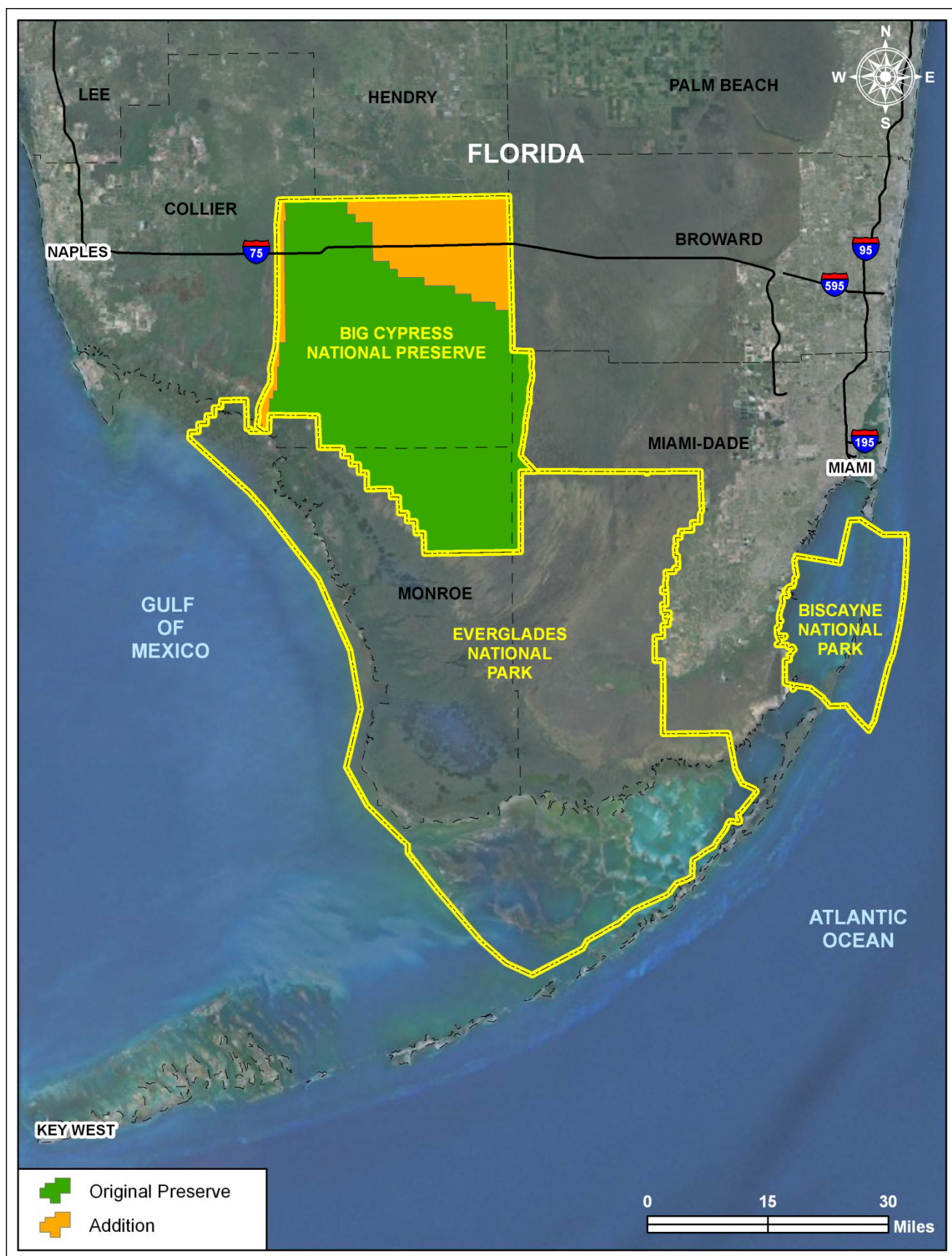


Figure 1-1 – Big Cypress National Preserve Location Map

PURPOSE AND NEED FOR ACTION

PURPOSE OF THE PROJECT

“Purpose” is an overarching statement of what the project must do to be considered a success (NPS 2011a). The project purpose was developed during the internal and public scoping portions of the project and is as follows:

To develop a hunting management plan for the Big Cypress National Preserve / Wildlife Management Area that allows the superintendent of the Preserve to provide for hunting opportunities in the Preserve in a manner that is in the best interest of the Preserve’s resources and the public, while meeting the requirements set forth by the NPS, the Preserve’s enabling legislation, the NPS/FWC Cooperative Partnership Agreement, and all applicable federal, state, and local laws and regulations.

NEED FOR ACTION

“Need for Action” describes why action is required (NPS 2011a). It summarizes the most important points of the planning issues and provides the reasons the project is needed at this time. The project need for action was developed during the internal and public scoping portions of the project.

A hunting management plan is needed for the Big Cypress National Preserve / Wildlife Management Area:

- *to provide clear and informational guidance for safe and responsible hunting within the Preserve to the public*
- *to provide for a visitor use experience that complies with the enabling legislation for the Preserve*
- *to manage the resources present in the Preserve*
- *to provide a framework for hunting management within the Preserve that*

meets the requirements set forth by the NPS, the Preserve’s enabling legislation, the NPS/FWC Cooperative Partnership Agreement, and all applicable federal, state, and local laws and regulations

OBJECTIVES IN TAKING ACTION

“Objectives” are specific purpose statements that describe what must be accomplished to a large degree for the action to be considered a success (NPS 2011a). Based on a consideration of the purpose and need for action for the project, the following project objectives were developed during the internal and public scoping portions of the project:

1. *Provide guidelines for hunting within the Big Cypress National Preserve / Wildlife Management Area that satisfy all NPS regulations, the Preserve’s enabling legislation, the NPS/FWC Cooperative Partnership Agreement, and all applicable federal, state, and local laws and regulations.*
2. *Provide a programmatic framework for facilitating agency communications and goal-setting that provides guidance over a number of years.*
3. *Utilize science-based resource management (e.g., habitat, wildlife, and protected species) for adaptive decision-making for:*
 - *the NPS and the FWC to collaborate and cooperate on the rule-making process regarding hunting*
 - *the NPS to take action independently, with notification to the FWC and USFWS as soon as practicable, for resource protection or public safety in certain cases (i.e., high water events, fires, threatened and endangered species issues), which*

*may have an effect on hunting
within the Preserve*

4. *Provide the public with clear and understandable information regarding:*
 - *hunting management within the Preserve*
 - *safe and responsible hunting practices*
5. *Manage opportunities for a positive visitor use experience for hunters and nonhunters.*
6. *Manage an array of access options to allow for a diversity of hunting opportunities within the framework of existing regulations and funding.*

PURPOSE OF AND SIGNIFICANCE OF BIG CYPRESS NATIONAL PRESERVE

ENABLING LEGISLATION

Big Cypress National Preserve was created by Congress on October 11, 1974 (PL 93-440) as one of the first two national preserves in the national park system, with 582,000 acres (see appendix A). The Big Cypress National Preserve Addition Act (PL 100-301) was subsequently passed on April 29, 1988, authorizing the addition of 147,000 acres to the Preserve. See appendix A for a copy of the enabling legislation (PL 93-440, as amended by PL 100-301) in its entirety.

Section 4 (b) of the enabling legislation (PL 93-440, as amended by PL 100-301) states:

In administering the preserve, the Secretary shall develop and publish in the Federal Register such rules and regulations as he deems necessary and appropriate to limit or control the use of Federal lands and waters with respect to:

- (1) motorized vehicles,*
- (2) exploration for and extraction of oil, gas, and other minerals,*
- (3) grazing,*
- (4) draining or constructing of works or structures which alter the natural water courses,*
- (5) agriculture,*
- (6) hunting, fishing, and trapping,*
- (7) new construction of any kind, and*
- (8) such other uses as the Secretary determines must be limited or controlled in order to carry out the purposes of this Act: Provided, That the Secretary shall consult and cooperate with the Secretary of Transportation to assure that necessary transportation facilities shall be located within existing or reasonably expanded rights-of-way and constructed within the reserve in a manner consistent with the purposes of this Act.*

Further, Section 5 of the enabling legislation (PL 93-440, as amended by PL 100-301) states:

The Secretary shall permit hunting, fishing, and trapping on lands and water under his jurisdiction within the preserve and the Addition in accordance with the applicable laws of the United States and the State of Florida, except that he may designate zones where and periods when no hunting, fishing, trapping, or entry may be permitted for reasons of public safety, administration, floral and faunal protection and management, or public use and enjoyment. Except in emergencies, any regulations prescribing such restrictions relating to hunting, fishing, or trapping shall be put into effect only after consultation with the appropriate State agency having jurisdiction over hunting, fishing, and trapping activities. Notwithstanding this section or any other provision of this Act, members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the preserve and the Addition, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonials.

PURPOSE STATEMENTS

Purpose statements are based on the Preserve's legislation, legislative history, and NPS policies. The statements reaffirm the reasons for which the Preserve was set aside as a unit of the national park system and provide the foundation for Preserve management and use (NPS 2010a).

The purpose of Big Cypress National Preserve, as stated in the enabling legislation,

... is to assure the preservation, conservation, and protection of the natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress Watershed in the State of Florida and to provide for the enhancement and public enjoyment thereof.

SIGNIFICANCE STATEMENTS

Significance statements capture the essence of the Preserve's importance to our country's natural and cultural heritage. Significance statements do not inventory Preserve resources; rather, they describe the Preserve's distinctiveness and help to place the Preserve within its regional, national, and international contexts. Significance statements answer questions such as: "Why are the Preserve's resources distinctive?" and "What do they contribute to our natural/cultural heritage?" Defining the Preserve's significance helps managers make decisions that preserve the resources and values necessary to accomplish the purpose of the Preserve (NPS 2010a).

The significance of Big Cypress National Preserve, as stated in the Addition GMP (NPS 2010a) is as follows:

Big Cypress National Preserve, including the Addition, contains vestiges of primitive southwest Florida. It is significant as a unit of the national park system because it:

- *provides opportunities for the public to pursue recreational activities in a subtropical environment*
 - *is home to the Miccosukee Tribe of Indians of Florida and Seminole Tribe of Florida and sustains resources that are important to their cultures*
 - *is a watershed that is an important component to the survival of the greater Everglades ecosystem (NPS 2010a).*
-
- *is a large wetland mosaic that supports a vast remnant of vegetation types found only in this mix of upland and wetland environments*
 - *contains the largest strands of dwarf cypress in North America*
 - *is habitat for the Florida panther and other animal and plant species that receive special protection or are recognized by the state of Florida, the U.S. government, or the Convention on International Trade in Endangered Species*

LAWS, REGULATIONS, AND POLICIES

Numerous laws, regulations, and policies at the federal, state, and local levels guide the decisions and actions regarding this EA. Some of the primary examples of these legal and regulatory constraints and bounds follow.

NATIONAL PARK SERVICE

National Park Service Organic Act (1916)

The National Park Service Organic Act (1916) (16 USC § 1-4) created the NPS with the direction to:

...conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

General Authorities Act (1970)

The purpose of the General Authorities Act (1970) (16 USC § 2, 3, and 4) was to include all areas administered by the NPS in one national park system and to clarify the authorities applicable to the system. Areas of the national park system, the act states:

... though distinct in character, are united through their inter-related purposes and resources into one national park system as cumulative expressions of a single national heritage; that, individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all people of the United States...

Redwood National Park Act (1978)

The Redwood National Park Act (16 USC § 79a) reasserted the system-wide standard of protection prescribed by Congress in the original Organic Act. It states:

Congress further reaffirms, declares, and directs the promotion and regulation of the various areas of the National Park System...shall be consistent with and founded in the purpose established by the first section of the Act of August 25, 1916, to the common benefit of all the people of the United States. The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

National Parks Omnibus Management Act (1998)

The National Parks Omnibus Management Act (16 USC § 5901, et seq.) provides direction for articulating and connecting resource management decisions to the analysis of impacts, using appropriate technical and scientific information. The purpose of this act is:

- (1) *to more effectively achieve the mission of the NPS*
- (2) *to enhance management and protection of national park resources by providing clear authority and direction for the conduct of scientific study in the national park system and to use the information gathered for management purposes*

- (3) *to ensure appropriate documentation of resource conditions in the national park system*
- (4) *to encourage others to use the national park system for study to the benefit of park management as well as broader scientific value, where such study is consistent with the [NPS Organic Act]*
- (5) *to encourage the publication and dissemination of information derived from studies in the national park system*

Management Policies

The NPS *Management Policies* (2006) establishes servicewide policies for the preservation, management, and use of park resources and facilities. These policies provide guidelines and direction for management of resources within the Preserve. The alternatives considered in this EA incorporate and comply with the provisions of these mandates and policies.

Chapter 2 of NPS *Management Policies* states:

Park planning helps define the set of resource conditions, visitor experiences, and management actions that, taken as a whole, will best achieve the mandate to preserve resources unimpaired for the enjoyment of present and future generations. NPS planning processes will flow from broad-scale general management planning through progressively more specific strategic planning, implementation planning, and annual performance planning and reporting, all of which will be grounded in foundation statements (NPS 2006a).

This planning process occurs through general principles laid out by the NPS for decision-making; scientific, technical, and scholarly analysis; public participation; and goal orientation. Chapter 2 of the NPS *Management Policies* states:

The National Park Service will use planning to bring logic, analysis, public

involvement, and accountability into the decision-making process. Park planning and decision-making will be conducted as a continuous, dynamic cycle, from broad visions shared with the public to individual, annual work assignments and evaluations ... Decision-makers and planners will use the best available scientific and technical information and scholarly analysis to identify appropriate management actions for protection and use of park resources. Analysis will be interdisciplinary and tiered ... The Service will actively seek out and consult with existing and potential visitors, neighbors, American Indians, other people with traditional cultural ties to park lands, scientists and scholars, concessioners, cooperating associations, gateway communities, other partners, and government agencies... Managers will be held accountable for identifying and accomplishing measurable long-term goals and annual goals that are incremental steps to carrying out the park mission. Such planning is a critical and essential part of the NPS performance management system that is designed to improve the Park Service's performance and results (NPS 2006a).

National Park Service Director's Orders

Director's orders, handbooks, and reference manuals issued by the NPS supplement and enhance the enabling legislation and *Management Policies*. The following director's orders were applicable to the development of this EA.

- Director's Order 6: *Interpretation and Education* (NPS 2005a)
- Director's Order 9: *Law Enforcement Program* (NPS 2009)
- Director's Order 11B: *Ensuring Quality of Information* (NPS 2005b)
- Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* (NPS 2011a)
- Director's Order 17: *Tourism* (NPS 1999)

- Director's Order 28: *Cultural Resource Management*
- Director's Order 41: *Wilderness Stewardship* (NPS 2011b)
- Director's Order 42: *Accessibility for Park Visitors with Disabilities in NPS Programs and Services* (NPS 2000b)
- Director's Order 47: *Sound Preservation and Noise Management* (NPS 2000c)
- Director's Order 54: *Management Accountability* (NPS 2003a)
- Director's Order 75A: *Civic Engagement and Public Involvement* (NPS 2007)
- Director's Order 82: *Public Use Data Collecting and Reporting* (NPS 2004)

National Park Service Director's Order

12. Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* and the associated handbook lay the groundwork for how the NPS complies with NEPA. Director's Order 12 and the handbook set forth a planning process for incorporating scientific and technical information and establishing a solid administrative record for NPS projects (NPS 2011a).

Director's Order 12 requires that impacts to the Preserve's resources be analyzed in terms of their context, duration, and intensity. It is crucial for the public and decision-makers to understand implications of those impacts in the short and long-term, cumulatively, and in context, based on an understanding and interpretation by resource professionals and specialists. Director's Order 12 also requires that an analysis of impairment to the Preserve's resources and values be part of the NEPA document (NPS 2011a).

OTHER FEDERAL LAWS AND EXECUTIVE ORDERS

The following laws, Executive Orders (EO), regulations, and policies were also considered in developing this EA.

National Environmental Policy Act (1969)

Section 102(2)(c) of the National Environmental Policy Act (42 USC § 4321) requires that an environmental analysis be prepared for proposed federal actions that may significantly affect the quality of the human environment or are major or controversial federal actions. The National Environmental Policy Act is implemented through regulations of the Council on Environmental Quality (CEQ) (40 CFR 1500-1508). The NPS has, in turn, adopted procedures to comply with the act and the CEQ regulations, as found in Director's Order 12 and its accompanying handbook (NPS 2011a). Section 102(2)(c) of this act requires that a detailed environmental analysis be prepared for proposed major federal actions that may significantly affect the quality of the human environment. Hunting management within the Preserve is considered a major federal action; therefore, a NEPA analysis and documentation is required.

Endangered Species Act (1973)

The Endangered Species Act (16 USC § 1531-1543) requires all federal agencies to consult with the Secretary of the Interior on all projects and proposals with the potential to impact federally endangered or threatened plants and animals. It also requires federal agencies to use their authorities in furtherance of the purposes of the Endangered Species Act by carrying out programs for the conservation of endangered and threatened species and to ensure that any agency action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat. This act was reviewed in the development of this EA for impacts to federally endangered and threatened species, including the Florida panther.

Migratory Bird Treaty Act (1918)

The Migratory Bird Treaty Act (16 USC § 703–712), as amended, implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the act, taking, killing, or possessing migratory birds is unlawful, except as permitted by regulation. Migratory birds, part, eggs, and nests are all included in the protection afforded by this act. This act was reviewed in the development of this EA for impacts to migratory birds found in the Preserve.

Firearms in National Park System Units (Credit Card Accountability Responsibility and Disclosure Act) (2009)

This federal law (16 USC § 512) instated in 2010 permits persons who can legally possess firearms under applicable federal, state, and local laws to legally possess firearms in national park system units, including the Preserve. Under this law, U.S. residents who possess a state-issued concealed weapons permit in Florida or who possess a state-issued concealed weapons permit from another state which shares concealed weapons permit reciprocity with Florida may possess concealed firearms within the Preserve. Possession of these firearms is regulated by Florida statutes. Additionally, federal law still prohibits firearms in certain facilities in the Preserve; those places are marked with signs at all public entrances.

Lacey Act (1900)

The Lacey Act (16 USC § 3371-3378), as amended, makes it illegal to “import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant taken, possessed, transported, or sold in violation of any law, treaty, or regulation of the United States or in violation of any Indian tribal law.” This law would apply to some of the nonnative species that occur in the Preserve, such as the Burmese python. This act was reviewed in the

development of this EA since some of the alternatives considered could potentially allow the option of future hunting of species listed in this act.

National Historic Preservation Act (1966)

The National Historic Preservation Act (16 USC § 470) was enacted to preserve historical and archaeological sites in the U.S. This act created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices. The National Historic Preservation Act requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register of Historic Places. In accordance with this act, coordination was conducted with the State Historic Preservation Officer (SHPO) for this EA.

Rehabilitation Act (1973)

The Rehabilitation Act (29 USC § 791 and 794) states:

No otherwise qualified individual with a disability in the United States shall, solely by reason of disability, be excluded from the participation in, be denied the benefits of, or be subject to discrimination under any program or activity conducted by Federal Financial Assistance or by any Executive Agency.

As stated in Director's Order 42 (NPS 2000b):

This means the NPS not only has to be concerned with enabling people with disabilities to have access to parks and facilities but, once there, the NPS also needs to do everything feasible to enable them to receive as close to the same benefits as those received by other visitors. This also means our obligation extends to individuals with visual impairments, hearing impairments, and

cognitive impairments, as well as those with mobility impairments.

This act was reviewed in the development of this EA to ensure compliance with both the act and Director's Order 42.

Wilderness Act (1964)

The Wilderness Act (16 USC § 1131-1136) established a National Wilderness Preservation System, "administered for the use and enjoyment of the American people in such manner as would leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness." Lands identified as being suitable for wilderness designation, wilderness study areas, proposed wilderness, and recommended wilderness (including potential wilderness) must also be managed to preserve their wilderness character and values in the same manner as "designated wilderness" until Congress has acted on the recommendations (NPS 2011a). Since proposed designated wilderness and eligible wilderness exists in the Addition, this act was reviewed in the development of this EA.

Executive Order 13112 – Invasive Species

This EO requires federal agencies to prevent the introduction of invasive species, provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species may cause. Since hunting management activities could potentially have an impact on invasive species in the Preserve, this EO was reviewed in the development of this EA.

Executive Order 13423 – Strengthening Environmental, Energy, and Transportation Management

Executive Order 13423 consolidates and strengthens the sustainable practices of EOs 13101, 13123, 13134, 13148, and 13149. Executive Order 13423 requires federal agencies to lead by example in advancing the nation's energy security and environmental performance. It requires federal agencies to "conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner." It includes requirements for the reduction of greenhouse gases and other energy and water conservation measures. The order requires agencies to reduce greenhouse gas emissions by 3% annually through the end of fiscal year 2015, or 30% by the end of fiscal year 2015, relative to the baseline of the agency's energy use in fiscal year 2003. This EO was reviewed in the development of this EA to ensure that the NPS is compliant.

Executive Order 13443 – Facilitation of Hunting Heritage and Wildlife Conservation

This EO directs the U.S. Department of the Interior and its component agencies, bureaus, and offices "to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat." Since this EO directly relates to providing hunting opportunities and the management of game species and their habitat, it was reviewed during the development of this EA.

Executive Order 13514 – Federal Leadership in Environmental, Energy, and Economic Performance

Executive Order 13514 enhances EO 13423, which requires federal agencies to improve energy efficiency, reduce water consumption,

and achieve other sustainability goals. All the provisions of EO 13423 remain in effect. Executive Order 13514 introduces new greenhouse gas emissions management requirements, expands water reduction requirements for federal agencies, and addresses waste diversion, local planning, sustainable buildings, environmental management, and electronics stewardship. This EO was reviewed in the development of this EA to ensure that the NPS is compliant.

STATE LAWS AND EXECUTIVE ORDERS

Florida Fish and Wildlife Conservation Commission, Big Cypress Wildlife Management Area Regulations (2011-2012 Hunting Season)

Current hunting regulations in the Preserve are set forth in FAC 68A and outlined for the public in the *FWC Big Cypress WMA Regulations (2011-2012 Hunting Season)* brochure (see appendix C), which states:

Persons using wildlife management areas are required to have appropriate licenses, permits and stamps. The following persons are exempt from all license and permit requirements (except for quota permits when listed as "no exemptions," recreational use permits, antlerless deer permits and the Migratory Bird Hunting and Conservation Stamp [federal duck stamp]): Florida residents who are 65 years of age or older; residents who possess a Florida Resident Disabled Person Hunting and Fishing Certificate; residents in the U.S. Armed Forces, not stationed in Florida, while home on leave for 30 days or less, upon submission of orders; and children under 16 years of age. Children under 16 years of age are exempt from the federal duck stamp. Anyone born on or after June 1, 1975 and 16 years of age or older must have passed a Commission-approved hunter-safety course prior to being issued a hunting license, except the Hunter Safety Mentoring exemption allows anyone to purchase a hunting license and hunt

under the supervision of a licensed hunter, 21 years of age or older, for one year.

The brochure provides detailed information on quota permit information, ORV permit requirements, general area regulations, public access and vehicles, check stations, dogs, camping, bag and possession limits, archery season, muzzleloading gun season, modern gun season, small game season, trapping (which is prohibited), spring turkey season, migratory bird seasons, fishing and frogging (not covered as part of this plan), and general NPS rules and information (FWC 2011a).

Florida Endangered and Threatened Species Act

The state of Florida regulates the protection of threatened and endangered species through the Florida Endangered and Threatened Species Act (FS § 379.2291-379.231). This act is the primary regulation in the state, and sets the policy to conserve and wisely manage these resources, as well as provide for research and management to conserve and protect these species as a natural resource. This act also emphasizes coordination with state agencies and outlines annual reporting requirements. This act was reviewed in the development of this EA for impacts to state-listed endangered and threatened species (including species of special concern).

Endangered Species Protection Act

The Endangered Species Protection Act (FS § 372.0725) prohibits the intentional wounding or killing of any fish or wildlife species designated by the FWC as endangered, threatened, or of special concern. This prohibition also extends to the intentional destruction of the nests or eggs of any such species. This act was reviewed in the development of this EA for impacts to state-listed endangered and threatened species (including species of special concern).

Preservation of Native Flora of Florida Act

The protection of endangered, threatened, or commercially exploited plants is addressed in the *Preservation of Native Flora of Florida Act* (FS § 581.185). Commercially exploited plants are defined as species native to the state which are subject to being removed in substantial numbers from native habitats in the state and sold or transported for sale. This act sets the policy for the state of Florida relating to these species and includes several prohibitions covering the “willful destroying or harvesting” of such plants. It also contains an exemption for agricultural and silviculture uses. Since hunting management could have an impact on native flora in the Preserve, this act was reviewed in the development of this EA.

Florida Coastal Management Act (1978)

The Florida Coastal Management Act authorized the development of the Florida Coastal Management Program. This program, approved in 1981, is charged with overseeing the state’s coastal management program and administers the Coastal Zone Management Act within the state of Florida. This act applies to a small portion of the Preserve located along the coast of southwestern Florida.

Florida Fish and Wildlife Conservation Commission Executive Order 09-08

In 2009, FWC EO 09-08 was approved, which created the Partner with Hunters program to assist in the control of reptiles of concern, particularly the Burmese python, within the Preserve/WMA. The Partner with Hunters Program allows hunters to take reptiles of concern within the Preserve, in accordance with regulations outlined in the EO.

Florida Fish and Wildlife Conservation Commission Executive Order 10-37

Florida Fish and Wildlife Conservation Commission EO 10-37 places restrictions on

deer hunting in the Stairsteps Unit, which are currently in place. Currently, in Zone 3 of the Stairsteps Unit, the bag limit for deer is one annually; hunting deer in Zone 4 of the Stairsteps Unit is prohibited.

RELATIONSHIP TO OTHER PLANS, POLICIES, AND ACTIONS

National Park Service Plans, Policies, and Actions

National Park Service plans, policies, and actions beyond those listed previously that may influence the *Hunting Management Plan* are provided below.

General Management Plan / Environmental Impact Statement

(1991). The GMP completed in 1991 for the original Preserve was mandated by the National Parks and Recreation Act (1978). This document guides visitor use, natural and cultural resource management, and general development for a period of 10 to 15 years. It provides a clearly defined direction for resource management and preservation as well as appropriate visitor use and interpretation of the resources within the original Preserve boundaries. This document also articulated the need to manage hunting within the Preserve.

Addition Final General Management Plan / Wilderness Study / Off-Road Vehicle Management Plan / Environmental Impact Statement

(2010). The purpose of the Addition GMP, completed in 2010, is “to provide a comprehensive direction for resource preservation and visitor use and a basic foundation for decision-making for the Addition for the next 15 to 20 years” (NPS 2010a). The Addition GMP outlines diverse frontcountry and backcountry recreational opportunities, enhanced day use and interpretive opportunities along road corridors, and enhanced recreational opportunities with new facilities and services. A substantial amount of ORV access and riding opportunities and a moderate amount of

proposed wilderness are also proposed in this document. This document also articulated the need for an independent plan to manage hunting within the Preserve.

Superintendent's Compendium. This document outlines specific regulatory provisions established for the proper management and protection of resources and the public use of the Preserve. Regulations outlined in the *Superintendent's Compendium* include those pertaining to closures and public use limits; permits; preservation of natural, cultural, and archeological resources; wildlife protection; and recreational uses and limitations.

Cooperative Partnership Agreement Between the National Park Service and the Florida Fish and Wildlife Conservation Commission (2010). This agreement was established between the NPS and the FWC in regards to managing the Preserve in order to:

... focus the resources, expertise, skills, and abilities of the FWC and the NPS toward achieving the proper management of the lands and waters involved, the proper management of fish and wildlife resources, and the maximum public benefit from these endeavors.

This agreement states:

NPS and FWC will offer reasonable access as provided for in Public Law 93-440 and Public Law 100-301, allowing the public to engage in authorized traditional uses in the Preserve and the Addition such as hunting, fishing, camping and other wildlife-oriented recreational activities, which can be compatible with fish and wildlife conservation and are integral to fulfilling the mandate and intent of said public laws, without compromising the integrity of Preserve natural and cultural resources.

See appendix B for the full text of the *Cooperative Partnership Agreement Between the NPS and the FWC*.

Final Environmental Impact Statement and South Florida and Caribbean Parks Exotic Plant Management Plan (2010).

This plan outlines the management of nonnative plants in nine South Florida and Caribbean parks, including the Preserve. The plan promotes restoration of native plant communities and habitat conditions in ecosystems that have been invaded by nonnative plants and protects resources, values, visitors, staff, and area residents from adverse effects resulting from nonnative plant presence and control activities. The plan takes a collaborative approach to managing nonnative plants across the nine parks, improving effectiveness and efficiency and providing a consistent management framework for responding to this threat. The plan also seeks to establish plant and treatment location priorities, reduce new nonnative plant introductions, and reduce the number of individually targeted plants to protect natural resources (NPS 2010b).

I-75 Recreational Access Plan / Environmental Assessment (1991). The Addition Act directed the NPS to cooperate with the state to develop three recreation access points along I-75 within the Preserve, including the Addition. Many of the requirements and recommendations included in this access plan are incorporated in the 1991 GMP. The development of recreational access points along I-75 was also included as a component of the Addition GMP.

Land Protection Plan (1988). This plan was written in response to the May 1982 policy statement in the Federal Register regarding use of the federal portion of the Land and Water Conservation Fund. The monies were to be used to identify land and/or interests in land to be in federal ownership to achieve management purposes that include resource protection and public access in a cooperative, cost-effective manner. The plan identifies methods for protecting the Preserve's resources while taking into consideration public access and visitor experiences. Such resources include natural, historic, scenic, cultural, and recreational resources among others. Due to severance of subsurface oil and

gas rights from the surface estate, oil and gas activities are not identified within the plan. The plan delineates the Preserve into zones and subzones for management purposes and outlines the acceptable activities on “improved property.”

Long-Range Interpretive Plan (2002).

This plan provides the vision for visitor experiences in the Preserve based on the purpose, significance, and mission put forth in the “Preserve’s Strategic Plan.” The *Interpretive Plan* proposes both development and management activities to satisfy current visitor demands and identifies a media and activity action plan to meet future visitor needs. The interpretive plan was meant to guide the Preserve’s interpretation direction for 10 years (NPS 2002a).

Recreational Off-road Vehicle Management Plan / Environmental Impact Statement (2000). This plan is called for and directed by the 1991 GMP. It was also prepared to comply with the 1995 settlement agreement negotiated between the Florida Biodiversity Project and several agencies and bureaus. ORV use is allowed in the original Preserve by the enabling legislation in a manner that is compatible with resource preservation. The ORV plan outlines the management of recreational ORV use in the original 582,000 acres of the Preserve. It specifies that ORV travel is facilitated by a system of designated access points and trails; that sensitive areas be closed; that temporal and seasonal closures be instituted; and that permits and education be required to operate off-road vehicles in the original Preserve.

Resource Management Plan (n.d.). The original Preserve was established “to assure the preservation, conservation and protection of the natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress Watershed.” The boundary of the Preserve was expanded in 1988 to include about 147,000 acres of adjacent tracts. This plan includes initial planning and resource inventorying for the Addition. Resource conditions in the Preserve vary from nearly pristine to areas where natural function no

longer exists. The plan outlines issues within the Preserve, including natural resources, cultural resources, nonnative plants and wildlife, and the hydrologic environment. The plan emphasizes that conservation, restoration, and preservation must take place on an ecosystem scale.

Other Federal Plans, Policies, and Actions

Comprehensive Everglades Restoration Plan (CERP) (2000). This plan is a framework and guide to restore, protect, and preserve the water resources of central and southern Florida, including the Preserve. The plan was approved in the Water Resources Development Act (2000), and it is a component of the world’s largest ecosystem restoration effort, encompassing 16 counties and an 18,000-square-mile area. The comprehensive plan includes more than 60 elements designed to capture, store, and redistribute fresh water. Implementation of the comprehensive plan is expected take more than 30 years to complete and would improve the quality, quantity, timing, and distribution of water flows through the Preserve.

CERP Master Recreation Plan (2004). The *CERP Master Recreation Plan* takes “a system-wide approach to identify, evaluate, and address the impacts of CERP implementation on existing recreational use within the South Florida Ecosystem and identify and evaluate potential new recreation, public use and public educational opportunities. A particular focus will be on the identification of additional public use and recreational opportunities to compensate for public use facilities that may be lost” [U.S. Army Corps of Engineers (USACE), South Florida Water Management District (SFWMD), et al. 2004].

Florida Panther National Wildlife Refuge Comprehensive Conservation Plan (1998). The National Wildlife Refuge System Improvement Act of 1997 requires the USFWS to develop comprehensive conservation plans for all lands and waters of

the National Wildlife Refuge System. The *Florida Panther National Wildlife Refuge Comprehensive Conservation Plan* meets the requirements of the act. The refuge was established to conserve fish, wildlife, and plants listed as endangered and/or threatened species under the Endangered Species Act of 1973, specifically the Florida panther. The Refuge abuts the northwest boundary of the Preserve and functions as a vital habitat linkage for panthers.

Interagency Florida Panther Response Plan (2008). The USFWS, in partnership with the NPS and the FWC, prepared a final response plan in October 2008 that includes guidelines for the agencies responding to human-panther interactions and depredations. The plan also provides guidelines for developing an outreach and education program to help people understand panther behavior and actions humans should take when living or recreating in panther habitat.

Florida Panther Recovery Plan (2008). This recovery plan includes specific recovery objectives and criteria to be met in order to reclassify (downlist) and eventually delist the Florida panther under the Endangered Species Act. The plan also includes provisions that contemplate reintroduction of panthers in locations across the Southeast. Last updated in 2008, this is the third update of the plan since 1981 when the first plan was crafted. The revised plan supersedes the panther chapter in the Service's Multi-Species Recovery Plan as well as its range-wide species recovery plan for the panther.

South Florida Multi-Species Recovery Plan (1999). This plan was written to recover multiple species by restoring ecological communities throughout the South Florida ecosystem (26,002 square miles). There are more than 600 species considered either rare or imperiled in South Florida, 68 of which are federally listed as threatened or endangered. A number of limiting factors for habitat-limited species are outlined, including habitat loss, fragmentation, and degradation as a result of urbanization, agriculture or other land-use conversions, wetland drainage and alteration

of hydrological patterns, invasion of nonnative species, fire suppression, soil subsidence, degradation of water quality, and increased levels of contaminants. Recovery objectives are identified at the species level, while recovery criteria are identified at the species and community level. Recovery actions have been developed to provide consistency between each of the 68 species, and habitat level recovery actions have been developed to facilitate the integration of individual species needs at the community level. The plan does not replace existing approved species recovery plans, but rather outlines South Florida's contribution to range-wide recovery. A number of threatened and endangered species reside within the Preserve, and the Preserve is a critical habitat link in the ecosystem.

Other State and Local Plans, Policies, and Actions

Conceptual Management Plan for the Everglades Complex of Wildlife Management Areas (2002). The Everglades Complex is part of the Kissimmee-Okeechobee-Everglades basin and lies within three counties — southwestern Palm Beach, western Broward, and northwestern Miami-Dade. It includes three management areas — Holey Land, Rotenberger, and Everglades-Francis S. Taylor. Through a cooperative management agreement with the South Florida Water Management District, the FWC has management authority over Everglades Complex WMA lands (mainly lands in Water Conservation Areas 2 and 3) for game and fresh water fish preservation, protection, propagation, and recreational use. The plan lists 28 state and federally listed and endangered or threatened species and their habitat. The majority of the complex is east and northeast of the Preserve; however, the southwest corner of Everglades-Francis S. Taylor WMA abuts the eastern boundary of the Preserve from the Tamiami Ranger Station north to the Broward County line.

Growth Management Plan. This plan was required under the 1985 Florida Growth Management Act and is to be consistent with state and regional plans. The elements of this plan provide the framework to effectively guide future development, while providing for the protection of open space; natural resources; and public health, safety, and welfare. Development in Collier County directly impacts natural resources in the Preserve. Therefore, managed growth policies outlined in this plan are necessary to reduce negative impacts of development and ensure that the Preserve is protected for future generations.

State Comprehensive Outdoor Recreation Plan – Outdoor Recreation in Florida (2000). This plan assesses recreational supply, demand, and needs for 11 regions in the state. Region 9 (Southwest Florida) includes the Preserve and the surrounding area. The plan identifies goals for recreational opportunities and facilities, including hiking, bicycling, horseback riding, camping, fishing, and ORV use.

ISSUES AND IMPACT TOPICS

ISSUES

Director's Order 12 defines an "issue" as a concern or obstacle to achieving a park goal (NPS 2011a). In NEPA, an issue is any possible barrier to achieving the main goal of NEPA, to minimize effects of proposals on the human environment. Project issues may be any problem that could arise due to implementation of the no-action alternative or an action alternative. The following issues were identified for this project and will be addressed as part of this EA:

- Opening hunting in the Addition could cause adverse environmental impacts on an area that contains unique natural resources that are protected by the NPS.
- Some members of the public believe that the Addition should be opened to hunting to allow opportunities for passing on hunting to younger generations, while others believe that hunting should not be allowed in the Addition in order to preserve the area for future generations.
- The deer population in the Preserve could be adversely impacted by allowing hunting in the Addition or changing the current hunting protocol within the original Preserve, which could adversely impact the Florida panther population in the Preserve since the deer are a main food source for the Florida panther.
- Allowing hunting in the Addition could create a perceived safety conflict for those visitors that wish to experience the Preserve's resources in the absence of hunting activities.
- Allowing hunting in the Addition could adversely impact the visitor experience of nonhunting visitors in the Addition.

ISSUES NOT ADDRESSED AS PART OF THIS PLAN

The scope of the alternatives considered in this EA is limited to recreational terrestrial hunting activities in the Preserve and the impacts associated with those activities. Direct impacts of the following issues are not addressed as part of this plan:

- fishing
- trapping
- frogging
- off-road vehicles

However, the cumulative impacts of these issues may be discussed in "Chapter 4: Environmental Consequences."

Additionally, it is important to note that the scope of this plan is limited to recreational hunting activities, and traditional uses in the Preserve by traditionally associated peoples are not addressed as part of this plan. The enabling legislation (PL 93-440, as amended by PL 100-301) states:

... members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the preserve and the Addition, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonies.

This *Hunting Management Plan* would not have any impacts on such customary use and occupancy, and hunting, fishing, and trapping on a subsistence basis by traditionally associated peoples would continue to be permitted, subject to existing laws and regulations.

IMPACT TOPICS SELECTED FOR ANALYSIS

The following impact topics are resources of concern that would be beneficially or adversely affected by the actions proposed under each alternative and are analyzed in this EA to ensure that the alternatives are evaluated and compared based on the most relevant topics. A brief rationale for the selection of each impact topic is given.

Natural Resources

Vegetation and Habitat. The NPS Organic Act and the NPS *Management Policies* (2006) direct national park system units to provide for the protection of Preserve resources. The NPS *Management Policies* (2006) states that “the [NPS] would not attempt to solely preserve individual species (except threatened or endangered species) or individual natural processes; rather, it would try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems. Just as all components of a natural system would be recognized as important, natural change would also be recognized as an integral part of the functioning of natural systems” (NPS 2006a).

As stated in the Addition GMP (2010), and consistent with the 1991 GMP for the original Preserve boundaries, five major vegetation communities can be found in the Preserve: (1) cypress strands and domes, mixed-hardwood swamps, and sloughs, (2) prairies and marshes, (3) mangrove forests, (4) pinelands, and (5) hardwood hammocks. Disturbed areas can also be found throughout the Preserve and are intermixed within all of these vegetation communities. Numerous protected plant species can be found within these vegetative communities, as well as serving as habitat for the protected animal species found in the Preserve.

Actions associated with hunting activities and the proposed alternatives could have impacts

on the vegetation and habitat present in the Preserve. Therefore, this impact topic is analyzed in detail in this EA.

Rare, Threatened, and Endangered Species. Rare, threatened, and endangered species in the Preserve are governed by several laws and policies, primarily the NPS Organic Act and the Endangered Species Act. The purpose of the Endangered Species Act is to conserve “the ecosystem upon which endangered and threatened species depend” and to conserve and recover listed species. This act mandates that all federal agencies protect listed species and preserve their habitats. NPS *Management Policies* (2006) also provides specific guidance for management of threatened or endangered plants and animals. These policies dictate that the NPS would survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. Additionally, in the state of Florida, laws protecting rare, threatened, and endangered species include the Florida Endangered and Threatened Species Act, the Endangered Species Protection Act, and the Preservation of Native Flora of Florida Act.

A total of 31 animal species that could occur in the Preserve receive some level of special protection or are recognized as rare species by the state of Florida or the federal government. Nine of these 31 species are listed as either federally endangered or threatened and reside in the Preserve. The federally listed species present in the Preserve are the Florida panther (*Puma concolor coryi*) (endangered), West Indian manatee (*Trichechus manatus*) (endangered), Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) (endangered), Everglade snail kite (*Rostrhamus sociabilis plumbeus*) (endangered), red-cockaded woodpecker (*Picoides borealis*) (endangered), wood stork (*Mycteria americana*) (endangered), American crocodile (*Crocodylus acutus*) (threatened), eastern indigo snake (*Drymarchon corais couperi*) (threatened), and American alligator (*Alligator mississippiensis*) (threatened due to similarity

of appearance). Additionally, critical habitat has been designated for the West Indian manatee in the Preserve.

Actions associated with hunting activities and the proposed alternatives could have impacts on the terrestrial and avian listed-species present in the Preserve. Therefore, this impact topic is analyzed in detail in this EA.

Wildlife. As stated in the Addition GMP, the Preserve contains 13 major game species. Of these, the white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo osceola*), and feral hog (*Sus scrofa*) require special management considerations because of their importance to recreational hunters. White-tailed deer and feral hogs are also main prey species for the endangered Florida panther, while turkeys are taken by panthers on occasion.

Actions associated with hunting activities and the proposed alternatives could have impacts on unprotected game species present in the Preserve. Therefore, this impact topic is analyzed in detail in this EA.

Nonnative / Invasive Species. The native plant communities that exist in the Preserve are considered an important resource. Nonnative/invasive plant species impact native species by outcompeting them – they aggressively take over disturbed habitats, expand their distribution and displace native species, use more water, and impact wildlife that depend on native plant communities and functional ecosystems. Nonnative/invasive plants can be distributed by recreational use and other activities, including hunting.

Hunting activities associated with the proposed alternatives could impact the native plant communities by potentially allowing the spread of nonnative/invasive species. Elements of the proposed alternatives could also have beneficial effects on the spread of nonnative/invasive species by helping to control the spread of certain nonnative/invasive plant and animal species. Therefore, this impact topic is analyzed in detail in this EA.

Wilderness Resources

Wilderness. Wilderness in national park system units is governed by the Wilderness Act and NPS *Management Policies* (2006). NPS *Management Policies* (2006) requires that wilderness considerations be integrated into all planning documents to guide the preservation, management, and use of the Preserve's wilderness area and ensure that wilderness is unimpaired for future use and enjoyment as such.

Summarizing the Wilderness Act (1964), wilderness resources and values are generally present if an area is untrammeled, undeveloped, natural, and has outstanding opportunities for solitude or primitive and unconfined types of recreation. There is currently no designated wilderness in the Preserve. However, per the Addition GMP (2010), about 47,067 acres of land would be proposed for wilderness designation in the Addition. Lands identified as being suitable for wilderness designation, wilderness study areas, proposed wilderness, and recommended wilderness (including potential wilderness) must also be managed to preserve their wilderness character and values in the same manner as "designated wilderness" until Congress has acted on the recommendations (NPS 2011a).

Actions associated with hunting activities and the proposed alternatives could have impacts on the areas proposed for wilderness in the Addition. Therefore, this impact topic is analyzed in detail in this EA.

Visitor Use

Recreational Opportunities / Visitor Use and Experience. NPS *Management Policies* (2006) addresses "enjoyment of park resources and values by the people of the United States" as "part of the fundamental purpose of all parks." The NPS is committed to "providing appropriate, high-quality opportunities for visitors to enjoy the parks," by maintaining "an atmosphere that is open, inviting, and accessible" (NPS 2006a).

The primary recreational activities within the original Preserve boundaries include frontcountry driving, sightseeing, and visitor centers; walking and hiking; bird-watching and wildlife viewing; paddling; motorboating; camping; bicycling; ORV riding; hunting, fishing, and frogging; and opportunities to experience peace and quiet in a natural environment (NPS 2010a). Within the Addition, current recreational opportunities are limited to walking and hiking, bird-watching and wildlife viewing, paddling, limited bicycling and motorboating, camping, and opportunities to experience peace and quiet in a natural environment; however, per the preferred alternative in the Addition GMP, all of the above activities that are currently permitted within the original Preserve boundaries have been proposed for the Addition (NPS 2010a).

Both hunting and nonhunting recreational activities in the Preserve could be impacted by the proposed alternatives. Additionally, the visitor experience of both hunting and nonhunting visitors could be impacted by hunting activities associated with the proposed alternatives. Therefore, this impact topic is analyzed in detail in this EA. Opportunities to experience peace and quiet in a natural environment will also be analyzed as part of the Noise/Soundscapes impact topic.

Noise / Soundscapes. In accordance with NPS *Management Policies* (2006) and Director's Order 47: *Sound Preservation and Noise Management* (NPS 2000c), an important part of the NPS mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in the Preserve, together with the physical capacity for transmitting natural sounds. As stated in Director's Order 47, natural sounds are intrinsic elements of the environment. They are inherent components of the "scenery and the natural and historic objects and the wildlife" protected by the NPS Organic Act. Natural sounds occur within and beyond the range of sounds that humans can

perceive and can be transmitted through air, water, or solid materials.

Intrusive sounds are of concern to the NPS because they can impede the NPS's ability to accomplish its mission. By definition, noise is human-caused sound that is considered unpleasant and unwanted. Whether a sound is considered unpleasant depends on the individual who hears the sound and the setting and circumstance under which the sound is heard. However, natural sounds throughout the Preserve – including flowing water, animals, and rustling leaves – are not considered noise.

Actions associated with hunting activities and the proposed alternatives, including the sound of firearm shots, could have impacts on the soundscape within the Preserve in the form of impacts to wildlife and nonhunting visitor use. Therefore, this impact topic is analyzed in detail in this EA.

Public Health and Safety. NPS

Management Policies (2006) states that the NPS "will not intervene in natural biological or physical processes, except: when directed by Congress; in emergencies in which human life and property are at stake; to restore natural ecosystem functioning that has been disrupted by past or ongoing human activities; or when a park plan has identified the intervention as necessary to protect other park resources, human health and safety, or facilities."

Hunting, similar to many other recreational activities, involves some potential safety risks. While the associated risks are primarily limited to those engaging in the activity and standard safety clothing and procedures are required to mitigate risks, there is also a potential for safety risks to nonhunting visitors at the Preserve.

Actions associated with hunting activities and the proposed alternatives could have impacts on the health and safety of both hunting and nonhunting visitors to the Preserve. Therefore, this impact topic is analyzed in detail in this EA.

NPS Management and Operations

Preserve Management and Operations.

Direction for management and operations at the Preserve is set forth in the Preserve's enabling legislation, *NPS Management Policies* (2006), the *Superintendent's Compendium*, and the two GMPs completed for the Preserve (the 1991 GMP for the original Preserve and the 2010 GMP for the Addition). Preserve management and operations refers to the current staff available to adequately protect and preserve resources and provide for an effective visitor experience, including education and interpretation, maintenance, and enforcement activities. This topic also includes the operating budget necessary to conduct Preserve operations.

All of the proposed alternatives could cause impacts to Preserve management and operations, especially in regards to enforcement activities. Therefore, this impact topic is analyzed in detail in this EA.

Socioeconomic Environment

Socioeconomics. Actions at the Preserve have the potential to affect local businesses and the local economy. As stated in the Addition GMP, Collier County is the primary geographic unit for analysis of the socioeconomic impacts in regards to the Preserve. However, actions at the Preserve also have the potential to cause socioeconomic impacts in Broward, Lee, Palm Beach, Hendry, Miami-Dade, and Monroe counties. Additionally, when data permit, socioeconomic impacts can also be analyzed for Everglades City, the Big Cypress Seminole Indian Reservation, and the Miccosukee Indian Reservation (NPS 2010a).

Since actions at the Preserve have the potential to affect the local economy, actions associated with allowance or prohibition of hunting activities in the Preserve as well as actions associated with regulating hunting activities in the Preserve could have socioeconomic impacts on surrounding areas, specifically

Collier County. Therefore, this impact topic is analyzed in detail in this EA.

IMPACTS TOPICS DISMISSED FROM FURTHER ANALYSIS

Several potential impact topics were dismissed because they would not be affected, or the potential for impacts under all of the alternatives would be negligible. These topics are listed below, with an explanation of why they were dismissed from further analysis.

Natural Resources

Air Quality. The legal authority for federal programs regarding air pollution control is based on the 1990 Clean Air Act Amendments. These are the latest in a series of amendments made to the Clean Air Act. This legislation modified and extended federal legal authority provided by the earlier Clean Air Acts of 1963 and 1970. The Air Pollution Control Act of 1955 was the first federal legislation involving air pollution. This act provided funds for federal research in air pollution. The Clean Air Act of 1963 was the first federal legislation regarding air pollution control. In 1967, the Air Quality Act was enacted in order to expand federal government activities. The Air Quality Act of 1967 also authorized expanded studies of air pollutant emission inventories, ambient monitoring techniques, and control techniques (U.S. Environmental Protection Agency 2008). The Preserve has been designated a Class II area under the Clean Air Act. The Preserve is currently within a designated attainment area (i.e., concentrations are below standards) for criteria pollutants.

Upon review of these laws and the proposed alternatives associated with this EA, the contribution of pollutants resulting from implementation any of the alternatives would be negligible compared to current levels. Exhaust emissions could be produced by an increase in visitor use and subsequent vehicle use in the Preserve; however, these activities would not be expected to cause national ambient air quality standards to be exceeded

because visitation increases would be relatively minor. Any amount of pollutants added because of the actions proposed in the alternatives would be negligible compared to existing levels. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Geologic Resources. The geological resources (soils) in the Preserve are important to maintaining the ecological integrity of the Preserve. However, none of the alternatives being considered would alter the geologic features or processes within the Preserve. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Estuarine and Fisheries Resources. The Magnuson-Stevens Fishery Conservation and Management Act, as amended, is the primary law governing fisheries management in the Preserve. The Preserve contains important estuarine and fisheries resources. Recreational fishing in the Preserve is currently regulated by the FWC; no commercial fishing is allowed in the Preserve. This plan only addresses hunting management in regards to terrestrial areas of the Preserve (including terrestrial wildlife) and does not address estuarine or fisheries resources. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Water Quality or Quantity. National Park Service policies require protection of water resources in a manner consistent with the Clean Water Act. Both water quantity and water quality are important issues at Big Cypress National Preserve. None of the alternatives being considered would alter the Preserve's water quality or quantity. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Wetlands. The Preserve's wetlands are protected under the NPS Organic Act, NPS *Management Policies* (2006), EO 11990 ("Protection of Wetlands"), and Director's Order 77-1: *Wetland Protection* (NPS 2002b).

Upon review of these laws and policies and the proposed alternatives associated with this EA,

none of the alternatives would alter the Preserve's wetlands. Although terrestrial wildlife considered in this plan utilize wetland habitats in the Preserve, specific impacts to wetlands from hunting activities are not expected. In all of the alternatives, the NPS would continue to protect and conserve the Preserve's wetlands as required under the NPS Organic Act, NPS *Management Policies*, EO 11990, and Director's Order 77-1 (NPS 2002b). General impacts to vegetation and wildlife habitat that would occur across all habitat types will be analyzed in detail as part of the Vegetation and Habitat impact topic. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Floodplains. The Preserve's floodplains are protected under the NPS Organic Act, NPS *Management Policies* (2006), EO 11988 ("Floodplain Management"), and Director's Order 77-2: *Floodplain Management* (NPS 2003b).

Upon review of these laws and policies and the proposed alternatives associated with this EA, none of the alternatives would alter the Preserve's floodplains and impacts to floodplains from hunting activities are not expected. In all of the alternatives, the NPS would continue to protect and conserve the Preserve's floodplains as required under the NPS Organic Act, NPS *Management Policies*, EO Order 11988, and Director's Order 77-2 (NPS 2003b). Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Night Sky / Lightscapes. Since lighting is not a component of any of the proposed alternatives, no impacts to night sky would occur. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Prime or Unique Farmlands. The Farmland Protection Policy Act (7 USC 4201 et seq.) and the U.S. Department of the Interior Environmental Statement Memorandum ESM94-7 – Prime and Unique Agricultural Lands require an evaluation of impacts on prime or unique agricultural lands. Prime

farmland is soil that produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts.

No prime or unique farmlands exist in the Preserve according to the U.S. Department of Agriculture Natural Resources Conservation Service. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Cultural / Archeological Resources

Cultural Resources (Archeological Resources, Prehistoric/Historic Structures, and Cultural Landscapes).

Several laws govern cultural resources in the Preserve. Section 106 of the National Historic Preservation Act (1966) requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register of Historic Places. The Antiquities Act (1906) protects all historic and prehistoric sites on federal lands and prohibits excavation or destruction of such antiquities unless a permit is obtained. The Archeological Resources Protection Act (1979) protects prehistoric, historic, or archeological data. The Native American Graves Protection and Repatriation Act (1990) assigns ownership and control of Native American cultural items, human remains, and associated funerary objects to Native Americans; it also establishes requirements for the treatment of Native American human remains and sacred or cultural objects found on federal land. The American Indian Religious Freedom Act (1978) affirms the right of Native Americans to have access to their sacred places. The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995) provides additional standards for preservation of historic properties.

Upon review of the above laws, since no ground disturbing activities are proposed as part of this *Hunting Management Plan*, no impacts are expected to occur to archeological

resources, historic structures, or cultural landscapes within the Preserve.

On August 5, 2011, a letter was sent to the SHPO, which provided information about the development of a hunting management plan for the Preserve and the opportunity to comment on the project. The State Historic Preservation Officer responded by letter on September 14, 2011, and stated that the scoping notice for the project was reviewed for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places. The review was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended and 36 CFR Part 800: Protection of Historic Properties. The SHPO letter concluded the following regarding the *Hunting Management Plan*:

“Based on the information provided, it is the opinion of this office that the above-referenced undertaking will have no effect on historic properties.”

Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Ethnographic Resources. As defined by the NPS *Management Policies* (2006), ethnographic resources are the cultural and natural features of the Preserve that are of traditional significance to traditionally associated peoples. These peoples are the contemporary Preserve neighbors and ethnic or occupational communities that have been associated with the Preserve for two or more generations (40 years), and whose interests in the Preserve's resources began before the Preserve's establishment.

Regarding traditional uses in the Preserve by traditionally associated peoples, the enabling legislation (PL 93-440, as amended by PL 100-301) states:

... members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use

and occupancy of Federal or federally acquired lands and waters within the preserve and the Addition, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonies.

The scope of this plan is limited to recreational hunting activities, and traditional uses in the Preserve by traditionally associated peoples are not addressed as part of this plan. This *Hunting Management Plan* would not have any impacts on such customary use and occupancy, and hunting, fishing, and trapping on a subsistence basis by traditionally associated peoples would continue to be permitted, subject to existing laws and regulations.

On August 5, 2011, letters were sent to representatives of the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma, which provided information about the development of a hunting management plan for the Preserve and the opportunity to comment on the project. A member of the Seminole Tribe of Florida commented on the proposed *Hunting Management Plan*, but no official correspondence was received. No correspondence was received from the Miccosukee Tribe of Indians of Florida or the Seminole Nation of Oklahoma. Copies of the Draft EA will be provided to each of the tribes for review and comment. If issues or concerns are raised by the tribes during their review of the Draft EA, NPS would conduct appropriate consultation to resolve any such issues or concerns before completing the Final EA or decision document.

Upon review of the NPS *Management Policies* (2006), the enabling legislation for the Preserve, and the above information, it has been determined that none of the alternatives are expected to affect ethnographic resources within the Preserve. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Museum Collections. Museum collections are prehistoric and historic objects, artifacts, works of art, archival material, and natural history specimens. Implementation of the any of the alternatives would have no effect on how the Preserve's museum collections are acquired, accessioned and cataloged, preserved, protected, and made available for access and use. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Socioeconomic Environment

Environmental Justice. Any proposed federal project must comply with the provisions of Title VI of the Civil Rights Act (1964), as amended by Title VIII of the Civil Rights Act (1968). Title VI of the 1964 Civil Rights Act provides that no person will, on the grounds of race, color, religion, sex, national origin, marital status, disability, or family composition be excluded from participation in, be denied the benefits of, or be otherwise subject to discrimination under any program of the federal, state, or local government. Title VIII of the 1968 Civil Rights Act guarantees each person equal opportunity in housing. Additionally, EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Upon review of these laws and the proposed alternatives associated with this EA, no person will be excluded from or discriminated against in any of the proposed alternatives considered in this EA. Additionally, minority or low-income populations would be treated the same way under all of the alternatives considered in this plan; none of the alternatives being considered would have a disproportionately high and adverse effect on any minority or low-income population or community. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Climate Change

Climate Change. Executive Order 13514, “Federal Leadership in Environmental, Energy, and Economic Performance” and U.S. Department of the Interior Secretarial Order 3285 both provide guidance on how federal agencies should address greenhouse gas emissions and climate change. The NPS has also issued draft interim guidance for considering climate change in NPS NEPA analyses.

NPS *Management Policies 2006* states that “Parks containing significant natural resources will gather and maintain baseline climatological data for reference.” *Management Policies* also state that “The Service will use all available authorities to protect park resources and values from potentially harmful activities...NPS managers must always seek ways to avoid, or minimize to the greatest degree possible, adverse impacts on park resources and values” (NPS 2006a).

The 2001 report of the United Nations sponsored Intergovernmental Panel on Climate Change projected a sea level rise over the coming century of one to three feet (median sea level rise of two feet) (Miami-Dade 2008). The 2007 Intergovernmental Panel on Climate Change report projected a somewhat lower sea level rise than the 2001 Intergovernmental Panel on Climate Change report, but it did not incorporate the substantially accelerated melting being observed in the Greenland Ice Sheet (Miami-Dade 2008). The *Second Report and Initial Recommendations* published by the Miami-Dade Climate Change Advisory Task Force states that global warming would result in many changes to the natural environment, “including changing atmospheric circulation and temperature patterns, changes in rainfall and severe weather, changes in biologic community distribution, increased extinction rates, changes in disease and pest distribution, and changes in sea level” (Miami-Dade 2008). While all these environmental impacts would affect South Florida within the next century, the key concern would be rising sea level,

“with a very high likelihood” that the sea level would rise an additional 1.5 feet in the next 50 years and a cumulative total of three to five feet within a century (Miami-Dade 2008).

Upon review of these laws and regulations and the information available regarding climate change and sea level rise estimates for South Florida, none of the actions associated with the proposed alternatives are anticipated to have an effect on climate change or sea level rise. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Land Use

Land Use. No land use plans (outside the Preserve boundaries) would be affected by actions proposed under any of the alternatives. In addition, hunting activities as described under any of the alternatives would not induce any changes in land use or increase pressure for development within or adjacent to the Preserve. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Other Agency or Tribal Land Use Plans or Policies. The actions included in this EA and considered under each of the proposed alternatives are compatible and not in conflict with local land use plans. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.

Energy Resources

Energy Resources. None of the alternatives being considered would result in the extraction of energy resources from the Preserve and none of the alternatives would result in a measurable change in energy consumption compared to current conditions. Additionally, none of the alternatives would affect ongoing oil and gas operations in the Preserve. Therefore, this impact topic is not analyzed in detail as a separate topic in this EA.



CHAPTER 2: ALTERNATIVES

PROJECT ALTERNATIVES

National Environmental Policy Act implementing regulations provide guidance on the consideration of alternatives in an EA. These regulations require the decision-maker (the NPS) to consider the environmental effects of the proposed action and a range of alternatives, including “no action” (40 CFR § 1502.14). The range of alternatives includes reasonable alternatives that must be rigorously and objectively explored, as well as other alternatives that are eliminated from detailed study. To be “reasonable,” an alternative must meet the stated purpose of and need for the project. Project alternatives may originate from the proponent agency, coordinating or cooperating agencies, other agencies, or members of the public, at public meetings, or during the early stages of project development. The alternatives analyzed in this document, in accordance with NEPA, are the result of internal scoping and public scoping for the project (see Chapter 5 – Consultation and Coordination for details of the internal and public scoping conducted for this project).

ELEMENTS COMMON TO ALL ALTERNATIVES

Two primary elements would be applied to all of the alternatives, regardless of which alternative is selected for implementation:

- The NPS is the lead agency for hunting management within the Big Cypress National Preserve. Consultation and coordination with other agencies would occur as outlined under each of the proposed alternatives.
- This *Hunting Management Plan* and the selected alternative would become effective upon signing of the decision document associated with the EA. The *Hunting Management Plan* and selected alternative would remain in effect for a period that mirrors the approved Addition GMP, which is 15 to 20 years.

ALTERNATIVE 1 – NO ACTION – APPLY CURRENT MANAGEMENT TO THE ADDITION

In Director’s Order 12, the NPS defines the no-action alternative as that which “would continue present management actions.” The original Preserve GMP (completed in 1992) and the Addition GMP (completed in 2010) form the basis for management actions taken by the NPS in the original Preserve and in the Addition, respectively. These two GMP documents dictate that hunting would be permitted throughout the entire Preserve. The Addition GMP further states that a hunting management plan would be required to implement hunting in the Addition. Therefore, in accordance with Director’s Order 12, the no-action alternative for this EA was defined as continuation of the current management guidance provided by the two GMP documents – hunting would be permitted throughout the Preserve and managed cooperatively by the NPS and FWC using the guidelines outlined in the *NPS/FWC Cooperative Partnership Agreement* (see appendix B).

It is important to note that public hunting is not currently feasible in the Addition. The Addition GMP, which guides management actions in the Addition, was completed in October 2010. The ROD for this document was signed in February 2011. The NPS staff at the Preserve have been in the process of coordinating access options to allow hunting in the Addition since the time that the ROD for the Addition was signed in February 2011; however, this process is still ongoing. Under the no-action alternative, hunting would be permitted as soon as feasible access options are established that allow the public to safely access the Addition for hunting purposes.

Under alternative 1 (no action), management of hunting in the entire Preserve would occur in accordance with the *NPS/FWC Cooperative Partnership Agreement* (see appendix B). The most recent *NPS/FWC Cooperative Partnership Agreement* was signed on December 1, 2010, by the NPS (represented by the Superintendent of the Preserve) and the

FWC (represented by the Executive Director of the FWC). While all 25 conditions of the agreement would apply to the entire Preserve under this alternative, the following key conditions would serve as the framework for hunting management in the Preserve:

Time Frame

Condition 23: *The Superintendent and the Executive Director or their designees will meet at least annually to insure that the provisions of the cooperative partnership established under this Agreement are being fully implemented and to identify any measures necessary to improve this cooperative partnership.*

Modifications

Condition 24: *Modifications to this Agreement may be made through mutual consent of the NPS and FWC as approved by the Superintendent and the Executive Director.*

Hunting Regulations

Condition 15: *FWC shall consult with and secure the concurrence of NPS before establishing any regulation of fishing, hunting, and other activities associated with the taking or possession of game fish and wildlife on the Preserve and the Addition.*

Law Enforcement

Condition 16: *FWC shall provide law enforcement support for sufficient enforcement of FWC regulations effective in the Preserve and the Addition. Furthermore the FWC and NPS will develop and adopt a specific Memorandum of Understanding that sets forth the procedures for mutual aid and law enforcement in the Preserve and the Addition.*

Threatened and Endangered Species

Condition 5: *FWC and NPS shall collaborate, consult and cooperate with one another regarding management of imperiled species of fish and wildlife on the Preserve and/ or the Addition.*

Nonnative / Invasive Species

Condition 6: *FWC and NPS shall collaborate, consult and cooperate with one another on courses of action to control or eradicate exotic or nonnative fish and wildlife or plants in the Preserve and the Addition. Nothing herein shall restrict or constrain the ability of NPS to implement management measures necessary to control or eradicate exotic fish, wildlife or plants.*

Research and Monitoring

Condition 7: *When practicable, the NPS and FWC shall collaborate, consult, and cooperate on ecological research and resource monitoring to address questions of mutual interest to NPS and FWC. Authorship rights to publications resulting from such collaboration, consultation, and cooperation shall follow the guidelines in Dickson, J. G., R. C. Conner, and K. T. Adair. 1978. Guidelines for Authorship of Scientific Articles. Wildlife Society Bulletin 6:260-261.*

Condition 8: *NPS and FWC shall have the opportunity to review and comment upon each other's research and monitoring proposals when related to fish and wildlife in the Preserve and the Addition prior to commencement of the research and monitoring.*

Public Access

Condition 2: *NPS and FWC will offer reasonable public access as provided for in Public Law 93-440 and Public Law 100-301, allowing the public to engage in authorized traditional uses in the Preserve and the*

Addition such as hunting, fishing, camping and other wildlife oriented recreational activities, which can be compatible with fish and wildlife conservation and are integral to fulfilling the mandate and intent of said public laws, without compromising the integrity of Preserve natural and cultural resources.

Emergencies

Condition 13: This Agreement recognizes the authority of the Preserve Superintendent to promulgate regulations and implement management limits and controls as they relate to public access, including but not limited to actions in response to changing resource conditions during emergencies as described in paragraph 19 below, but in any case where such actions relate to fish and wildlife management or the taking of fish and wildlife or associated activities, these actions shall be promulgated in collaboration, consultation, and cooperation with FWC.

Condition 19: When necessary to address emergencies, NPS may issue regulations or orders to restrict or prohibit public use and access in the Preserve and the Addition or portions thereof. With the concurrence of NPS, FWC may issue regulations or orders to restrict or prohibit hunting or fishing or other activities associated with the taking of fish and wildlife in the Preserve and the Addition or portions thereof. When practicable, regulations and orders of the nature referenced in this provision should be jointly or cooperatively issued.

Condition 20: FWC and NPS shall enter into a separate agreement to render mutual assistance as practicable in times of emergency or natural disaster affecting the Preserve or its employees.

ALTERNATIVE 2 – MINIMUM MANAGEMENT – NO HUNTING IN THE ADDITION

For this EA, the no-action alternative (continuation of current management guidance) could potentially cause adverse environmental impacts. Additionally, the environmental baseline conditions in the Preserve, absent from hunting impacts, cannot be evaluated since hunting is currently an ongoing practice in the original Preserve. Therefore, a “minimum management” alternative was added to the range of alternatives that evaluates the environmental consequences of continuing with the current hunting management protocol in the original Preserve and prohibiting hunting in the Addition.

Under this alternative, current hunting management would continue within the original Preserve boundaries, using the guidance outlined in the *NPS/FWC Cooperative Partnership Agreement* (see appendix B). All 25 conditions of the agreement would apply to the original Preserve boundaries under this alternative, including the key conditions outlined under alternative 1 above. In the Addition, public hunting would be prohibited.

ALTERNATIVE 3 – NEW ADAPTIVE MANAGEMENT STRATEGY

Under alternative 3, the NPS and the FWC, in consultation with the USFWS, would cooperate to implement an adaptive management strategy to manage hunting in the Preserve. A detailed description of adaptive management, as defined by the U.S. Department of the Interior, can be found in appendix D.

Adaptive Management Process

Implementation of the adaptive management process would occur in two phases – a set-up phase in which the key components are developed and an iterative phase in which the components are linked together in a sequential decision process (Williams et al. 2009).

Set-Up Phase. The set-up phase has five structural elements: stakeholder involvement, management objectives, potential management actions, predictive models, and monitoring plans.

1. Stakeholder Involvement – Allow for open and transparent stakeholder involvement regarding management actions.

The NPS and the FWC, in consultation with the USFWS, would continue to involve other stakeholders including other government agencies, non-government organizations, and interested individuals. The agencies would develop a stakeholder review process and a system for reporting results. The agencies would make monitoring plans and reports and other supporting documents available to the stakeholders and implement a process for addressing comments and responding to inquiries regarding hunting management in the Preserve.

2. Management Objectives – Identify clear, measurable, and agreed-upon management objectives to guide decision-making and evaluate management effectiveness over time.

Adaptive Management Objectives:

- a sustainable deer population in the Preserve, which takes into account the food source needs of the Florida panther population³

³ Deer are the Florida panthers' most consistent prey item (Land 1994, USFWS 2008). Janis and Clark (2002) determined a predation success rate of one kill per 5.24 days for female panthers and one kill per 7.7 days for male panthers, with an average of one kill per animal per 6.45 days for the general panther population.

- a feral hog population in the Preserve that balances the feral hog as an invasive species as well as a main prey item of the Florida panther
- a sustainable population for all other game species in the Preserve including wild turkey and small game species

Actions to Achieve Adaptive Management Objectives:

- monitor key game species (white-tailed deer) and threatened and endangered species (Florida panther) in the Preserve, as necessary to determine the appropriate ecosystem management actions for managing hunting in the Preserve
 - conduct ecosystem management actions in the Preserve to sustain an ample, healthy, and diverse wildlife community
 - adjust ecosystem management actions, when necessary, under the following conditions, to manage a healthy ecosystem in the Preserve:
 - extended high water events
 - disease
 - tropical storm / hurricane events
 - drought
 - conduct ecosystem management actions in the Preserve to control problem nonnative invasive nongame wildlife species to the lowest level practicable
 - conduct other ecosystem management actions applicable to hunting management (e.g., prescribed burning, nonnative invasive plant control, etc.), as necessary to maintain a healthy ecosystem in the Preserve
3. Potential Management Actions – Identify a set of potential management actions for decision-making.

Potential management actions include a continuum of different potential hunting management strategies. The types of hunting could include the allowance or prohibition of modern guns, muzzle-loading guns, or archery, or any combination thereof. Another

potential management option could include the allowance or prohibition of hunting for specific dates, number of days, and/or hours of the day. Other potential management actions could include setting permit limits for the number harvested and/or harvests in specific age/sex categories. These permits limits could apply per hunter, per unit, per season, or any combination thereof.

4. Predictive Models – Identify models that characterize different ideas (hypotheses) about how the system works.

Models play an important role in virtually all applications of structured decision-making, whether adaptive or otherwise. In order to make smart decisions, it always is important to compare and contrast management alternatives in terms of their costs, benefits, and resource consequences. Models typically express benefits and costs as outputs of management through time. More importantly, they allow one to forecast the impacts of management.

The term “model” is used here to mean a plausible representation of a dynamic natural resource system. Models can be as informal as a verbal description of system dynamics, or as formal as a detailed mathematical expression of change. The models used in an adaptive management framework are not restricted to a particular kind.

A proposed conceptual ecological model has been developed for the Preserve (see appendix D). There are a large range of options for the type and complexity of models to be developed in the future. The use of predictive models is intended to focus/compare different sources of uncertainty (particularly structural uncertainty, environmental variability, and partial observability) associated with a management decision. The types of models necessary is closely associated with the amount of disagreement between agencies or stakeholders who participate in the adaptive management process.

Development of predictive models for hunting management would be done in cooperation with the NPS and the FWC, in consultation

with the USFWS, as needed and as resources are available.

5. Monitoring Plans – Design and implement a monitoring plan to track resource status and other key resource attributes.

Various forms of monitoring are already in use. Deer check stations have been used since at least 1982 to measure: the count of deer harvested, hunting pressure (or number of hunter-days that the area is hunted) in each management unit, the success rate (number of deer harvested per hunter-day of effort) in each management unit, an acreage based success rate (number of deer harvested per acre of a management unit), the number of deer harvested in each of six possible age classes, the gutted weight of each deer, the mean antler main beam circumference, the number of points present on the rack, and the spread distance between antlers. All check station information is specific to those deer that are brought in by hunters to the check station. Aerial monitoring has been used to estimate deer population density in some management units (Garrison et al. 2009) and land cruise surveys have been conducted in the northern Addition (Garrison et al. 2009), but the methods are challenging to execute.

Development of additional monitoring efforts would be done in cooperation with the NPS and the FWC, in consultation with the USFWS, as needed and as resources are available.

Iterative Phase. The iterative phase of the adaptive management process uses these elements in an ongoing cycle of learning about system structure and function, and managing based on what is learned (Williams et al. 2009).

6. Decision-making – Select management actions based on management objectives, resource conditions, and understanding.

The FWC hunting regulation development process is open and transparent to the public and allows for coordination between agencies and other stakeholders. Under alternative 3, on the first day of implementation of this *Hunting Management Plan*, management of

hunting in the original Preserve would be guided by the current rules and regulations set forth in FAC 68A and outlined for the public in the *FWC Big Cypress WMA Regulations (2011-2012 Hunting Season) brochure* (see appendix C). For the Addition, rules, regulations, and potential quotas would be determined by extrapolating the available NPS and FWC data for areas in the Preserve that are most similar in habitat types to areas in the Addition, based on the habitat map presented in chapter 3 (“Existing Conditions”).

7. Follow-up Monitoring – Use monitoring to track system responses to management actions.

Annual deer population estimates are derived from check station information and aerial surveys. Both of these methods are challenged by partial observability in the sense that neither are complete censuses of the deer population. The development of the aerial deer population survey is currently focused on explicitly accounting for the degree of observability of deer with this method. There is no existing plan for explicitly estimating the observability of harvested deer in the check stations (i.e. what fraction of harvested deer is measured in the check stations?).

8. Assessment – Improve understanding of resource dynamics by comparing predicted and observed changes in resource status.

This process has not yet been conducted as there is no simulation process being used to predict changes in deer populations. Assessment would only be possible once simulations are developed and an explicit estimate of observability of the deer population is constructed.

9. Iteration – Cycle back to Step 6.

The knowledge and understanding gained in step 7 (follow-up monitoring) and step 8 (assessment) would be used to better inform the selection of hunting management actions at the next decision point. As knowledge and understanding of the hunting management process and resource dynamics evolves, the hunting management decision-making process

would be improved. Consequently, the iterative cycle of decision making, monitoring, and assessment would gradually lead to improved understanding of resource dynamics, and improved hunting management as a consequence of improved understanding.

ALTERNATIVES CONSIDERED AND DISMISSED

NO HUNTING IN THE PRESERVE

Under this alternative, no hunting would be allowed in any part of the Preserve (i.e., within the original boundaries or the Addition). This alternative does not meet the purpose and need for the *Hunting Management Plan*, specifically, “To develop a hunting management plan for the Big Cypress National Preserve / Wildlife Management Area that allows the superintendent of the Preserve to provide for hunting opportunities in the Preserve ...” Additionally, this alternative would conflict with the mandate in the enabling legislation (PL 93-440, as amended by PL 100-301) for the Preserve and the Addition that states: “The Secretary shall permit hunting ... on lands and water under his jurisdiction within the preserve and the Addition ...” Therefore, this alternative was dismissed from further consideration.

COST ANALYSIS OF THE ALTERNATIVES

This *Hunting Management Plan* would not require any facilities as part of its implementation. Therefore, costs associated with implementation of the alternatives would be limited mainly to staffing and research and monitoring activities. Costs associated with implementation of the alternatives could include the following:

- research and monitoring
- enforcement
- staffing (other than enforcement)
- hunter education costs (brochures, signs, etc.)

Existing funding and staffing resources from the NPS and other agencies (FWC and USFWS) would be used with all of the alternatives to accomplish the required enforcement and research and monitoring activities. Therefore, it was determined that the difference in costs between the alternatives would be negligible, and costs were not considered in the determination of the preferred alternative.

HOW THE ALTERNATIVES MEET PROJECT OBJECTIVES

All action alternatives selected for analysis must address the stated purpose of the plan and resolve the need for action. The action alternatives selected for analysis must meet all objectives to a large degree to be considered reasonable. Therefore, alternatives were

assessed as to how well they would meet the plan objectives. Table 2-1 summarizes the results of this assessment. Alternative 3 best meets the project objectives by meeting objectives 1, 2, 3, 4, and 6 to a high degree and meeting objective 5 to a moderate degree.

Table 2-1 – Analysis of How the Alternatives Meet Project Objectives

Project Objective	Alternative 1 No Action Apply Current Management to the Addition	Alternative 2 No Hunting in the Addition	Alternative 3 New Adaptive Management Strategy
1. Provide guidelines for hunting within the Big Cypress National Preserve / Wildlife Management Area that satisfy all NPS regulations, the Preserve's enabling legislation, the <i>NPS/FWC Cooperative Partnership Agreement</i> , and all applicable federal, state, and local laws and regulations.	This alternative meets the project objective. This alternative fully complies with all NPS regulations, the Preserve's enabling legislation, the <i>NPS/FWC Cooperative Partnership Agreement</i> , and all applicable federal, state, and local laws and regulations. <i>Rank: High</i>	This alternative meets the project objective. This alternative fully complies with all NPS regulations, the <i>NPS/FWC Cooperative Partnership Agreement</i> , and all applicable federal, state, and local laws and regulations. However, this alternative only partially complies with the Preserve's enabling legislation since hunting would only be permitted within the original Preserve. <i>Rank: Low</i>	This alternative meets the project objective. This alternative fully complies with all NPS regulations, the Preserve's enabling legislation, the <i>NPS/FWC Cooperative Partnership Agreement</i> , and all applicable federal, state, and local laws and regulations. <i>Rank: High</i>
2. Provide a programmatic framework for facilitating agency communications and goal-setting that provides guidance over a number of years.	This alternative meets the project objective. This alternative creates a framework for facilitating agency communications and goal-setting (e.g., the <i>NPS/FWC Cooperative Partnership Agreement</i>); however, the framework takes a year-to-year approach to coordination between agencies. <i>Rank: Moderate</i>	This alternative meets the project objective. This alternative creates a framework for facilitating agency communications and goal-setting (e.g., the <i>NPS/FWC Cooperative Partnership Agreement</i>); however, the framework takes a year-to-year approach to coordination between agencies. Additionally, this alternative does not provide any long-term guidance for coordination regarding hunting management in the Addition. <i>Rank: Low</i>	This alternative meets the project objective. This alternative creates a long-term framework for facilitating agency communications and goal-setting that would be valid for a number of years. <i>Rank: High</i>

Table 2-1 – Analysis of How the Alternatives Meet Project Objectives

Project Objective	Alternative 1 No Action Apply Current Management to the Addition	Alternative 2	Alternative 3 New Adaptive Management Strategy
		No Hunting in the Addition	
<p>3. Utilize science-based resource management (e.g., habitat, wildlife, and protected species) for adaptive decision-making for:</p> <ul style="list-style-type: none"> • The NPS and the FWC to collaborate and cooperate on the rule-making process regarding hunting. • The NPS to take action independently, with notification to the FWC and USFWS as soon as practicable, for resource protection or public safety in certain cases (i.e., high water events, fires, threatened and endangered species issues), which may have an effect on hunting within the Preserve. 	<p>This alternative does not meet the project objective. This alternative does allow for NPS and FWC to collaborate and cooperate on the rule-making process as well as allowing the NPS to take action independently through the <i>NPS/FWC Cooperative Partnership Agreement</i>; however, it does not utilize adaptive decision-making in this process.</p> <p><i>Rank: Nil</i></p>	<p>This alternative does not meet the project objective. This alternative does allow for NPS and FWC to collaborate and cooperate on the rule-making process as well as allowing the NPS to take action independently through the <i>NPS/FWC Cooperative Partnership Agreement</i>; however, it does not utilize adaptive decision-making in this process. Additionally, it does not allow for any actions regarding hunting management in the Addition.</p> <p><i>Rank: Nil</i></p>	<p>This alternative meets the project objective. This alternative utilizes a framework of science-based resource management for adaptive decision-making for both the NPS and FWC, in consultation with the USFWS, to collaborate and cooperate on the rule-making process and the NPS to take action independently.</p> <p><i>Rank: High</i></p>
<p>4. Provide the public with clear and understandable information regarding:</p> <ul style="list-style-type: none"> • Hunting management within the Preserve • Safe and responsible hunting practices 	<p>This alternative meets the project objective. This alternative provides the public with information regarding hunting within the Preserve and safe and responsible hunting practices.</p> <p><i>Rank: High</i></p>	<p>This alternative meets the project objective. This alternative provides the public with information regarding hunting within the Preserve and safe and responsible hunting practices. However, hunting management rules would differ between the original Preserve and the Addition, which would make the information more difficult for the public to understand.</p> <p><i>Rank: Moderate</i></p>	<p>This alternative meets the project objective. This alternative provides a framework that clearly outlines a science-based process for determining hunting management rules. Additionally, the same process would be applied to the entire Preserve, which would limit any confusion by the public.</p> <p><i>Rank: High</i></p>

Table 2-1 – Analysis of How the Alternatives Meet Project Objectives

Project Objective	Alternative 1 No Action Apply Current Management to the Addition	Alternative 2	Alternative 3 New Adaptive Management Strategy
		No Hunting in the Addition	
5. Manage opportunities for a positive visitor use experience for hunters and nonhunters.	This alternative meets the project objective. This alternative allows the NPS to manage opportunities for a positive visitor use experience for both hunters and nonhunters. While nonhunting recreational activities would be available year-round (as permitted by regulations), visitors would only be able to experience these activities in the absence of hunting during certain times of the year (i.e., out of hunting season). <i>Rank: Moderate</i>	This alternative meets the project objective. This alternative allows the NPS to manage opportunities for a positive visitor use experience for both hunters and nonhunters by providing separate areas of the Preserve (e.g., the original Preserve and the Addition) for hunting and nonhunting recreational activities. <i>Rank: High</i>	This alternative meets the project objective. This alternative allows the NPS to manage opportunities for a positive visitor use experience for both hunters and nonhunters. While nonhunting recreational opportunities could only be experienced by visitors in the absence of hunting during certain times of the year (i.e., out of hunting season), this alternative allows the NPS and FWC, in consultation with the USFWS, the flexibility to make changes to the plan to adaptively manage opportunities for a positive visitor use experience. <i>Rank: Moderate</i>
6. Manage an array of access options to allow for a diversity of hunting opportunities within the framework of existing regulations and funding.	This alternative meets the project objective. This alternative allows access for hunting opportunities within the entire Preserve. <i>Rank: High</i>	This alternative meets the project objective. This alternative allows access for hunting opportunities within the original Preserve; however, it does not allow hunting opportunities within the Addition. <i>Rank: Moderate</i>	This alternative meets the project objective. This alternative allows access for hunting opportunities within the entire Preserve. <i>Rank: High</i>

Legend
<i>Nil</i> – Does not meet the project objective to any degree
<i>Low</i> – Meets the project objective to a low degree
<i>Moderate</i> – Meets the project objective to a moderate degree
<i>High</i> – Meets the project objective to a high degree

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

In accordance with Director's Order 12 (NPS 2011a), the NPS is required to identify the "environmentally preferable alternative" in all environmental documents, including an EA. According to the CEQ regulations implementing NEPA (43 CFR 46.30), the environmentally preferable alternative is the alternative "that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the [NPS] of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources." Based on the analysis of potential impacts included in this EA, the environmentally preferable alternative for this Hunting Management Plan is alternative 3.

Big Cypress National Preserve is a unit of the national park system, and as the trustee of the Preserve the NPS would continue to fulfill its obligation to protect the area for future generations under any of the alternatives. The NPS would provide for and minimize risk to public health and safety under all of the alternatives. All of the alternatives would preserve historic and cultural resources in the Preserve, and none of the alternatives would have any adverse impacts on historic or cultural resources in the Preserve. Additionally, none of the alternatives involve the use of any depletable resources, and all of the alternatives would have some impacts on natural renewable resources (e.g., wildlife) in the Preserve.

Under alternative 3, the NPS and the FWC, in consultation with the USFWS, would cooperate to implement an adaptive management strategy to manage hunting in the Preserve. This science-based adaptive management strategy for hunting would permit the NPS and FWC, in consultation with the USFWS, flexibility to make changes to hunting protocol over time in response to changing ecological conditions, monitoring data, and/or public input. In comparison to

alternatives 1 and 2, this would allow for the best protection of natural resources in the Preserve, particularly protected wildlife species and major game species.

The white-tailed deer is the most important game species in the Preserve. In addition to being a popular large game animal, white-tailed deer are the endangered Florida panthers' most consistent prey item (Land 1994, USFWS 2008). Under alternative 3, the adaptive management strategy would allow the NPS and FWC, in consultation with the USFWS, to use monitoring data for the white-tailed deer, Florida panther, and environmental conditions (e.g., water level data) to make science-based decisions about hunting management to best balance the needs of the endangered Florida panther with the desire for recreational hunters to harvest deer in the Preserve.

Alternative 3 would provide the widest array of recreational opportunities for visitors in the Preserve by allowing hunting throughout. Nonhunting visitors and private residences in proximity to the Preserve would be exposed to hunting activities and the associated sporadic noise impacts on a seasonal basis (during hunting seasons and hours); however, alternative 3 would allow the NPS and FWC, in consultation with the USFWS, to modify hunting protocol if a specific visitor conflict arises.

This adaptive management strategy could also be used to adjust hunting management protocol for other natural resource conditions or visitor use issues as specific needs arise, which makes it the best long-term alternative to managing hunting in the Preserve over the next 15 to 20 years. For further information on how the environmentally preferable alternative was determined, please reference table 2-2 (Environmental Consequences Summary) in the next section of this document, which presents a summary comparison of the effects of the alternatives, based on the evaluations of the impact topics in "Chapter 4: Environmental Consequences."

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2-2 below summarizes the environmental consequences associated with the implementation of each project alternative including the no-action alternative (alternative 1) and both action alternatives. These impacts were analyzed relative to the environmental

baseline alternative (alternative 2). Additional information on impacts associated with project alternatives can be found in “Chapter 3: Affected Environment” and “Chapter 4: Environmental Consequences.”

Table 2-2 – Summary of Environmental Consequences by Alternative

Impact Topic	Alternative 1 No Action Apply Current Management to the Addition	Alternative 2 No Hunting in the Addition	Alternative 3 New Adaptive Management Strategy
Natural Resources			
Vegetation and Habitat			
Native Vegetative Communities and Habitat, Protected Plant Species, and Nonnative Invasive Plant Species	Impacts on native vegetation communities and protected plant species and impacts from nonnative invasive plants from alternative 1 would be long-term, negligible, and adverse throughout the Preserve.	Impacts on native vegetation communities and protected plant species and from nonnative invasive plant species from alternative 2 would be long-term, negligible, and adverse within the original Preserve; no direct or indirect short- or long-term adverse impacts to native vegetation communities or protected plant species or from nonnative invasive plant species would occur within the Addition.	Impacts on native vegetation communities and protected plant species and from nonnative invasive plant species from alternative 3 would be long-term, negligible, and adverse throughout the Preserve.
Wildlife			
Protected Wildlife Species	No impacts would occur to the West Indian manatee, and long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) would result throughout the Preserve from the selection of alternative 1. Impacts on the Florida panther from alternative 1 would be long-term, moderate, and adverse throughout the Preserve.	Within the original Preserve, no impacts would occur to the West Indian manatee, and long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) would result from the selection of alternative 2; in the Addition, no direct or indirect short- or long-term adverse impacts to federally listed wildlife species or their habitat (except the Florida panther) would occur with implementation of this alternative. Impacts on the Florida panther from alternative 2 would be long-term, moderate, and adverse throughout the Preserve.	No impacts would occur to the West Indian manatee, and long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) would result throughout the Preserve from the selection of alternative 3. Impacts on the Florida panther from alternative 3 would be long-term, negligible to minor, and adverse throughout the Preserve.

Table 2-2 – Summary of Environmental Consequences by Alternative

Impact Topic	Alternative 1 No Action Apply Current Management to the Addition	Alternative 2 No Hunting in the Addition	Alternative 3 New Adaptive Management Strategy
Major Game Species	Impacts to game species and their habitat from alternative 1 would be long-term, minor, and adverse within the original Preserve and long-term, minor to moderate, and adverse in the Addition.	Impacts to game species and their habitat from alternative 2 would be long-term, minor, and adverse within the original Preserve; in the Addition, no direct or indirect short- or long-term adverse impacts to game species or their habitat would occur with implementation of this alternative.	Impacts to game species and their habitat from alternative 3 would be long-term, moderate, and beneficial throughout the Preserve.
Nonnative / Invasive Wildlife Species	Impacts to native wildlife populations from nonnative invasive wildlife species from alternative 1 would be long-term, negligible, and adverse throughout the Preserve.	Impacts to native wildlife species from nonnative invasive wildlife species from alternative 2 would be long-term, negligible, and adverse within the original Preserve; in the Addition, no direct or indirect short- or long-term adverse impacts to native wildlife species from nonnative invasive wildlife species would occur with implementation of this alternative.	Impacts to native wildlife populations from the control of nonnative invasive wildlife species from alternative 3 would be long-term, minor to moderate, and beneficial throughout the Preserve.
Wilderness Resources and Values			
Wilderness	Impacts on wilderness resources and values from alternative 1 would be long-term, negligible to minor, and adverse within the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)].	No direct or indirect short- or long-term adverse impacts on wilderness resources and values would result from alternative 2.	Impacts on wilderness resources and values from alternative 3 would be long-term, negligible to minor, and adverse within the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)].
NPS Management and Operations			
Preserve Management and Operations	Impacts on Preserve management and operations from alternative 1 would be long-term, minor, and adverse.	Impacts on Preserve management and operations from alternative 2 would be long-term, minor, and adverse.	Impacts on Preserve management and operations from alternative 3 would be long-term, minor to moderate, and adverse.

Table 2-2 – Summary of Environmental Consequences by Alternative

Impact Topic	Alternative 1 No Action Apply Current Management to the Addition	Alternative 2 No Hunting in the Addition	Alternative 3 New Adaptive Management Strategy
Visitor Use			
Visitor Use and Experience / Recreational Opportunities	Impacts on visitor use and experience and recreational opportunities throughout the Preserve from alternative 1 would be long-term, moderate, seasonal, and beneficial for hunters and long-term, minor, seasonal, and adverse for nonhunters.	Impacts on visitor use and experience and recreational opportunities in the original Preserve from alternative 2 would be long-term, moderate, seasonal, and beneficial for hunters and long-term, minor, seasonal, and adverse for nonhunters. In the Addition, impacts on visitor use and experience and recreational opportunities would be long-term, minor, seasonal, and adverse for hunters and long-term, moderate, year-round, and beneficial for nonhunters with the implementation of this alternative.	Impacts on visitor use and experience and recreational opportunities throughout the Preserve from alternative 3 would be long-term, moderate, seasonal, and beneficial for hunters and long-term, minor, seasonal, and adverse for nonhunters.
Noise / Soundscapes	Impacts to the Preserve soundscape from alternative 1 would be long-term, minor, and adverse.	Impacts to the Preserve soundscape from alternative 2 would be long-term, negligible to minor, and adverse.	Impacts to the Preserve soundscape from alternative 3 would be long-term, minor, and adverse.
Public Health and Safety	Impacts on public health and safety from alternative 1 would be long-term, negligible, and adverse throughout the Preserve.	Impacts on public health and safety from alternative 2 would be long-term, negligible, and adverse in the original Preserve; in the Addition, no direct or indirect short- or long-term adverse impacts to public health and safety would result from the selection of this alternative.	Impacts on public health and safety from alternative 3 would be long-term, negligible, and adverse.
Socioeconomic Environment			
Socioeconomics	Impacts on the socioeconomic environment of the Preserve, Collier County, and the South Florida region from alternative 1 would be long-term, negligible to minor, and beneficial.	Impacts on the socioeconomic environment of the Preserve, Collier County, and the South Florida region from alternative 2 would be long-term, negligible to minor, and beneficial.	Impacts on the socioeconomic environment of the Preserve, Collier County, and the South Florida region from alternative 3 would be long-term, negligible to minor, and beneficial.

CHOOSING BY ADVANTAGES AND PREFERRED ALTERNATIVE

The NPS uses a selection and ranking process during all projects and actions called Choosing By Advantages. In the CBA process, the NPS asks “what and how large are the advantages of each of the alternatives?” proposed for a project, “how important are the advantages of each of the alternatives?,” and “are those advantages worth the associated cost?” A CBA workshop was conducted on November 1, 2011, at the Preserve for the purpose of determining the preferred alternative. Workshop participants consisting of NPS (Preserve, Denver Service Center, and contractor) staff and cooperating state (FWC) and federal (USFWS) agency participants reviewed the project alternatives to determine which alternative best meets the project purpose, need for action, and objectives.

Since the cost differences between the alternatives were determined to be negligible, the alternatives were evaluated purely on a total importance basis. It was determined by the CBA process that alternative 3 provides the greatest total importance of advantages to the NPS and the public.

A landscape photograph of a pond or lake surrounded by tall pine trees and grass, with a warm orange overlay. The scene is captured during the "golden hour" of sunset or sunrise, with the sky and foliage bathed in a warm, orange-gold light. The water in the pond is dark and still, reflecting the silhouettes of the trees and the bright sky. In the foreground, there is a field of tall, dry grass. The overall mood is serene and natural.

CHAPTER 3: AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the existing environmental conditions (“Affected Environment”) in the areas potentially affected by the alternatives. The impact topics discussed in this chapter are those that were selected for analysis in this *Hunting Management Plan*, as described in Chapter 1. Information for this chapter was gathered from several sources, including but not limited to, the following documents:

- *General Management Plan* for the original Preserve (NPS 1991a)
- Addition GMP (NPS 2010a)
- *The Big Cypress National Preserve Resource Inventory and Analysis* (Duever et al. 1986)
- NPS Public Use Statistics Office website (NPS 2011d)
- *FWC Big Cypress WMA Regulations (2011-2012 Hunting Season)* (FWC 2011a)

The following sections detail the natural resources (vegetation/habitat and wildlife) and wilderness resources that are present in the Preserve that may be potentially affected by the proposed alternatives. Then, the relevant NPS management and operations and visitor use at the Preserve are discussed in reference to management, operations, and uses that may be potentially affected by the proposed alternatives. Finally, the socioeconomic environment characteristics in the areas surrounding the Preserve that may be potentially affected by the proposed alternatives are discussed.

NATURAL RESOURCES

VEGETATION AND HABITAT

Native Vegetative Communities and Habitat

Five major vegetation communities can be found in the Preserve: Cypress – cypress strands and domes, mixed-hardwood swamps, and sloughs; Prairie – prairies and marshes; Mangrove; Pinelands; and Hammocks. Disturbed areas are intermixed throughout the Preserve and can be found within all the vegetation communities. The vegetation classes used in this plan are the same as those used in the Addition GMP (NPS 2010a).

Temperate plants are abundant in the Preserve but the majority of the species are tropical. Pinelands, cypress strands and domes, prairies, and marshes are the most prevalent vegetation types and are dominated by temperate species. Tropical species occur primarily in hardwood hammocks but are also found in pinelands, mixed-hardwood swamps, and cypress strands. Endemic species, native only to the Preserve area, comprise 10 percent of the Preserve vegetation (Long 1974).

Cypress (Cypress Strands and Domes, Mixed-Hardwood Swamps, and Sloughs). The dominant trees in the Preserve are two species of cypress, bald cypress (*Taxodium distichum*) and pond cypress (*T. ascendens*). Both species are deciduous conifers that are tolerant of inundation and saturated soils for extended periods. Pond cypress occurs naturally in shallow ponds and along the edges of swamps and low-flow streams in low-nutrient soils. Bald cypress prefers sites with moderate water flow and higher nutrient concentrations. While pond cypress tolerates frequent water draw-downs, bald cypress prefers a more stable water level with seasonal fluctuations (Myers and Ewel 1990).

Cypress strands — Cypress strands are linear swamps dominated by bald cypress occurring throughout the Preserve in deep mineral soil

depressions. They form along major drainageways and generally retain a north-south orientation. Strands are similar to cypress domes but are generally larger and more biologically diverse. Hardwood trees that are adapted for hydric conditions, such as red maple (*Acer rubrum*), pond-apple (*Annona glabra*), and pop ash (*Fraxinus caroliniana*), are often common. Although the shrub stratum is generally sparse, scattered individuals of commonly occurring species such as dahoon (*Ilex cassine*), myrsine (*Myrsine cubana*), or swamp dogwood (*Cornus foemina*) are often present. Ground cover is often very sparse because hydroperiods are long or may be ephemeral and appear during the dry season. Swamp fern (*Blechnum serrulatum*) is a common ground cover that is dominant in strands. The substrates of this vegetation community type are generally inundated or saturated nearly throughout the year with hydroperiods often extending over 240 days.

Cypress domes — Cypress domes are generally small, relatively discrete wetlands dominated by cypress. Domes are nearly circular swamps often surrounded by fire-maintained herbaceous wetland communities with few trees. The dome shape results from taller bald cypress trees growing in the deeper waters of the interior with progressively smaller trees extending to the shallower waters of the periphery. Soils are often composed of a layer of peat that is thicker toward the dome's interior and becomes thinner approaching the periphery (Florida Natural Areas Inventory 2010).

The cypress dome community transitions to the surrounding herbaceous communities (e.g., prairie) at the periphery. Limestone usually occurs near the substrate surface in the peripheral areas, inhibiting the establishment of root systems. The cypress trees that survive near the periphery are usually smaller than those near the center, where soils are deeper with a more hydric peat layer. In the peripheral areas, the ground cover is similar to

that found in the adjacent communities because the smaller trees become more scattered, allowing more sunlight to reach the substrate.

Mixed-hardwood swamps — Cypress swamps that contain significant populations of hardwood trees that co-dominate the canopy with cypress are often referenced as mixed hardwood and cypress swamps. Red maple, pond-apple, swamp bay (*Persea palustris*), cabbage palm (*Sabal palmetto*), or laurel oak (*Quercus laurifolia*) are often co-dominants in this vegetation community. Vines such as poison-ivy (*Toxicodendron radicans*), grapes (*Vitis* spp.), laurel greenbrier (*Smilax laurifolia*), and rattan vine (*Berchemia scandens*) are common. Understory species include ferns, epiphytes, aquatic species, and saplings of overstory vegetation. Several bromeliads such as airplants (*Tillandsia* spp.) and the state listed endangered Fuch's bromeliad (*Guzmania monostachia*), and orchids such as epidendrums (*Epidendrum* spp.) and ghost orchid (*Polypodium lindenii*) occur on the branches and trunks of trees in this community. Epiphytic ferns such as shoestring fern (*Vittaria lineata*) and golden polypody (*Phlebodium aureum*) are common on the trunks of cabbage palms.

Knolls within this vegetation type comprise a principal habitat for the state listed endangered Florida royal palm (*Roystonea regia*). Mixed-hardwood swamps serve as habitat for numerous birds, mammals, reptiles, and amphibians. This swamp community is usually diverse and may represent a later stage of community succession than the bald cypress-dominated community.

Sloughs — Sloughs are sinuous, elongated natural drainage channels that are inundated most of the time and are usually the deepest drainageways within swamp and marsh systems. They are broad channels inundated with slow-moving water, except during extreme droughts. The vegetation structure is variable with some sloughs dominated by floating aquatics, others by large emergent herbs, and still others by a low or sparse canopy. Canopied sloughs are characterized by

various swamp species, particularly pop ash and coastalplain willow (*Salix caroliniana*), with or without a mixture of large emergent herbs and floating aquatic plants. Pond-apple is a frequent canopy component and can withstand somewhat deeper water than pop ash (Florida Natural Areas Inventory 2010). Other common woody species include cypress (*Taxodium* spp.) and common buttonbush (*Cephalanthus occidentalis*). Sloughs are generally a few feet to a few inches below adjacent marshes. Soils are mostly peat or muck, with submerged surface sediments rising and falling with fluctuating water levels. During severe droughts, surface sediments dry out and ground fires may develop, but generally sloughs are wet most of the year and have historically served as fire breaks for communities bordering the sloughs. When fires do occur, depressions are formed in the organic soils, and they fill with water to become ponds. Ponds and sloughs provide important habitat for alligators.

Prairie (Prairies and Marshes).

Prairies — Prairies are treeless areas dominated by grasses and grasslike plants (graminoids). Herbaceous wet and dry prairies and cypress prairies can be found in the Preserve. Wet prairies are typically seasonally inundated short-grass communities characterized by hydroperiods of 70 days with inundation to eight inches. Graminoids such as hairawn muhly (*Muhlenbergia capillaris*), blue maidencane (*Amphicarpum muhlenbergianum*), rhizomatous bluestem (*Schizachyrium rhizomatum*), or short sawgrass (*Cladium jamaicense*) often dominate these prairies. Wet prairie communities may occur on many soils, but these communities are often found on frequently flooded calcium carbonate marls or fine sands. Dry prairies are typically seasonally inundated graminoid communities characterized by hydroperiods of 50 days with inundation to two inches. Common components of dry prairies include broomsedge bluestems (*Andropogon* spp.), sand cordgrass (*Spartina bakeri*), starrush whitetop (*Rhynchospora colorata*), and saw palmetto (*Serenoa repens*). Herbaceous

broad-leaved plants (forbs) are common components of the wet and dry prairie communities, but these plants do not usually dominate them. Limestone is commonly near the soil surface in prairie areas, which inhibits the growth of trees; thus vegetation is limited to ground cover. Additionally, prairies will burn during periods of drought and when sufficient fuel is present. Fire maintains prairies by eliminating invading trees and shrubs.

Cypress prairies are communities that transition between prairies and cypress-dominated swamp communities and typically contain elements of both. Cypress prairies are usually dominated by graminoid ground cover made up of species common in prairies such as hairawn muhly or sawgrass. Cypress trees are common in these prairies but seldom attain a large size. This is partly because the limestone that is a common component of substrates in the region is close to the soil surface and inhibits the establishment and growth of cypress trees unless there are fractures in the limestone where the cypress trees can establish limited growth. These trees are called dwarf or hatrack cypress. These areas are inundated (usually less than 1 foot of water depth) through much of the wet season.

Marshes — Both freshwater and saltwater marshes can be found in the Preserve with freshwater marshes more prevalent. Marshes are wetland communities that are dominated by herbaceous plants and occasional shrubs. These communities are typically inundated nearly year-round and have substrates with a thick organic mantle on the surface. Marshes are usually dominated by herbaceous species, but a marsh that is dominated by grasses or sedges may be considered a graminoid marsh. Grasses usually occur in areas without standing water during some part of the year, but related graminoids may be common in areas with prolonged hydroperiods. The graminoid that is probably most common in such areas is sawgrass. Sawgrass is actually a sedge (Cyperaceae) that is commonly found in wetlands with various depths to limestone, often with a significant organic peat layer covering the limestone. This organic layer is usually derived from the sawgrass.

Freshwater marshes are commonly dominated by broad-leaved plants, typically including pickerelweed (*Pontederia cordata*), cattails (*Typha* spp.), and bulltongue arrowhead (*Sagittaria lancifolia*) along with sawgrass and maidencane (*Panicum hemitomon*). These wetlands have comparatively deep water during the wet season and persist as aquatic communities year-round or well into the dry season. These deeper areas provide refuge for fish during dry seasons, when few places are under water, and also tend to concentrate populations of fish and other aquatic animals as water levels decrease with dry weather. Many wading birds such as wood storks depend on these concentrated prey populations to find sufficient food for nesting and brood rearing.

Saltwater marshes occur in coastal areas and are often affected by marine systems. These communities are influenced by tidal fluctuations and have higher soil salinity than inland freshwater systems. Saltwater marshes that are far inland may be affected by marine waters only during extreme storm tides such as those associated with hurricanes. This produces a change in salinity very infrequently, but the effects of this change may remain with the marsh community for several years. These inland saltwater marsh communities are usually populated with plants that are typical of freshwater marshes but that are able to tolerate small increases in salinity. Plants commonly occurring in these communities include southern cattail (*Typha domingensis*), pond-apple, and sand cordgrass. These areas and other communities inland from coastal systems may be dominated by fresh water almost all of the time but may still be frequently influenced by tidal changes in water level. During the dry season, decreased flow of fresh water may allow salt water to flow farther inland than during the wet season.

Tidal systems are more likely to dominate in proximity to the coast so that mixing of fresh water and salt water becomes more common, which can produce a gradient of fresh, brackish, and salt-tolerant species assemblages. Communities that are dominated most of the year by brackish water are likely to

be dominated by saltwater marsh with occasional mangrove trees. These saltwater marsh communities typically are comprised of commonly occurring species such as needle rush (*Juncus roemerianus*) cordgrasses (*Spartina* spp.), saltgrass (*Distichlis spicata*), and seashore dropseed.

Mangrove. Mangrove forests (mangrove swamps) are intertidal wetlands dominated by hardwood trees that are tolerant of coastal, saline conditions. Mangrove communities are the least diverse terrestrial vegetation type in South Florida (Long 1974). Three mangrove species, red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*), along with buttonwood (*Conocarpus erectus*), a mangrove associate, comprise the dominant tree species within these communities. These trees often form dense forests on much of the coast in southern Florida and form scattered tree islands farther inland where surface waters become brackish. The distribution of mangrove communities in the Preserve depends on water depth and salinity.

Depending on the distance from the coast and seasonal runoff from inland freshwater systems, mangrove forest soils can vary in salinity. These changes in ground water and salt content create adverse conditions for most organisms, so that species richness in mangrove forests is usually low. Catastrophic events such as fires, frosts, hurricanes, and oil spills also limit mangrove productivity. Frosts severely prune mangroves and hurricanes can destroy them.

Pinelands. Pinelands occur in areas that are higher than most wetlands, so their substrates are inundated less frequently. In the Preserve, South Florida slash pine (*Pinus elliottii* var. *densa*) dominates these communities. Slash pine forests are woodland communities with pine trees that are spaced several yards apart resulting in an open (incomplete) tree canopy. Depending on substrate, some of these woodlands form a pine and palmetto community, where widely spaced pine trees form an open canopy with a dense shrub layer comprised primarily of saw palmetto. The saw

palmetto shrub layer is often so dense that groundcover does not become well established.

Slash pine forested communities that occur on limestone outcrops are called pine rockland communities. These areas also develop a saw palmetto shrub layer, but the saw palmettos are usually not as dense as in the pine and palmetto communities. This allows the establishment of other shrubs and ground cover resulting in more diversity than pine and palmetto communities occurring on sandy substrates. Pine rockland communities often contain plants that are associated with the Atlantic coastal ridge communities.

The pine and palmetto and pine rockland communities are typically mesic communities, but frequently include extensive ecotonal (transitional) areas that are adjacent to wetlands. These ecotonal communities have brief or infrequent hydroperiods and contain elements of the adjacent wetlands. Saw palmettos may not adapt well to hydric conditions and are not common in areas that are saturated or inundated often. Slash pines, however, tolerate more hydric conditions so that in areas with short hydroperiods, slash pines commonly live without the saw palmetto understory. In these areas, the open pine canopy allows sunlight to penetrate, and graminoids commonly found in prairies are supported.

Several ecotonal communities can be found in pinelands. These ecotonal communities occur in areas with subtle topographic differences, so that differences in the communities may occur because of differences in soil type, hydrology, small elevation differences, or fire history.

Pine needles, grasses, and other combustible materials accumulate relatively quickly in pinelands, and pinelands burn at frequent intervals. Pinelands are fire-dependent, and prescribed fires by NPS staff maintain the habitat viability by preventing hardwood succession. If fires are suppressed, pinelands eventually succeed to hardwood-dominated stands.

Suitable pinelands provide habitat for the federally listed red-cockaded woodpecker. Red-cockaded woodpeckers form clusters of trees with cavities within pinelands.

Hammocks. Hardwood hammock communities are dense and diverse forests of hardwood trees and shrubs, ferns, and epiphytes occurring on slightly elevated areas with soils slightly drier than the surrounding swamps and herbaceous wetlands. Mesic and hydric hardwood hammocks are scattered throughout the Preserve and because of their slightly elevated position, they often appear as islands of trees. Hammocks are usually small areas (2.5 acres or less) that are surrounded by other communities; in the Big Cypress region, the surrounding community is typically a wetland swamp or prairie. These slightly elevated areas function as refuges for wildlife during periods of high water. Because soils remain moist most of the year, hardwood hammocks rarely burn, but they are susceptible to fire during extended droughts. Following a fire, the species composition of recolonized hammocks often changes significantly (Duever et al. 1986).

Hammocks are usually dominated by hardwood trees with cabbage palms. Dominant canopy species are usually oaks such as live oak (*Quercus virginiana*), laurel oak, and water oak (*Quercus nigra*). Wild-tamarind (*Lysiloma latisiliquum*) is often a prevalent canopy species of hammocks in the less frost-susceptible southern portions of the Preserve. Understory composition commonly includes saw palmetto, coco-plum (*Chrysobalanus icaco*), common snowberry (*Chiococca alba*), and American beautyberry (*Callicarpa americana*). Epiphytes are common, especially on the branches of oak trees, where resurrection fern (*Pleopeltis polypodioides* var. *michauxiana*), numerous bromeliads, and several uncommon orchids grow. Many epiphytes such as shoestring fern and golden polypody also occur on the trunks and boots (persistent leaf bases) of cabbage palms. Vines that attain the tree canopy such as poison ivy, grapes, and peppervine (*Ampelopsis arborea*) are common canopy components. Elevated areas with sandy soils and limestone near the substrate surface often

support cabbage palm hammocks. These hammocks are usually not especially diverse, and have few trees other than cabbage palms forming the tree canopy. Shrubs are uncommon, and ground cover is sparse. Vines and epiphytes may occur on the palm trunks, but these are also usually sparse.

Disturbed Areas. Disturbed areas, found throughout the Preserve and intermixed within all of the above vegetation communities, are areas that have been affected by nature (fire, freeze, storms, extreme tides, etc.) or by man's activities such as logging, canal and road construction, farming and grazing, oil extraction, ORV use, fire, deliberate introduction of nonnative species, earth moving, altering drainage, altering the chemistry of water or soils, or facility construction. Community succession has been altered in disturbed areas. Soils in disturbed areas differ with locations and original substrates. The result is a change in the ecosystem that usually allows colonization and recruitment of invasive nonnative and opportunistic native species. These invasive nonnative and opportunistic native species outcompete desirable native species and quickly dominate the disturbed area.

Protected Plant Species

As shown in table 3-1, three species of plants that occur in the Preserve are listed as candidate species for federal listing as endangered or threatened. The state of Florida lists 99 species (including those three listed as federal candidate species) that occur in the Preserve as threatened or endangered, along with three more that are listed as commercially exploited. Collectively, these species warrant attention because they have had long-term population declines and are vulnerable to exploitation or environmental changes. Table 3-1 displays the status of all 102 special status plant species that occur in the Addition.

Table 3-1 – Listed Plant Species for Big Cypress National Preserve¹

Common Name	Scientific Name	Designated Status ²	
		Federal	State
Paurotis palm, Everglades palm	<i>Acoelorrhaphe wrightii</i>		T
Golden leather fern	<i>Acrostichum aureum</i>		T
Brittle maidenhair	<i>Adiantum tenerum</i>		E
Sensitive joint-vetch, meadow joint-vetch	<i>Aeschynomene pratensis</i>		E
White colic-root, bracted colic-root	<i>Aletris bracteata</i>		E
Pineland-allamanda, pineland golden trumpet	<i>Angadenia berteroi</i>		T
Eared spleenwort	<i>Asplenium erosum</i>		E
Bird's-nest fern, wild birdnest fern	<i>Asplenium serratum</i>		E
Pinepink	<i>Bletia purpurea</i>		T
Fakahatchee bluethread	<i>Burmannia flava</i>		E
Manyflowered grasspink	<i>Calopogon multiflorus</i>		E
Spicewood, pale lidflower	<i>Calyptanthus pallens</i>		T
Leafless bentspur orchid	<i>Campylocentrum pachyrrhizum</i>		E
Narrow strap fern, narrow-leaved strap fern	<i>Campyloneurum angustifolium</i>		E
Tailed strap fern	<i>Campyloneurum costatum</i>		E
Powdery strap airplant	<i>Catopsis berteroniana</i>		E
Florida strap airplant	<i>Catopsis floribunda</i>		E
Southern Florida sandmat, rockland sandmat	<i>Chamaesyce pergamena</i>		T
Porter's sandmat	<i>Chamaesyce porteriana</i>		E
Satinleaf	<i>Chrysophyllum oliviforme</i>		T
Coffee colubrina, greenheart	<i>Colubrina arborescens</i>		E
Butterflybush, Curacao bush	<i>Cordia globosa</i>		E
Quailberry, Christmasberry	<i>Crossopetalum ilicifolium</i>		T
Pepperbush	<i>Croton humilis</i>		E
Florida tree fern, red-hair comb fern	<i>Ctenitis sloanei</i>		E
Blodgett's swallowwort	<i>Cynanchum blodgettii</i>		T
Cowhorn orchid, cigar orchid	<i>Cyrtopodium punctatum</i>		E
Florida prairieclover	<i>Dalea carthagenensis</i> var. <i>floridana</i>	C	E
Ghost orchid, palmplolly	<i>Polyradicion lindenii</i>		E
Caribbean crabgrass	<i>Digitaria filiformis</i> var. <i>dolichophylla</i>		T
Florida pineland crabgrass, Everglades crabgrass, twospike crabgrass	<i>Digitaria pauciflora</i>	C	E
Guiana-plum	<i>Drypetes lateriflora</i>		T
Clamshell orchid, cockleshell orchid	<i>Encyclia cochleata</i>		E
Florida butterfly orchid	<i>Encyclia tampensis</i>		CE
Dingy-flowered star orchid	<i>Epidendrum anceps</i>		E
Acuna's star orchid	<i>Epidendrum blancheanum</i>		E
Umbrella star orchid	<i>Epidendrum floridense</i>		E
Night-blooming epidendrum, night-scented orchid	<i>Epidendrum nocturnum</i>		E
Stiff-flower star orchid	<i>Epidendrum rigidum</i>		E
Sanibel Island love grass	<i>Eragrostis tracyi</i>		E
Beach verbena, coastal mock vervain	<i>Glandularia maritima</i>		E
Wild cotton, upland cotton	<i>Gossypium hirsutum</i>		E
Fuchs' bromeliad, West Indian tufted airplant	<i>Guzmania monostachia</i>		E
Snowy orchid	<i>Habenaria nivea</i>		T
Needleroot airplant orchid	<i>Harrisella porrecta</i>		T
Poeppig's rosemallow	<i>Hibiscus poeppigii</i>		E
Hanging club-moss	<i>Huperzia dichotoma</i>		E
Delicate violet orchid	<i>Ionopsis utricularioides</i>		E
Rockland morningglory	<i>Ipomoea tenuissima</i>		E

Table 3-1 – Listed Plant Species for Big Cypress National Preserve¹

Common Name	Scientific Name	Designated Status ²	
		Federal	State
Pineland clustervine	<i>Jacquemontia curtisii</i>		T
Skyblue clustervine	<i>Jacquemontia pentanthos</i>		E
West coast lantana, Sanibel shrubverbena	<i>Lantana depressa</i> var. <i>sanibelensis</i>		E
Catesby's lily, pine lily	<i>Lilium catesbaei</i>		T
Small's flax	<i>Linum carteri</i> var. <i>smallii</i>		E
Pantropical widelip orchid	<i>Liparis nervosa</i>		E
Nodding club-moss	<i>Lycopodiella cernua</i>		CE
Hidden orchid	<i>Maxillaria crassifolia</i>		E
Pineland blackanthers	<i>Melanthera parvifolia</i>		T
Climbing vine fern	<i>Microgramma heterophylla</i>		E
Twinberry, Simpson's stopper	<i>Myrcianthes fragrans</i>		T
Giant sword fern	<i>Nephrolepis biserrata</i>		T
Wild basil, wild sweet basil	<i>Ocimum campechianum</i>		E
Florida dancinglady orchid	<i>Oncidium ensatum</i>		E
Hand fern	<i>Ophioglossum palmatum</i>		E
Erect pricklypear	<i>Opuntia stricta</i>		T
Royal fern	<i>Osmunda regalis</i> var. <i>spectabilis</i>		CE
Pineland passionflower	<i>Passiflora pallens</i>		E
Comb polypody	<i>Pecluma ptilodon</i> var. <i>caespitosa</i>		E
Cypress peperomia	<i>Peperomia glabella</i>		E
Florida peperomia, baby rubberplant	<i>Peperomia obtusifolia</i>		E
Yerba linda	<i>Peperomia rotundifolia</i>		E
Southern fogfruit	<i>Phyla stoechadifolia</i>		E
Greater yellowspike orchid	<i>Polystachya concreta</i>		E
Bahama ladder brake	<i>Pteris bahamensis</i>		T
Swartz's snoutbean	<i>Rhynchosia swartzii</i>		E
Royal palm, Florida royal palm	<i>Roystonea regia</i>		E
Leafless beaked lady's-tresses	<i>Sacola lanceolata</i> var. <i>paludicola</i>		T
Ray fern	<i>Schizaea pennula</i>		E
Florida Keys nutrush	<i>Scleria lithosperma</i>		E
Everglades bully	<i>Sideroxylon reclinatum</i> subsp. <i>austrofloridense</i>	C	E
Mullein nightshade	<i>Solanum donianum</i>		T
Everglades Keys false buttonweed	<i>Spermacoce terminalis</i>		T
Texas ladiestresses	<i>Spiranthes brevifolius</i>		E
Lacelip lady's-tresses	<i>Spiranthes laciniata</i>		T
Longlip lady's-tresses	<i>Spiranthes longilabris</i>		T
Southern lady's-tresses	<i>Spiranthes torta</i>		E
West Indian mahogany	<i>Swietenia mahagoni</i>		T
Broad halbard fern	<i>Tectaria heracleifolia</i>		T
Curtiss' hoarypea	<i>Tephrosia angustissima</i> var. <i>curtissii</i>		E
Lattice-vein fern	<i>Thelypteris reticulata</i>		E
Reflexed wild-pine, northern needleleaf	<i>Tillandsia balbisiana</i>		T
Stiff-leaved wild-pine, cardinal airplant	<i>Tillandsia fasciculata</i> var. <i>densispica</i>		E
Banded wild-pine, twisted airplant	<i>Tillandsia flexuosa</i>		T
Hoary wild-pine, fuzzywuzzy airplant	<i>Tillandsia pruinosa</i>		E
Giant wild-pine, giant airplant	<i>Tillandsia utriculata</i>		E
Soft-leaved wild-pine, leatherleaf airplant	<i>Tillandsia variabilis</i>		T
Chiggery grapes	<i>Tournefortia hirsutissima</i>		E
Entire-winged bristle fern	<i>Trichomanes holopterum</i>		E
Hoopvine	<i>Trichostigma octandrum</i>		E

Table 3-1 – Listed Plant Species for Big Cypress National Preserve¹

Common Name	Scientific Name	Designated Status ²	
		Federal	State
Florida gamagrass	<i>Tripsacum floridanum</i>		T
Leafy vanilla	<i>Vanilla phaeantha</i>		E
Rain-lily, redmargin zephyrlily	<i>Zephyranthes simpsonii</i>		T

Sources: USFWS 2011a, USDA 2011, and Florida Natural Areas Inventory 2011.

¹ Species in this table include those that have been documented in the Preserve – it does not include listed species for Collier County that are not present in the Preserve.

² E = endangered; T = threatened; C = candidate; CE = commercially exploited

Nonnative Invasive Plant Species

Thousands of nonnative plant species have been introduced to South Florida for ornamental plantings, agriculture, and other human uses. Due to the relative youth of the South Florida landmass and the semi-tropical climate, it is theorized that the region is particularly susceptible to invasion by nonnative invasive plant species (Duever et al. 1986a). The Florida Exotic Pest Plant Council keeps an updated list of the 143 Category I and Category II nonnative plants in Florida, which represents about eleven percent of the more than 1,400 nonnative plant species that have been introduced into Florida and subsequently established outside of cultivation (Florida Exotic Pest Plant Council 2011). Category I nonnative plants are those invasive nonnatives that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives (Florida Exotic Pest Plant Council 2011). Category II nonnative plants are those invasive nonnatives that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species; these species may become ranked Category I, if ecological damage is demonstrated (Florida Exotic Pest Plant Council 2011). Many of these plants are reported in the Preserve, but most are restricted to early successional stages on disturbed sites, and only a few pose a long-term threat to native communities. Of these, five species — melaleuca (*Melaleuca quinquenervia*), Brazilian-pepper (*Schinus terebinthifolius*), water-hyacinth (*Eichhornia crassipes*), hydrilla (*Hydrilla verticillata*), and small-leaf climbing fern (*Lygodium*

microphyllum) — are fairly common in the Preserve. Melaleuca and Brazilian-pepper are capable of invading native plant communities, and control efforts have been concentrated on these species. Australian-pine (*Casuarina* spp.) was identified as a nonnative invasive species of concern; however, in the last two decades it has been eradicated. All known Australian-pine plants have been eliminated from the Preserve, except for those on private property. Crested floatingheart (*Nymphoides cristata*), a relatively new nonnative for South Florida, was discovered in the Preserve in August 2006. Infestations are restricted to about 4 miles of canal along Tamiami Trail and two strand swamps south of the trail (NPS 2006b). Evidence suggests that this species was introduced to the Preserve through the transfer of propagules attached to a net or other fishing gear. Invasion of the adjacent swamps likely occurred from water flowing through culverts in the area. Water-lettuce (*Pistia stratiotes*) and common air-potato (*Dioscorea bulbifera*) are also known to be present.

The nonnative plant control program is carried out by NPS contractors and maintenance and resource management staff. NPS staff are active participants in the Florida Exotic Pest Plant Council, an interagency task force organized to share technical information on the control of nonnatives, monitor the distribution of nonnatives in South Florida, and collaborate on comprehensive control strategies.

Even though nonnatives are spread by natural events (such as hurricanes) and animals (such as raccoons and birds), there are indications

that ORVs have resulted in the spread of nonnative and invasive plants within the Preserve, including Brazilian-pepper, melaleuca, and small-leaf climbing fern. Off-road vehicles transport seed in their tire treads and vehicle beds and distribute it in currently unaffected areas of the Preserve as they travel. Evidence of the spread of invasive plants along ORV trails has been documented around the Monroe Station trailhead (Pernas 1999).

Melaleuca. This species, a native of Australia and New Guinea, was introduced to Florida around 1910 for landscaping. Perhaps the first introduction of melaleuca in the Preserve was at Monroe Station around 1940. Since it grows in pure stands at the expense of native vegetation and can occupy large areas, melaleuca is considered to be a major threat to the ecological integrity of the Preserve.

Melaleuca has successfully invaded much of South Florida because of its outstanding ability to propagate. A mature tree may contain tens of thousands of small woody seed capsules along its branches, and each capsule contains about 250 seeds. The capsules remain closed as long as they receive moisture from the tree's vascular system. However, if the vascular system fails due to damage by fire, frost, cutting, herbicidal injury, or simply old age, the capsules will slowly dry out, open, and release hundreds of thousands of seeds. The seeds fall within a short distance of the parent tree and germinate best on open, moist soils. Germination is limited on very dry or very wet soils and under dense canopy cover. As a result, melaleuca does well in prairies and open, moist pinelands, but is slower to invade wetter communities such as cypress domes and strands.

Melaleuca is extremely fire tolerant. The spongy inner bark insulates the trunk while the papery outer bark and oil-rich leaves readily carry fire. Following a fire, melaleucas will both release seeds and resprout, and fires create excellent conditions for melaleuca seed germination and seedling survival. Hence, fire in a mature melaleuca stand can encourage the nonnative to spread.

Melaleuca is controlled through two primary methods: (1) hand pulling — manually pulling the plants when they are small enough, and (2) stump cutting/girdling — brushing or spraying herbicide on freshly cut stump surfaces. Both techniques are labor-intensive, and trained personnel are required to handle the herbicides. Once mature, seed-bearing trees have been killed, prescribed fire or cutting may be used to control seedlings and sprouts.

The entire Preserve has been inspected for the presence of melaleuca plants. Today, melaleuca is considered to be under control within the Preserve. Future treatments of melaleuca in the Preserve would focus on re-treating previously treated areas.

Brazilian-pepper. A native of South America, Brazilian-pepper was first introduced to South Florida around 1900. It is now widespread in the region, primarily on disturbed, well-drained sites.

Brazilian-pepper reproduces by seed. Seeds are produced in bright red berries that are ingested by birds and other wildlife and then spread to other areas. Ingestion appears to improve seed germination potential.

Fire has variable effects on pepper plants. Seedlings are killed by fairly frequent fires; however, in more mature stands trees may be top-killed by fires but can resprout and reoccupy a burned area. Intense fires on upland sites tend to eliminate competing vegetation and prepare good seedbed conditions.

Like melaleuca, Brazilian-pepper occurs in dense, pure stands. However, unlike melaleuca, dense Brazilian-pepper stands are almost always confined to areas with substrate disturbance (roadsides, canal banks, abandoned homesites, or camps — typically areas in which fill has been placed to create dry land). As some upland areas mature toward hardwood hammock vegetation, Brazilian-pepper will decline in importance. However, in most upland areas the natural fire cycle is likely to maintain Brazilian-pepper as a component of the understory indefinitely. Fire and hydrological cycles seem to prevent

Brazilian-pepper from invading undisturbed prairies, marshes, and other more moist types of environments.

Brazilian-pepper occurs in mesic communities nearly throughout the Preserve. It is often found on old farm fields, spoil banks, and canal berms. The overall goal is for stopping the spread of Brazilian pepper in the entire Preserve, which would likely take about 10 years (NPS 2006b).

Water-hyacinth and Hydrilla. Water-hyacinth and hydrilla have invaded the Preserve's canal systems and excavated ponds, where they often form dense mats. Neither species can invade seasonally dry wetlands, and both species appear to be restricted to permanent water in canals and ponds. For this reason no major control program is currently warranted.

Small-leaf Climbing Fern. Small-leaf climbing fern is rapidly becoming a significant problem species throughout southern Florida due to its invasive nature. It apparently originated in the Palm Beach County area on the east coast of the state and has been spreading rapidly westward and southward. The first recorded treatment of small-leaf climbing fern in the Preserve occurred in 1998. Since then this nonnative invasive species has been found in nearly 100 sites in the Preserve. Infestations have been found throughout the Preserve, with the greatest concentration in the northeast. Most of these infestations are small (<0.5 acre), although some larger patches have been found. To date all known infestations of this species have been treated.

However, further establishment of this fern in the Preserve is anticipated, and detailed reconnaissance to locate infestations will occur annually. The overall goal is to prevent incipient infestations of small-leaf climbing fern from becoming major eradication problems.

Another similar nonnative invasive climbing fern, Japanese climbing fern (*Lygodium japonicum*), is causing similar problems with native communities, but this plant is more common to the north. Although Japanese climbing fern has been recorded in the Preserve, it is not common.

WILDLIFE

Protected Wildlife Species

A total of 29 animal species that could occur in the Preserve receive some level of special protection or are recognized as rare species by the state of Florida or the federal government.

Eight of the 29 species mentioned above are listed as either federally endangered or threatened and reside in the Preserve. The state lists 13 species as species of special concern. Collectively, these species warrant attention because they have experienced long-term population declines and are vulnerable to exploitation or environmental changes. Table 3-2 displays the status of all 29 special status wildlife species that are known to occur in the Preserve.

Table 3-2 – Listed Wildlife Species for Big Cypress National Preserve¹

Common Name	Scientific Name	Designated Status ²	
		Federal	State
Mammals			
Florida bonneted bat	<i>Eumops floridanus</i>		T
Everglades mink	<i>Mustela vison evergladensis</i>		T
Mountain lion	<i>Puma concolor</i>		T(S/A)
Florida panther	<i>Puma concolor coryi</i>	E	E
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>		T
West Indian manatee	<i>Trichechus manatus</i>	E	E
Florida black bear	<i>Ursus americanus floridanus</i>		T

Table 3-2 – Listed Wildlife Species for Big Cypress National Preserve¹

Common Name	Scientific Name	Designated Status ²	
		Federal	State
Birds			
Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	E	E
Limpkin	<i>Aramus guarauna</i>		SSC
Little blue heron	<i>Egretta caerulea</i>		SSC
Reddish egret	<i>Egretta rufescens</i>		SSC
Snowy egret	<i>Egretta thula</i>		SSC
Tricolored heron	<i>Egretta tricolor</i>		SSC
White ibis	<i>Eudocimus albus</i>		SSC
Florida sandhill crane	<i>Grus canadensis pratensis</i>		T
American oystercatcher	<i>Haematopus palliatus</i>		SSC
Wood stork	<i>Mycteria americana</i>	E	E
Osprey	<i>Pandion haliaetus</i>		SSC*
White-crowned pigeon	<i>Patagioenas leucocephala</i>		T
Brown pelican	<i>Pelecanus occidentalis</i>		SSC
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	E
Roseate spoonbill	<i>Platalea ajaja</i>		SSC
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E	E
Black skimmer	<i>Rynchops niger</i>		SSC
Least tern	<i>Sterna antillarum</i>		T
Reptiles			
American alligator	<i>Alligator mississippiensis</i>	T(S/A)	T(S/A)
American crocodile	<i>Crocodylus acutus</i>	T	T
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T	T
Mollusks			
Florida tree snail	<i>Liguus fasciatus</i>		SSC

Sources: USFWS 2011a, FWC 2011, and Florida Natural Areas Inventory 2011.

¹ Species in this table include those that have been documented in the Preserve- it does not include listed species for Collier County that are not present in the Preserve.

² E = endangered; T = threatened; (S/A) = similarity of appearance to a threatened or endangered species; SSC = species of special concern (no regulatory authority); SSC* = SSC in Monroe County only

Florida Panther. The Florida panther is federally listed as endangered under the Endangered Species Act and is state-listed as endangered in Florida. Lands in the Preserve contain suitable habitat for the Florida panther, and approximately one-third of the panthers' current range falls within the Preserve. Figure 3-1 shows the regional network of state and federal lands in South Florida where Florida panthers are known to occur. Figure 3-2 shows the Preserve, Florida Panther National Wildlife Refuge, and Everglades National Park overlaid with a 95% kernel range estimate based on panther radio-telemetry data (1981-2009).

Panthers once lived throughout most of the southeastern U.S., but intensive persecution of these animals, prey decline, and destruction of wildlands severely reduced the population. Today, the only confirmed breeding population is located in South Florida. The current panther population is centered in and around the Preserve, including Everglades National Park, Fakahatchee Strand Preserve State Park, Florida Panther National Wildlife Refuge, and privately owned lands north of the Preserve in Collier and Hendry counties.

Approximately 20 to 30 Florida panthers remained in the early 1980s (McBride et al. 2008). In 1995, eight female Texas cougars were released into the Florida panther

population, including four introduced into the Big Cypress, to offset the negative effects of inbreeding documented in panthers. The panther population has been steadily increasing since genetic restoration was initiated, and the present population is estimated to be between 100 and 160 animals.

Panthers are a landscape species that require large contiguous areas with adequate prey availability and reduced levels of human disturbance. Forest patches comprise an important component of panther habitat in South Florida (Kautz et al. 2006). Panthers select forested habitat types interspersed with other habitat types that are used in proportion to their availability (Land et al. 2007, Onorato et al. 2010). Panthers prefer to move through vegetated areas, and rarely move through open areas except at night. It is important to maintain vegetated corridors between habitats to allow for panther movement.

Existing data on panther reproduction indicate that breeding may occur throughout the year, with a peak during winter and spring, a gestation period of around 90 to 95 days, litter sizes of one to four kittens, and a breeding cycle of two years for females successfully rearing young to dispersal, which typically occurs at 18 months (USFWS 2008). Most panther births occur between March and July, and the den sites are used for two months after birth. Den sites are usually located in dense, understory vegetation, typically saw palmetto (Maehr 1990a, Shindle et al. 2003).

The panther's preferred prey items are white-tailed deer and feral hogs (Maehr et al. 1990, Dalrymple and Bass 1996). Secondary prey includes raccoons (*Procyon lotor*), nine-banded armadillos (*Dasypus novemcinctus*), marsh rabbits (*Sylvilagus palustris*) (Maehr et al. 1990) and alligators (Dalrymple and Bass 1996). Regarding deer predation, Janis and Clark (2002) determined a predation success rate of one kill per 5.24 days for female panthers and one kill per 7.7 days for male panthers, with an average of one kill per animal per 6.45 days for the general panther population.

Panthers are typically shy, secretive animals that normally avoid human interaction. Interactions with humans can affect panther behavior. A study was conducted between 1994 and 1998 by Janis and Clark (1999) to study the effects of hunting on panthers. It centered on the panther population north of I-75, including the Bear Island Unit in the original Preserve. The USFWS's "Biological Opinion" for the 2000 *Final Recreational ORV Management Plan* states the following on page 562 of the plan:

Janis and Clark (1999) surmise that the increase in the distance of panther locations from trails is "biologically minor" and probably related to prey behavior; i.e. white-tailed deer moving deeper into the forest to avoid ORV users. The decrease in panther use of the Bear Island Unit is balanced by an increase in use of private lands north of [Big Cypress National Preserve] as "refugia." The authors assert that this pattern would be of serious concern if panther habitat on private lands were lost.

Fletcher and McCarthy (2011) conducted an updated analysis to assess effects found in Janis and Clark (2002). Their analysis provided limited support for the effects of hunting on panthers. In particular, Fletcher and McCarthy (2011) did not re-affirm private land refugia postulated by Janis and Clark (2002). Rather, they found:

Our updated analysis to assess effects found in Janis and Clark (2002) provided limited support for concluding hunting affects panther distribution and movements. We observed an increasing frequency of use of Bear Island during the hunting season by panthers rather than a decrease as seen in Janis and Clark (2002). Similar to Janis and Clark (2002), we found a significant difference in the distance to trail across hunting time periods. However, we did not observe an increase in the hunting period followed by a decrease in the post period, as in Janis and Clark (2002) but rather a continuous increase from pre-hunting through to post-hunting, perhaps because the small

game and turkey seasons appear to be included in the post-hunting period of Janis and Clark (2002). We also note that the change in the average distance of panther locations from trails between the pre-hunting and hunting seasons (81 m) was well within the telemetry error of panther locations (489 m; as estimated by Janis 1999).

Fletcher and McCarthy (2011) found that heightened ORV use has some weak effects on panther distribution, specifically an increase in use of forested wetlands, but that variation in standing ground water was more influential on panther distributions. The authors concluded:

Nonetheless, these results suggest that panthers and hunter ORV use can co-occur at least at the hunter ORV levels observed, and that forested wetlands may be disproportionately used by panthers during times of high hunter ORV use.

Several government agencies are involved in panther management and research in South Florida and the Preserve. Under the Endangered Species Act, the USFWS has oversight responsibility to review the actions of other agencies in relation to federally protected species and to establish species recovery programs. The NPS has the primary responsibility for protecting the panther (as well as other listed species) on lands under its jurisdiction. National Park Service efforts have concentrated on the distribution of panthers on NPS lands in the Preserve south of I-75 and east of SR 29 and in Everglades National Park. The FWC is responsible for panther research and management and has focused on panther home ranges and movement patterns, habitat selection and needs, food habits, demographic parameters, physical condition and health, and other life history and management questions. In addition, the FWC has also been involved in studies of the condition and health of deer in the Preserve as the panthers' main prey. The NPS and the FWC cooperate for overall wildlife management in the Preserve.

In 2008, the *Florida Panther Recovery Plan* was updated with a third revision and released by the USFWS (USFWS 2008). This 2008 plan

includes the following recovery objectives: recovery objectives:

- to maintain, restore, and expand the panther population and its habitat in South Florida and expand the breeding portion of the population in South Florida to areas north of the Caloosahatchee River
- to identify, secure, maintain, and restore panther habitat in potential reintroduction areas within the historic range, and to establish viable populations of the panther outside south and south-central Florida
- to facilitate panther recovery through public awareness and education

The plan also identifies criteria for recovery and reclassification under the Endangered Species Act. Downlisting on the Florida panther would require two separate, viable populations of at least 240 individual panthers (adults and subadults) that have been established and maintained for a minimum of 12 years. And, sufficient habitat quality, quantity, and spatial configuration to support these populations would need to be secured.

To work toward this long-term goal, the 2008 recovery plan identifies an interim goal to achieve and maintain a minimum of 80 panthers in each of two reintroduction areas within the historic range and to maintain, restore, and expand the south/south-central Florida subpopulation. The actions needed to achieve this interim goal are as follows:

1. Maintain, restore, and expand the panther population and its habitat in South Florida.
2. Expand the breeding portion of the population in South Florida to areas north of the Caloosahatchee River.
3. Identify potential reintroduction areas within the historic range of the panther.
4. Reestablish viable panther populations outside of south and south-central Florida within the historic range.
5. Secure, maintain, and restore habitat in reintroduction areas.
6. Facilitate panther conservation and recovery through public awareness and education.

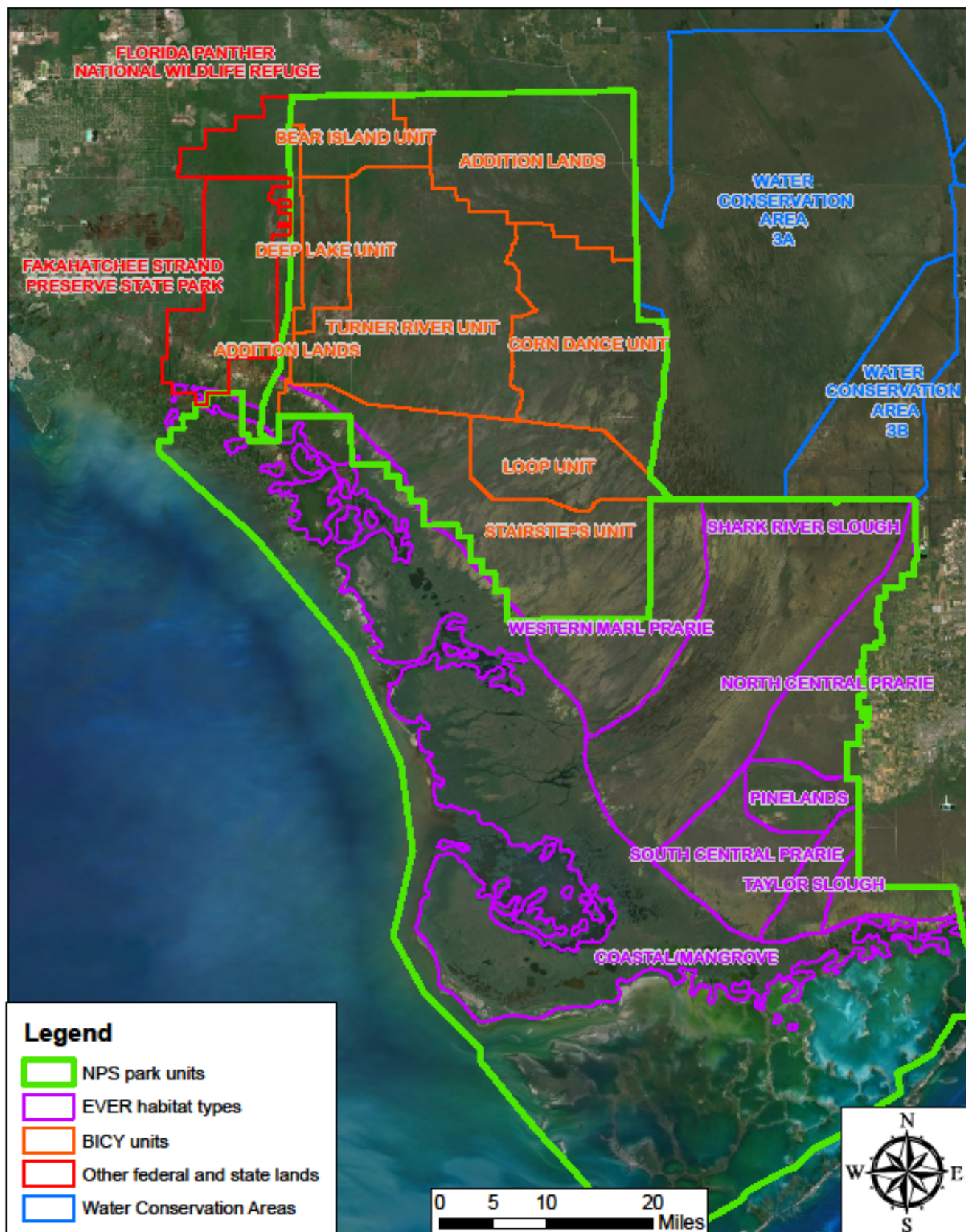


Figure 3-1 – Regional Network of State and Federal Lands in South Florida Where Florida Panthers are Known to Occur

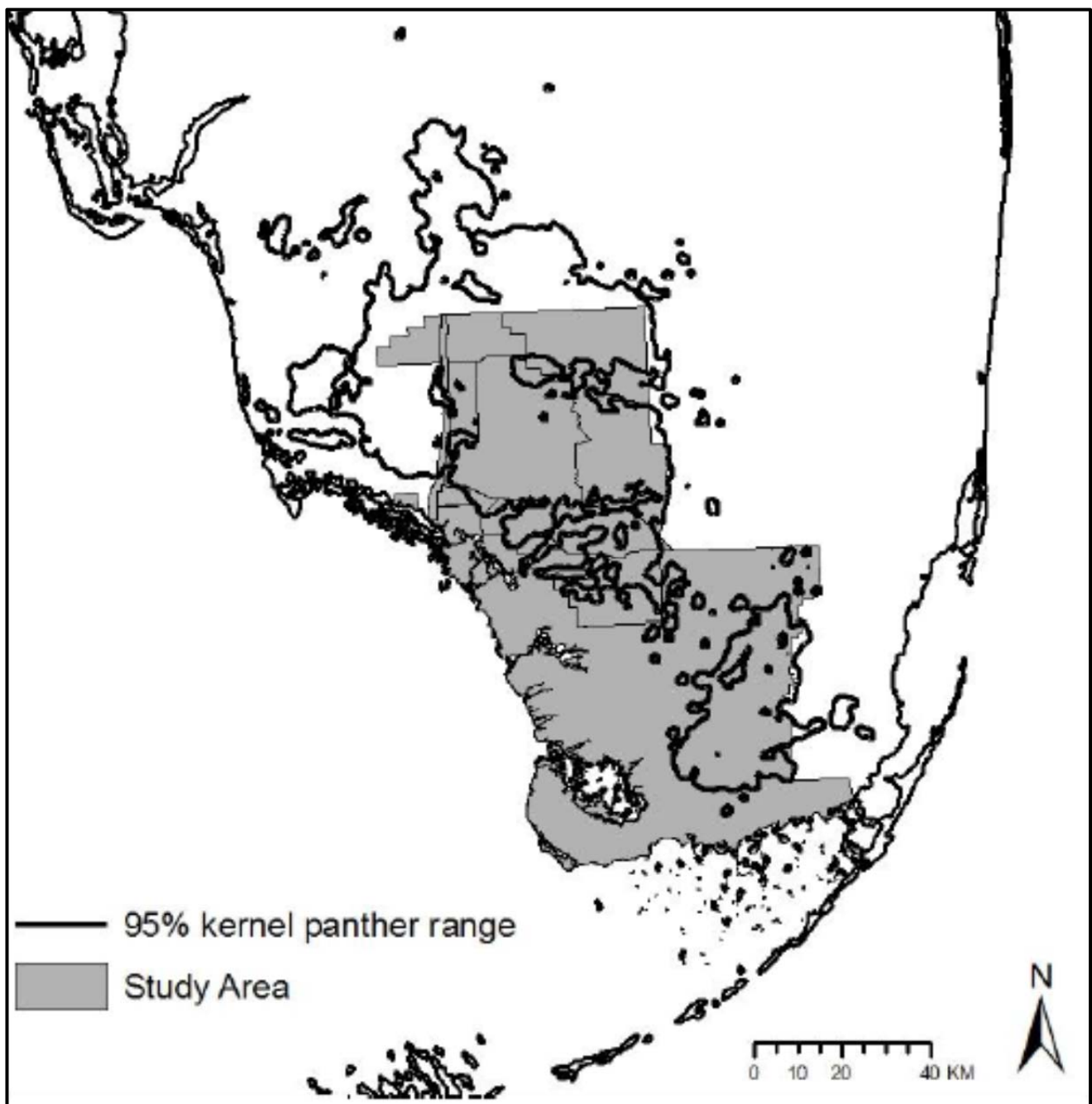


Figure 3-2 – The Preserve, Florida Panther National Wildlife Refuge, and Everglades National Park overlaid with a 95% Kernel Range Estimate Based on Panther Radio-Telemetry Data (1981-2009)

Source: Fletcher and McCarthy 2011

West Indian Manatee. The West Indian manatee was listed as federally endangered under the Endangered Species Act in 1967. Critical habitat for the West Indian manatee was designated by the USFWS in 1976 (41 FR 41914), and corrected and augmented in 1977 (42 FR 47840-47845). As published in the *Federal Register* (50 CFR Part 17.95), critical habitat, as it applies to the Addition, is defined as:

all U.S. territorial waters adjoining the coast and islands and all connected bays, estuaries, and rivers from Gordon's Pass, near Naples, Collier County, southward to and including Whitewater Bay, Monroe County.

No specific primary or secondary constituent elements were included in the designation. Critical habitat for the manatee identifies specific areas occupied by the manatee that have those physical or biological features that are essential to the conservation of the manatee and/or may require special management considerations.

Interpretations of the critical habitat criteria contained in the *Federal Register* have led biologists to conclude that critical habitat in the Preserve is generally limited to open water creeks, canals, and estuarine areas south of U.S. 41. Critical habitat includes near-shore mangrove estuaries and creeks, as well as the canals along U.S. 41 and SR 29. Occupied critical habitat in the SR 29 canal (aka Barron River Canal) extends to the north beyond U.S. 41 as far as the first water control structure. The West Indian manatee is one of the largest coastal mammals in North America. The West Indian manatee is an aquatic mammal with grey to grey-brown, thick, tough skin that is sparsely covered with small, thick hairs and is sometimes covered with barnacles and algae. The rounded body of the manatee has no hind limbs, but it has paddle-like forelimbs or flippers with three to four nails present on the dorsal surface of each flipper. The body tapers to a flattened tail.

This unusual marine mammal with its massive, seal-like body has been able to adapt well to its marine environment. Exact

estimates of the historic manatee population are uncertain, but overhunting during the 1700s to 1900s is believed to be responsible for reducing the manatee population to only a few relict groups (Hartman 1979). Manatees migrate seasonally to adapt to changing water temperatures. West Indian manatees roam in fresh, brackish, and marine waters throughout Florida, the Greater Antilles, Central America, and South America. Waters colder than 20 degrees Celsius increase the manatees' susceptibility to cold stress and cold-induced mortality. Because of this temperature restriction, manatees seek out warm water refuges to help reduce energetic maintenance costs. The West Indian manatee is one of the most endangered marine mammals in coastal waters of the United States.

The manatee occurs throughout the southeastern United States. The only year-round populations of manatees occur throughout the coastal and inland waterways of peninsular Florida and Georgia (Hartman 1974). During the summer, manatees may range as far north along the East Coast of the U.S. as Rhode Island, west to Texas, and, rarely, east to the Bahamas (USFWS 1996, Lefebvre et al. 1989). There are reports of occasional manatee sightings from Louisiana, southeastern Texas, and the Rio Grande River mouth (Gunter 1941, Lowery 1974).

Manatees frequently migrate throughout the waterways in South Florida. The South Florida ecosystem region is home to the most resident manatee populations and transient migrants in Florida. In South Florida, manatees are most prominent year-round in the following areas: Indian River, Biscayne Bay, Everglades and Ten Thousand Island area, Estero Bay and Caloosahatchee River area, and Charlotte Harbor area. Some of the largest winter aggregations (50 or more manatees) occur in south and central Florida (USFWS 1996).

Manatees occur in both fresh- and saltwater habitats within tropical and subtropical regions. They depend on areas with access to natural springs or manmade warm water refugia and access to areas with vascular plants and freshwater sources (Humphrey 1992). Several factors contribute to the

distribution of manatees in Florida. Between October and April, Florida manatees concentrate in areas of warmer water. When water temperatures drop below 21 to 22 degrees Celsius, they migrate to South Florida or form large aggregations in natural springs and industrial outfalls. Severe cold fronts have been known to kill manatees when the animals did not have access to warm water refuges.

During warmer months they appear to choose areas based on food supply, water depth, and proximity to fresh water. Manatees may not need fresh water, but they are frequently observed drinking fresh water from sewage outfalls and culverts.

The manatee occupies a prominent position in marine and estuarine systems as a prodigious grazer of submerged aquatic vegetation. It spends about five hours a day feeding, and in that time, it consumes about 4 – 9 per cent of its body weight (44 to 99 pounds or 20 to 45 kilograms /day) (Bengston 1983). Submerged aquatic vegetation, such as seagrasses, is a major component of the diet of manatees, and although manatees appear to tolerate marine and hyper saline conditions, they are most frequently found in fresh or brackish waters. Manatees inhabit both salt and fresh water of sufficient depth (5 feet to usually less than 20 feet) and may be encountered in canals, rivers, estuarine habitats, saltwater bays, and, on occasion, have been observed as much as 3.7 miles off the Florida gulf coast (USFWS 2005).

Although there are no accurate estimates of manatee population size, the Florida Department of Environmental Protection aerial surveys determined that there were at least 2,639 manatees in Florida's waters in 1996, and a minimum of 1,709 in 1997. The synoptic (general) aerial survey for 2007 reported 2,817 manatees in Florida waters, and 3,807 manatees in 2009 (Fish and Wildlife Research Institute 2009). Although this has been the highest estimate of manatees since the surveys were started, the results of these surveys may vary because of such factors as sampling methodology, manatee behavior, and weather conditions.

Human activities have significantly affected manatees by eliminating or modifying suitable habitat, altering migratory access routes, increasing mortality, and decreasing abundance, all of which can affect manatee reproduction, recruitment, distribution, and behavior. The greatest current threat to manatees is the high rate of manatee mortalities caused by watercraft or propeller collisions. In addition to direct collisions with boats, secondary effects from boating activity include such stresses as disruption of normal breeding behavior, disruption of cow-calf bonding, interference with migration routes and patterns, and the loss of feeding areas. The second most significant threat to manatees is the loss and degradation of habitat, due primarily to direct damage by aquatic recreational and commercial boating activity, coastal construction, and pollution from sewage discharge and stormwater runoff (Marine Mammal Commission 1992, Smith 1993). Other human-related threats include manatee death or injury from flood-control structures and navigational locks, entanglement in fishing line, entrapment in culverts, and poaching. These other threats accounted for 162 known mortalities between 1974 and 1993.

The USFWS's recovery plan for the manatee established four objectives: (1) identify and minimize causes of manatee disturbance, injury, and mortality, (2) protect essential manatee habitat, (3) determine and monitor the status of manatee populations and essential habitat, and (4) coordinate recovery activities, monitor and evaluate progress, and update and/or revise the recovery plan (USFWS 1996).

Red-cockaded Woodpecker. The red-cockaded woodpecker was listed as federally endangered under the Endangered Species Act in 1970. Critical habitat for the red-cockaded woodpecker has not been designated by the USFWS. Lands in the Preserve contain suitable habitat for the red-cockaded woodpecker.

The red-cockaded woodpecker is one of 22 species of woodpeckers native to North America. Adult red-cockaded woodpeckers are

approximately 7 to 8 inches in length and have a wingspan that ranges between 1 to 1.2 feet. The red-cockaded woodpecker is easily distinguished by its large, conspicuous white cheek patches, black cap and neck, and black-and-white barred back and wings (Jackson 1994).

The red-cockaded woodpecker's historic range encompassed the southeastern U.S. from eastern Texas and Oklahoma to New Jersey, and the bird was characterized as abundant in 19th-century literature. Throughout the 20th century, however, the species distribution within its historic range has become fragmented, and its total population numbers have decreased drastically due to the destruction of its habitat. The woodpecker is still widely distributed in the southeastern United States, but the few remaining colonies (a particular group of woodpeckers that use a set of cavity trees) are confined to scattered refuges.

The population in the Preserve is the southernmost and perhaps the largest in South Florida (NPS 1981). The red-cockaded woodpecker can only survive in mature pine stands, usually 60 years old or more, that are infected with red-heart disease, a fungus that weakens the interior "heartwood" of a pine. This allows the birds to excavate cavities for roosting and nesting. The red-cockaded woodpecker typically nests between April and August in tree cavities located 20 to 50 feet above the ground. In the Preserve, nesting is usually over by mid-June (Schulze 2007).

The pine trees must be widely spaced and preferably have an open understory. Such stands are uneconomical from a forest products perspective, and most mature pinelands in the Southeast have been converted to plantations of young pines for the pulp and lumber industries, thus removing most woodpecker habitat (Lennartz et al. 1983) and causing population decline.

Beyond direct removal of mature pinelands, the woodpecker may also decline if remaining mature pinelands are not properly managed. The open understory is commonly maintained by periodic fire. However, if fires are too

frequent, then the pine reproduction necessary to perpetuate the stand may be suppressed; if fires are not frequent enough, the understory may become too dense to maintain the colony, or the fuel build-up may cause an intense fire that could destroy cavity trees (NPS 1981).

Red-cockaded woodpeckers forage in a wide variety of pine species and especially favor areas that contain large trees, which have a large surface area and loose bark. They feed on adults, larvae, and eggs of arthropods, especially ants and termites that they find by flaking bark from the tree. In prime habitat the forage area for the red-cockaded woodpecker surrounds the colony and consists of pine forests. But in Big Cypress, where pine forests are patchy, the forage area is large and includes prairies, swamps, and other vegetation communities. Recent studies show that forage areas in South Florida average more than 360 acres rather than 200 acres typical for most of the woodpecker's range (Nesbitt et al. 1983).

The red-cockaded woodpecker appears to be fairly tolerant of human activities as long as the colony is maintained. For instance, several active colonies in the Preserve are near ORV trails, oil pads, and backcountry camps. There appears to be a limit, however, on the amount or types of activities that woodpeckers will tolerate; in other parts of the South, nesting failures have been attributed to noise from loud radio music and house construction, continuous chainsaw operation, and heavy interstate traffic (Jackson 1983).

The FWC has been monitoring the red-cockaded woodpecker population in Big Cypress Preserve since 2008. In 2011, there were 86 confirmed active clusters containing 84 potential breeding groups. The FWC intensively monitors a portion of these clusters every year for reproductive success, cavity augmentations, translocation potential, and habitat recommendations. New clusters have been discovered in suitable pine habitat consistently since 2008.

Management of the red-cockaded woodpecker in the Preserve currently consists of prescribed burning, or allowing prescribed natural fire in

mature pine stands known to support colonies, and restricting oil and gas activity to avoid disturbing these colonies. NPS staff from the Resource Management and Fire programs meet annually to determine prescribed fire needs. Oil and gas activity is prohibited near a colony to provide an undisturbed forage area around the colony. Management actions for this species within the Preserve include mechanical removal of fuel loads under cavity trees and reduction in midstory vegetation through prescribed fire. Annual work includes determining cluster status, observing nesting activity, making nesting cavities in trees, and banding nestlings.

Habitat fragmentation and/or loss are the primary threats to this species. Other range-wide threats to the red-cockaded woodpecker include cluster abandonment due to encroachment of midstory vegetation. Genetic isolation may be a problem with the woodpecker throughout its range. Even though genetic problems have not been documented within the Preserve, the widely scattered habitat may preclude adequate genetic mixing. Environmental events such as wildfires, hurricanes, and inundation by water for extended periods have also affected pinelands that host woodpeckers.

Wood Stork. The wood stork was listed as federally endangered under the Endangered Species Act in 1984. Critical habitat for the wood stork has not been designated by the USFWS. Lands within the Preserve and several known rookeries are documented. A large portion of the Preserve contains the habitat parameters required to support nesting.

The wood stork is a large, long-legged wading bird, with a body length (head to tail) of approximately 2.75 to 3.25 feet and a wingspan of 5 to 5.5 feet. Their plumage is white, except for iridescent black primary and secondary feathers and a short black tail. On adult wood storks, the rough scaly skin of the head and neck is unfeathered and blackish in color. Their legs are dark with dull pink toes. The bill color is blackish.

Wood storks are birds of fresh water and brackish wetlands, primarily nesting in cypress

or mangrove swamps. In the United States, wood storks historically nested in all coastal states between Texas and South Carolina (Wayne 1910; Bent 1926; Howell 1932; Oberholser 1938; Dusi and Dusi 1968; Cone and Hall 1970; Oberholser and Kincaid 1974). Currently, wood storks breed in Florida, Georgia, and coastal South Carolina. Wood storks usually construct their nests in medium to tall trees that are usually standing in water or in trees that are on dry land if the land is a small island surrounded by water. Their nests are large rigid structures usually found in the forks of large branches or limbs. Storks may add guano to the nest to stabilize the twigs (Rodgers et al. 1988). The nest may be constructed in branches that are only a yard above the water or in the tops of tall trees.

The nesting season of wood storks varies geographically, but in Florida egg laying begins in October, and fledging of young birds occurs in February or March. The U.S. breeding population of the wood stork declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960. Since 1978, fewer than 5,000 pairs have bred each year. The decline is believed to be due primarily to the loss of suitable feeding habitat, especially in South Florida rookeries, where repeated nesting failures have occurred despite protection of the rookeries. According to the *South Florida Multi-Species Recovery Plan*, under pre-drainage conditions wood storks formed colonies between November and January (December in most years regardless of annual rainfall and water level conditions). In response to deteriorating habitat conditions in South Florida, wood storks in the Everglades and Big Cypress basins have delayed the initiation of nesting to February or March in most years since the 1970s. This shift in timing is believed to be responsible for the increased frequency of nest failures and colony abandonment.

Wood storks feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools, primarily on fish between 7.75 and 9.75 inches in length. Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels. Feeding areas in South

Florida have decreased by about 35 per cent since 1900 because of human alteration of wetlands. Additionally, levees, canals, and floodgates have greatly changed natural water regimes in South Florida.

The wood stork forages annually in Big Cypress when water levels provide concentrations of fish. Documented nesting in the Big Cypress was rare until 1996 when 45 colonies were reported (Jansen and Brooks 1996). The previous two consecutive years of high water and subsequent buildup of the prey base apparently provided ideal conditions in which to raise young. Wood stork nests have been found only sporadically in the Big Cypress since 1996. Observations since that time have not been systematic and have generally been conducted in conjunction with overflights and aerial surveys for the Florida panther.

Preservation and/or restoration of natural hydrologic processes is critical to the survival of the wood stork, as it depends on open water to support its nesting, roosting, and foraging sites.

Cape Sable Seaside Sparrow. The Cape Sable seaside sparrow was first listed as federally endangered under the Endangered Species Conservation Act (which preceded the Endangered Species Act) in 1967 (32 FR 4001). Cape Sable seaside sparrows are small birds about 13 centimeters or 5 inches long (USACE et al. 2000).

The Cape Sable seaside sparrow inhabits brushless, subtropical marshes (prairies) of interior southern Florida. These habitats remain dry most of the year but are seasonally flooded with entirely fresh to slightly brackish water. These habitats are subject to occasional flooding, which can be a major cause of nest loss (USACE et al. 2000).

According to USACE et al. (2000), the Cape Sable seaside sparrow remains widely distributed over a large area of South Florida and continues to occupy much of its historically known range in Collier, Miami-Dade, and Monroe Counties. Most of the sparrow population occurs in and near Taylor

Slough and in Big Cypress Swamp (Kushlan and Bass 1983). Critical habitat for the Cape Sable seaside sparrow is designated in the area of Taylor Slough in Collier, Miami-Dade, and Monroe counties (USACE et al. 2000).

The population estimate in 1992 was 6,450 birds. In 1993, they numbered 3,347 and in 1994 they totaled 2,800 birds. The decrease is likely because of the devastating effects of Hurricane Andrew in August 1992.

The principal reasons for the decline of the Cape Sable seaside sparrow and the greatest threats to its continued survival are vegetation changes, fire, development, and hydrologic alteration. Catastrophic storms, such as the hurricanes in 1935 and 1992, can lead to natural vegetation changes that make the environment unsuitable for Cape Sable sparrows, thus causing local extirpations. Hurricanes may also kill birds directly, as was likely the case in 1992, as mentioned above (USACE et al. 2000).

Regarding management of the Cape Sable seaside sparrow, this species is adapted to life in vegetation that burns periodically (Kushlan et al. 1982). Timing of the fires, however, is critical. Fires that occur late in the dry season or during and immediately after nesting threaten eggs and newly fledged young. If burned too frequently, an area may never support a vigorous population of nesting sparrows. Prescribed fires and natural wet season fires can enhance marsh habitat and retard the invasion of native shrubs and trees into the prairies occupied by sparrows. A natural fire regime resulting in a burn mosaic is compatible with protecting sparrow habitat (Kushlan et al. 1982). Maintenance of water levels is also important to sparrows because periods of inundation are required to perpetuate the marshes on which they depend. The manipulative capabilities of the water management system can cause high water levels at the wrong time of year which can limit sparrow production by reducing the duration of the nesting season (Kushlan et al. 1982).

Everglade Snail Kite. The Everglade snail kite was first listed as federally endangered under the Endangered Species Conservation

Act (which preceded the Endangered Species Act) in 1967 (32 FR 4001). With a very low population at that time (only 10 snail kites were counted in Florida in 1965), the species was included in the first group of species to be listed under the act. Subsequent to the initial listing, critical habitat for the Everglade snail kite was designated by the USFWS in 1977 (42 FR 40685) and augmented and corrected later that year (42 FR 47840). The designated critical habitat areas for the kite are east and north of Big Cypress National Preserve (along the western perimeter of Lake Okeechobee and the South Florida Water Management District's Water Conservation Areas 1, 2A, 2B, and 3A).

Potential impacts to snail kite critical habitat should be considered because Water Conservation Area 3A is very close to the Preserve (abutting portions of the Preserve to the east). Also, in the *South Florida Multi-Species Recovery Plan*, the USFWS recommends a reconsideration of the critical habitat boundaries for the Everglade snail kite as a "species-level recovery action" and identifies Big Cypress National Preserve as a potential area of inclusion in the critical habitat area.

The Everglade snail kite (or snail kite) is medium in size, with a wingspan of 43 to 46 inches and a body length of 14 to 16 inches (Sykes et al. 1995). It is most easily distinguished from other raptors by its narrow, curved bill, which it uses to extract its primary prey, the apple snail. Also, the tail of both sexes is square-tipped with a white base. Adult snail kites have red eyes, while juveniles have brown eyes (Brown and Amadon 1978; Clark and Wheeler 1987). The adult males are a uniform slate gray in color, whereas adult females are brown with cream-colored streaks from the face down to the breast. Immature snail kites tend to resemble adult females, with the facial/breast streaking being slightly more light brown than cream (Sykes et al. 1995).

The current range of the Everglade snail kite includes parts of South Florida, Cuba, and northwestern Honduras. However, the movement of birds between Florida and Cuba has never been confirmed (Sykes 1979;

Beissinger et al. 1983). Currently, the range and distribution of the Everglade snail kite in Florida is confined to areas with available habitat in the southern half of the state. This Florida range is much smaller than it was years ago when the snail kite was documented in areas of north Florida. Loss of habitat from urban development, agricultural operations, and hydrologic alterations is the primary cause for this reduction in range. Although the snail kite is not a migratory bird species, it is known to be somewhat nomadic within its range in response to habitat changes (i.e., hydrologic changes, food availability, etc.)

The habitat for the Everglade snail kite primarily consists of lowland freshwater marshes and the shallow littoral zones of lakes where an abundance of apple snails (*Pomacea paludosa*) can be found. The snail kite's diet predominantly consists of apple snails. The kite generally forages for the snail by flying low over the water surface or by perching on woody vegetation over open water. Thus the kite depends on sustaining healthy populations of apple snails. Sustained wetland flooding conditions and low-density emergent aquatic vegetation are important for snail reproduction.

However, even if apple snails are thriving in an area, the habitat value for the kite may be dramatically reduced if turbid or eutrophic water conditions exist, or if the kite's view of the water is obstructed by dense vegetation. In other words, the snail kite relies heavily on a clear view of the water subsurface. Thus, marshes or lakes with high nutrient levels can also yield diminished habitat value for the snail kites because nutrient-rich water often generates invasive, nonnative plant growth. This impact from eutrophication can be two-fold. First, algal blooms that result from high nutrient levels can diminish water clarity, which in turn limits the kite's ability to locate subsurface apple snails. And, dense, nonnative growths such as cattail stands can quickly displace large areas of open water, which can fully eliminate foraging areas for the kite.

Also, the presence of interspersed shrubs or small trees in the emergent vegetation in the marsh or lake littoral zone is another

important habitat feature for the snail kite. The kite uses this woody vegetation for foraging activities, roosting, and nesting. Kite roosting and nesting sites are predominantly located over open water. And, nests in shrubs or small trees are less susceptible to water fluctuations, waves, human disturbances, and predators than nests in emergent herbaceous vegetation. Thus, the nest sites in interspersed shrubs and small trees tend to be more successful than those in herbaceous vegetation.

As noted above, the very low Everglade snail kite population in the 1960s (less than 20) warranted its original listing as an endangered species. Subsequently, the snail kite population has grown to several hundred. However, the population counts vary considerably from year to year. For example, during a 10-year monitoring period from 1985 to 1994, the Everglade snail kite count went from 563 in 1986 to 325 in 1987, and back to 498 in 1988. This count period ended with a 1994 population estimate of 996 kites in Florida. The year-to-year fluctuations in counts is attributed to bird mortality, decreased nesting success, dispersal into new areas, or a combination of these factors. However, the potential for more accurate population estimates increases each year as the number of marked birds and their resightings increase.

According to the *South Florida Multi-Species Recovery Plan*, the USFWS has an objective to restore the Everglade snail kite to a stable, self-sustaining population that would allow a status reclassification to threatened (USFWS 1999). This status change would occur if the 10-year average total population size is sustained above 650 kites (assuming various sustainability and year-to-year variation criteria are met). The USFWS considers the Everglade snail kite a resilient species in a highly changeable environment. However, given the limited distribution of the species, its specialized ecological niche, and the irreversible loss of its habitat in South Florida, the USFWS believes that the snail kite does not have the potential to be elevated above the threatened status.

American Crocodile. The American crocodile is one of two crocodilian species that are native to the United States. It was first listed as a federal endangered species under the Endangered Species Act in 1975 (40 CFR 44151). At the time of listing, an estimated 100 to 400 nonhatchling crocodiles existed in Florida (Ogden 1978). Given its low numbers at the time, as well as rapidly growing disturbances to its habitat from human activities (e.g., recreation, hydrology alterations, and urban encroachment), critical habitat for the American crocodile was designated in 1979 (44 CFR 75076). The designated critical habitat for the crocodile includes most of Florida Bay and its perimeter lands, running from the Florida keys north and west to the southern portions of the Everglades.

Given the stabilization of crocodile numbers in Florida by the early 21st century, the USFWS reclassified the American crocodile to threatened in the state of Florida in 2007. According to the USFWS, the Florida crocodile population is between 1,400 and 2,000 individuals (not including hatchlings), with more than 90 documented nest sites in 2005 (USFWS 2007). However, the crocodile population in Florida continues to be susceptible to habitat loss from development and recreation, road mortality, and extreme weather such as hurricanes. And, through the remainder of its range, the crocodile remains listed as an endangered species. In addition to its South Florida range, the American crocodile inhabits the coastal wetlands and rivers of Cuba, Jamaica, the Caribbean coast from Venezuela to the Yucatan peninsula, and the Pacific coast from central Mexico to northern Peru (Moler 1992).

The American crocodile is the larger of the two crocodilian species in Florida. Generally, in Florida, both the American crocodile and the American alligator coexist without conflict. The tolerance for the other species is maintained as long as food and essential and unique habitat attributes are available to both species. Most likely, the coexistence and tolerance of these two species result from species-specific habitat utilization (spatially or temporally), which depends on variations in

the species' preferences for water salinity levels (USFWS 1999). In addition to its size, it can typically be distinguished from the adult alligator by its longer, narrower, tapered snout and its exposed fourth tooth of the lower jaw (when mouth is closed). Adult crocodiles in Florida are often more than 12 feet long (Moler 1992).

The habitat for the American crocodile is mainly associated with mangrove swamps and mangrove-lined creeks, rivers, and bays. However, the habitat use varies seasonally. During breeding and nesting season, adult crocodiles tend to occupy exposed shoreline areas along Florida Bay and nearby inland creek banks. Males generally move more inland than females during this time. In South Florida, breeding typically occurs from late February through March, when ambient air and water temperatures are high enough to trigger reproductive hormonal activity in the crocodiles. In nonnesting seasons, crocodiles generally prefer the lower saline waters of inland swamps, ponds, and creeks (Kushlan and Mazzotti 1989). Given this dependence on inland waterbodies with low salinity and brackish estuaries, the timing and frequency of inland freshwater flow deliveries to South Florida and Florida Bay are very important attributes of American crocodile habitat (USFWS 1999).

Female crocodiles usually locate their nests along the exposed shoreline of open waterbodies (e.g., Florida Bay), or along the banks of inland creeks in extreme South Florida. They typically select nest sites in well-drained, sandy soils at about the normal high water level. However, nests in other substrates, such as peat, marl, and rocky spoil piles, are not uncommon. The nesting success often depends on sustained soil moisture, but success can also be affected by flooding and egg predation. Females must return to the nests to excavate the soil for the hatchlings, thus human presence during nest building, egg laying, and incubation tending can adversely affect nest success. Research indicates that some females may abandon their nest if they are exposed to repeated human disturbances (Kushlan and Mazzotti 1989).

Once the hatchlings leave the nest site, they typically disperse to seek shelter, stable food sources, and brackish to freshwater in nursing areas that are generally more inland than their nest sites. The hatchlings are very susceptible to predation during this dispersal period (Kushlan and Mazzotti 1989). Also, a lack of available freshwater can adversely affect hatchling survival. Periods of low rainfall or long distances to available freshwater can be detrimental to crocodile hatchlings. Once the hatchlings reach the brackish or freshwater nursing areas in estuarine and inland mangrove forests, they typically feed on fish, crabs, snakes, and small invertebrates (USFWS 1999).

Generally, the American crocodile is primarily a nocturnal species, doing most of its active foraging between sunset and sunrise (Lang 1975; Mazzotti 1983). The diet of adult crocodiles generally consists of small mammals, fish, snakes, turtles, and crabs (Ogden 1978; Ross and Magnusson 1989).

The American alligator is also listed as threatened due to similarity of appearance to the crocodile as an additional protection measure for the crocodile. While alligator hunting is permitted in the state of Florida, it is currently prohibited in the Preserve.

Eastern Indigo Snake. The eastern indigo snake was first listed as a federally threatened species under the Endangered Species Act in 1978. The listing was prompted by the snake's significant population decline, which was caused by over collecting for the domestic and international pet trade, as well as mortalities resulting from rattlesnake collectors gassing gopher tortoise burrows. With enforcement of the Endangered Species Act as well as the Lacey Act, exploitation for the pet trade has declined but still remains a concern (Moler 1992). Although the gassing of tortoise burrows is still a threat to the eastern indigo snake, it is not the most serious. Instead, the displacement and fragmentation of habitat from urban development have become the biggest threats to the snake since the listing. However, no critical habitat areas have been designated for the snake to date.

The eastern indigo snake is a long, black, nonvenomous snake found in Florida and Georgia. With a length of up to 104 inches, it is considered one of the longest snakes in the United States (Ashton and Ashton 1981). The eastern indigo has large and smooth scales with a uniform shiny black coloration, except for red or cream tints on the throat, chin, or cheeks.

The eastern indigo snake is an active terrestrial predator that will eat any vertebrate small enough to be overpowered. Layne and Steiner (1996) documented several instances of indigos flushing prey from cover and then chasing it. An adult eastern indigo snake's diet may include frogs, toads, snakes (venomous as well as nonvenomous), lizards, turtles, turtle eggs, fish, juvenile gopher tortoises, small alligators, birds, and small mammals (Keegan 1944; Babis 1949; Kochman 1978; Steiner et al. 1983). Juvenile eastern indigo snakes eat mostly invertebrates (Layne and Steiner 1996).

Currently, the eastern indigo is primarily found in sandhill habitat in northern Florida and southern Georgia. However, the snake is also widely distributed throughout central and South Florida. With their general preference for upland habitats, large numbers of eastern indigos are not common in the wetland complexes of the Everglades region (Duellman and Schwartz 1958; Steiner et al. 1983). Historically, the eastern indigo snake was found throughout Florida and in the coastal plain of Georgia, Alabama, and Mississippi (Haltom 1931; Carr 1940; Cook 1954; Diemer and Speake 1983; Moler 1985a).

Throughout most of its range, the eastern indigo uses a variety of habitat types, particularly because it needs a mosaic of habitats to complete its annual cycle. The habitats include pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and even human-altered habitats. They are especially common in the hydric hammocks throughout this region (Moler 1985a). In central and coastal Florida, eastern indigos are mainly found within many of the state's high, sandy ridges. In extreme South Florida, these

snakes are typically found in pine flatwoods, pine rocklands, tropical hardwood hammocks, and mangrove forests (Kuntz 1977). In portions of South Florida, eastern indigos may also occupy agricultural sites and areas along canals and other artificial waterways.

Wherever the eastern indigo snake occurs in xeric habitats, it is closely associated with the gopher tortoise (*Gopherus polyphemus*), the burrows of which provide shelter from winter cold (Bogert and Cowles 1947; Speake et al. 1978; Layne and Steiner 1996). In the milder climates of central and southern Florida, eastern indigo snakes exist in a more stable thermal environment, where availability of thermal refuge may not be as critical to the snake's survival. However, even though thermal stress may not be a limiting factor throughout the year in South Florida, eastern indigo snakes still seek and use underground refuges in the region. On the sandy central ridge of South Florida, eastern indigos use gopher tortoise burrows more (62 per cent) than other underground refuges (Layne and Steiner 1996). Other underground refuges used by this species include burrows of armadillos, cotton rats (*Sigmodon hispidus*), and land crabs; burrows of unknown origin; natural ground holes; hollows at the base of trees or shrubs; ground litter; trash piles; and in the crevices of rock-lined ditch walls (Layne and Steiner 1996; Hyslop 2007).

Eastern indigo snakes range over large areas and into various habitats throughout the year, with most activity occurring in the summer and fall (Smith 1987; Moler 1985b; Speake 1993). In peninsular Florida, data on home ranges for females vary from 4.75 to 375 acres; while male home ranges vary from 4 to 818 acres (Moler 1985b, Layne and Steiner 1996, Bolt 2006, Dodd and Barichivich 2007). Summer home ranges tend to be much larger than winter home ranges. The eastern indigo's relatively large home range also makes it vulnerable to habitat loss, degradation, and fragmentation (Lawler 1977; Moler 1985b). Extensive tracts of wild land are the most important refuge for large numbers of eastern indigo snakes (Diemer and Speake 1981; Moler 1985b). Additional human population growth will increase the risk of direct mortality of the

eastern indigo snake from property owners, domestic animals, and highway mortality. Pesticides that are introduced into the food chain may also be a hazard to the snake. Pesticides used on crops or for silviculture would pose a threat to the indigo (Speake 1993). Secondary exposure to rodenticides used to control rats may also occur (Speake 1993).

Declines in gopher tortoise populations are negatively affecting eastern indigo snake populations, especially in the northern areas of the snake's range. Gopher tortoises are declining due to loss of both quantity and quality of their habitat. Loss of tortoise habitat quantity is occurring from human population growth and development and conversion of native habitat to agriculture. The use of off-road vehicles in sandhill habitats of the tortoise can also destroy groundcover and soil stability (Lawler 1977).

In the southern parts of their range, eastern indigo snakes often move among the available habitat types. This is one of the reasons why the species is especially vulnerable to habitat fragmentation (Breininger et al. 2004, Hyslop et al. 2006). Large areas of natural habitats protected from roads and the fragmentation associated with development are needed to maintain viable snake populations (Layne and Steiner 1996, Breininger et al. 2004). During the past decade, the loss of natural areas in Florida has continued to rise dramatically (The Nature Conservancy 2006). The effects of habitat destruction and alteration on the eastern indigo snake are likely most substantial along the Florida coasts, in the Keys, and along the high ridges of south-central Florida. Agricultural interests (principally citrus) continue to destroy large expanses of suitable natural indigo snake habitat throughout much of southern Florida. More roads create habitat fragmentation and increases in mortality when snakes try to cross highways (Andrews and Gibbons 2005, Bolt 2006). At some point, the size of fragmented habitat patches will become too small to support viable populations. It has been suggested that eastern indigo snake populations that occur on managed preservation lands of at least 2,500 acres, with

few roads or human-altered habitats that increase habitat fragmentation and mortality, may have the best chance of long-term viability (Moler 1992, Breininger et al. 2004).

The USFWS estimates that the eastern indigo population as a whole is declining in South Florida because of habitat destruction and degradation. Considering the small population of this species, additional threats to its survival or habitat could cause local extirpations. Current and future habitat fragmentation would probably result in a large number of isolated, small groups of indigo snakes. However, even with continued habitat loss, this species would probably persist in most localities where large, unfragmented pieces of natural habitat remain. According to the *South Florida Multi-Species Recovery Plan*, the USFWS has an objective to stabilize and increase the overall eastern indigo population and ensure that multiple healthy populations exist and are protected. If it is determined that sufficient, suitable habitat exists in South Florida for the eastern indigo snake population to stabilize or increase, delisting criteria would be considered.

Major Game Species

Of the 13 game species in the Preserve, white-tailed deer, wild turkey, and feral hogs require special management consideration because of their importance to recreational hunters. White-tailed deer and feral hogs are also main prey species for the endangered Florida panther, while turkeys are taken by panthers on occasion. The current status of these three game species and their habitat is described below.

White-tailed Deer. The white-tailed deer is the most important game species in the Preserve. In addition to being a popular large game animal, white-tailed deer are the endangered Florida panthers' most consistent prey item (Land 1994, USFWS 2008). The deer's food preference is the swamp lily (*Crinum americanum*), a monocot that grows in cypress and hardwood swamps (Labisky 2003).

Generally, deer browse in South Florida is poor because of low fertility and low palatability (Florida Game and Fresh Water Fish Commission 1959). In the later stages of plant succession woody plants and graminoids, which tend to be high in lignin and low in nutrition, occupy a site. Consequently, deer browse declines as the vegetation matures. The best deer browse occurs after disturbances that encourage new growth, because young shoots are relatively high in nutritional value and much more palatable. Fires in the Preserve likely improve deer browse and habitat in the near-term.

Although areas within the Preserve host resident Florida panthers, the full effect of panther predation on deer herds is unknown. McBride (1985) suggests a comparison with western cougar predation on mule deer. Ackerman (1982) found that a cougar in Utah killed a mule deer about every 9.5 days, which equates to 39 mule deer per year per cougar. Janis and Clark (2002) determined a predation success rate of one kill per 5.24 days for female panthers and one kill per 7.7 days for male panthers, with an average of one kill per animal per 6.45 days for the general panther population.

The FWC began collecting data on the deer herd in the Preserve in 1984 to estimate the population size and assess the health and condition of the deer. Since the 1991 *General Management Plan* was completed, the deer population in many areas of the Preserve has increased. Factors influencing this increase include area closures, favorable environmental conditions, and changes in hunting regulations. Data collected from aerial surveys and counts have limitations and have not allowed for complete and accurate estimates of herd size in the entire Preserve to date.

The FWC prepared an analysis in 2011 titled “Status of White-Tailed Deer in the Stairsteps Unit of Big Cypress National Preserve.” This study concluded:

The white-tailed deer population in the Stairsteps Unit of the [the Preserve] has sharply declined in the past decade, with recent surveys and harvest numbers

indicating a near complete population crash. High water levels have been hypothesized as a cause of the decline. Evaluation of hydrological data confirmed that the number and duration of high water events, weeks where water depth exceeded 50 cm and even 60 cm, has become significantly more common in Stairsteps since the 1994-1995 floods. Comparison of water levels pre-and-post deer population declines also demonstrated a significant change in the hydrological parameters between these periods.

The FWC (2011) study further concluded:

The Stairsteps Unit deer population appeared to have recovered from the 1994-95 floods. However, the following recurring years of high water events and the various impacts high water has on deer populations may have caused the population to decline over time due to lower productivity, reduced recruitment, and higher mortality. Long-term research on causes of mortality and survival rates of fawns and adults may be necessary to clarify the role of hydrology on deer populations in the area. Other factors, such as the role of predators, the impact of hunting, and changes in habitat conditions should also be measured to allow for interpretation of study results.

Following this study, FWC EO 10-37 was approved, placing restrictions on deer hunting in the Stairsteps Unit, which are currently in place⁴.

Legal hunting does not seem to be a threat to deer populations in the Preserve, but the cumulative effect of legal and illegal hunting, environmental factors (e.g., extreme high water events), and panther predation is unclear.

Feral Hog. Feral hogs are second to deer in importance as game animals in the Preserve.

⁴ In Zone 3 of the Stairsteps Unit, the bag limit for deer is one annually; hunting deer in Zone 4 of the Stairsteps Unit is prohibited.

Feral hogs were first introduced to Florida by Spanish explorers in the 16th century. Feral hogs are managed by the FWC as a game animal on WMAs and in the past were stocked in many of these areas in South Florida, including Big Cypress as late as 1975. It is now illegal to stock feral hogs in the Preserve; however, illegal stocking in the Preserve may still occur.

Mast-producing hardwood hammocks are probably the preferred habitat for hogs, followed by pinelands (because of their short hydroperiod), and during the dry season mixed-hardwood swamps (Schortemeyer et al. 1985). As with deer, cypress prairies and prairies are probably the least productive vegetation for hogs (J. L. Schortemeyer, Florida Game and Freshwater Fish Commission, pers. comm. 1986).

Feral hogs are known for their ability to rapidly reproduce. In the Merritt Island National Wildlife Refuge near Cape Canaveral, hogs may produce 1.5 litters per year, with an average of 2.3 piglets at weaning (Ron Hight, USFWS, pers. comm. 1986). In south-central Florida, Belden and Frankenberger (1990) determined litter size to be 3.5 piglets prior to weaning. The summer wet season may be a limiting factor for hog populations. Schortemeyer has observed hogs freely moving through 1 foot of water or less, but when water is deeper than 16 inches, their movement appears to be greatly restricted, confining the animals to higher ground and limiting available space and food (Schortemeyer et al. 1985). Conversely, a prolonged winter drought appears to reduce hog reproduction and increase hog movements and may cause direct mortality through dehydration (J. L. Schortemeyer, Florida Game and Freshwater Fish Commission, pers. comm. 1986). Given these limits, the hog population in the Big Cypress may be constrained from large or rapid increases by environmental conditions.

In addition to being a popular game animal, feral hogs are a prey species for Florida panthers (Maehr et al. 1990b, Dalrymple and Bass 1996). Generally, feral hogs constitute the greatest biomass consumed by panthers north of the Alligator Alley section of

Interstate 75 (I-75) while white-tailed deer are the greatest biomass consumed to the south (Maehr et al. 1990).

Some concerns have been raised about the impact of hogs as a nonnative species on natural and cultural resources in the preserve. Hogs are known to uproot extensive areas in hardwood hammocks, and this activity could pose a threat to native plants, *Liguus* tree snail eggs, and archeological resources. Rooting could encourage nonnative plants by providing disturbed areas necessary for establishment. However, it has also been suggested that rooting exposes grubs and other foods for turkey, quail, and additional native wildlife and encourages browse plants for deer. Rooting also occurs during the dry season in marshes.

Other hog-related problems include diseases carried by hogs, possible competition between hogs and native wildlife, possible adverse effects on wild turkey nesting, and competition with deer for the annual mast crop (Beckwith, 1965); however, negative impacts from competition have not been quantified or confirmed. Hogs are known to be carriers of brucellosis (Becker et al. 1978, van der Leek et al. 1993a), a disease that infects humans, and pseudorabies (van der Leek et al. 1993b), a disease known to be fatal to Florida panthers.

The current population of feral hogs in the Preserve has declined in recent years and is currently very low. Data from the 2006 hunt conducted in the Preserve indicated only four animals were taken by hunters, one during muzzleloading season and three during archery season.

Wild Turkey. Wild turkeys are one of the principal game animals for hunting in the Preserve and are occasionally taken by panthers as prey. Wild turkeys are common in the region. Turkey density tends to fluctuate widely from year to year due to environmental conditions (Powell 1965; Frye 1954). Turkey poult mortality is very high if heavy rains occur during April or May when young birds are susceptible, but populations usually bounce back if conditions are favorable during the next breeding season (Powell 1965).

Nonnative / Invasive Wildlife Species

Nonnative species impact natural systems through unchecked predation or consuming and killing of native plant species. In many cases, nonnative wildlife has no natural predators and can displace native species and multiply rapidly. More than 100 nonnative animal species have been introduced into South Florida (Duever et al. 1986a). Sixty of these are believed to have established breeding populations. At least 22 nonnative species have been collected in the Preserve, 18 of which are known to have breeding populations, such as the feral hog, armadillo, several fish (walking catfish, black acara, spotted tilapia, and oscar), several insects (fire ants and lovebugs), and snakes.

The increasing number of nonnative snakes found in South Florida has been causing concern to biologists, with the Burmese python being the most commonly observed snake. The Burmese python is native to India and southeast Asia and has flourished in the subtropical climate of South Florida. Twenty-nine nonnative snakes were discovered in Big Cypress in 2011, an increase from previous years. In nearby Everglades National Park, as of 2007 more than 624 southeast Asian snakes have been found since 2000. In 2006 and 2007, more than 418 snakes were captured and/or removed from the Everglades.

In 2009, FWC EO 09-08 was approved, which created the Partner with Hunters program to assist in the control of reptiles of concern, particularly the Burmese python, within the Preserve/WMA. The Partner with Hunters Program allows hunters to take reptiles of concern within the Preserve, in accordance with regulations outlined in the EO.

WILDERNESS RESOURCES AND VALUES

WILDERNESS

According to Director's Order 41: *Wilderness Stewardship* (NPS 2011b), wilderness character can be measured by four "tangible qualities" that the NPS can utilize in wilderness planning, stewardship, and monitoring. These four qualities are practical and measureable and are rooted in the Wilderness Act:

- **Untrammeled** – Wilderness is essentially unhindered and free from modern human control or manipulation. Actions authorized or unauthorized by the federal land manager that manipulate the biophysical environment are indicators used to identify effects to the untrammeled quality.
- **Natural** – Ecosystems are substantially free from the effects of modern civilization. Plant and animal species and communities, physical resources, and biophysical processes are indicators used to identify effects to the natural quality.
- **Undeveloped** – Wilderness retains its primeval character and influence and is without permanent improvements or modern human habitation. Nonrecreational structures, installations, and developments, inholdings, use of motor vehicles, motorized equipment, or mechanical transport, loss of statutorily protected cultural resources are indicators used to identify effects to the Undeveloped quality.
- **Opportunity for Solitude or Primitive and Unconfined Recreation** – Remoteness from sights and sounds of people inside the wilderness, remoteness from occupied and modified areas outside the wilderness, facilities that decrease self-reliant recreation, management restrictions on visitor behavior are indicators used to identify effects to the Solitude or Primitive and Unconfined quality.

There are also many intangible aspects of wilderness character that are important, including scenic, educational, and ecological

resources and values. According to the Addition GMP (NPS 2010a), these values allow visitors to learn about and experience the contrasting scenery of the Preserve's various plant communities, archeological resources, and water-dependent natural systems. All of these resources and values contribute to and enhance the wilderness character of the area.

Wilderness Resources in the Region

According to the Addition GMP (NPS 2010a), there are three designated wilderness areas in the South Florida region:

- **Marjory Stoneman Douglas Wilderness** (1,296,500 acres in Everglades National Park – the largest wilderness area in the state) managed by the NPS in Collier, Miami-Dade, and Monroe counties
- **J.N. "Ding" Darling Wilderness** (2,619 acres) managed by the USFWS on Sanibel Island in Lee County
- **Florida Keys Wilderness** (6,197 acres) managed by the USFWS in the Florida Keys in Monroe County

Wilderness Resources in Big Cypress National Preserve

There is currently no designated wilderness in the Preserve. However, the preferred alternative in the Addition GMP (NPS 2010a) identifies 47,067 acres of land in the Addition to be proposed for designation as wilderness (see figure 3-3). The NPS is currently in the process of formally designating these lands as wilderness by legislative act. Lands identified as being suitable for wilderness designation, wilderness study areas, proposed wilderness, and recommended wilderness (including potential wilderness) must be managed to preserve the wilderness character and values in the same manner as "designated wilderness" until Congress has acted on the recommendations (NPS 2011a). Therefore, for the purpose of this plan, the 47,067 acres of proposed wilderness located in the Addition would be treated as designated wilderness.

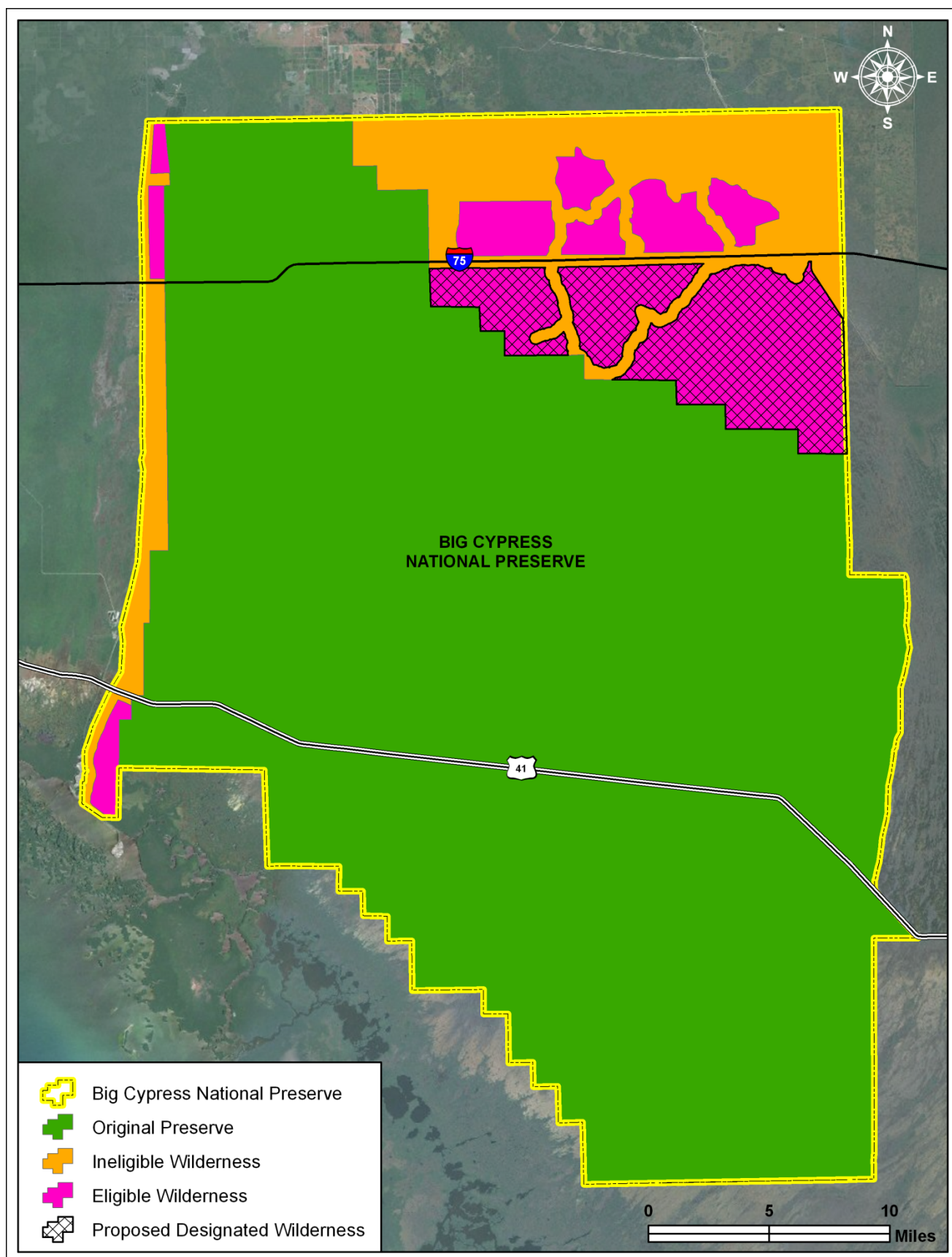


Figure 3-3 – Wilderness Areas in Big Cypress National Preserve

NPS MANAGEMENT AND OPERATIONS

PRESERVE MANAGEMENT AND OPERATIONS

Administrative Organization and Management

The Preserve is administered by a superintendent, responsible for managing and supervising all Preserve operations and activities. The superintendent's office, located at the Preserve headquarters in the southwestern portion of the Preserve in Ochopee, Florida, includes the deputy superintendent, the program assistant, the environmental protection specialist, and the management assistant. Divisions within the Preserve include administration, interpretation, maintenance, resource management, resource and visitor protection, and fire and aviation, each of which is headed by a division chief (NPS 2010a, NPS 2011c). NPS staffing at the Preserve is currently 95-105 employees as of 2012 (NPS 2010a).

- **Administration Division** – The administration division is the "business office" for the Preserve. Its principal functions include human resources, administering the Preserve's Safety Program, purchasing, property management, budget administration, contracting, housing matters, payroll, technology support (personal computers and telephone system), and mail (NPS 2011c).
- **Interpretation Division** – The interpretation division is responsible for information / education programs and services provided to Preserve visitors and neighbors. The division manages Preserve publications, interpretive exhibits, and visitor center operations. Interpretive rangers provide a variety of ranger-led programs to the public. A curriculum-based education program reaches many students in local schools in the fall (NPS 2011c).
- **Maintenance Division** – The maintenance division maintains all roads, trails,

buildings, utilities, grounds, vehicles, and other physical facilities in the Preserve to assure their safe use. The division also manages construction and rehabilitation projects to support the Preserve's operation (NPS 2011c).

- **Resource Management Division** – The resource management division provides scientific guidance to Preserve management on all matters related to natural and cultural resources. The division conducts or oversees studies on physical, biological, and cultural resources. Staff members often work with private landowners to ensure the protection of conservation easements held by the NPS. The division also maintains an extensive museum collection (NPS 2011c).
- **Resource and Visitor Protection Division** – The resource and visitor protection division is responsible for law enforcement, emergency medical services, dispatch, search and rescue, fire management, fees, and security of Preserve facilities, buildings, and NPS housing (NPS 2011c).
- **Fire and Aviation Division** – The fire and aviation division is responsible both for fire-fighting activities and for restoring the natural fire regime to areas where fires naturally occur. The effects of fire on natural ecological systems are actively monitored by division staff (NPS 2010a).

Management Units

The original boundaries of the Preserve established in 1974 consisted of 582,000 acres. The original Preserve is divided into six management planning units – Bear Island, Corn Dance, Deep Lake, Loop, Stairsteps, and Turner River units – which are cooperatively managed by the superintendent and each division, as appropriate (see figure 3-4).

The Addition

In 1988, an additional 147,000 acres were added to the Preserve. These areas – the Northeast Addition and the Western Addition – have not yet been formally divided into management units (see figure 3-4). However, the Northeast Addition and the Western Addition are managed in the same manner as the current management units.

Facilities

NPS facilities are primarily designed to provide safe, enjoyable, and educational access and support to visitors who come to experience Big Cypress National Preserve. Facilities are typically located in areas that can sustain visitation while protecting resources, natural systems, and the generally wild character that was intended upon designation of the Preserve (NPS 2010a). Public facilities present in the Preserve include trails and trailheads, roads, staffed (i.e., Oasis Visitor Center and Big Cypress Swamp Welcome Center) and nonstaffed (i.e., a series of information points along U.S. 41) visitor information centers, and campgrounds (developed and backcountry sites). Administrative facilities include offices, storage, buildings, and Preserve housing. These public and administrative facilities are discussed in detail in the Addition GMP (NPS 2010a).

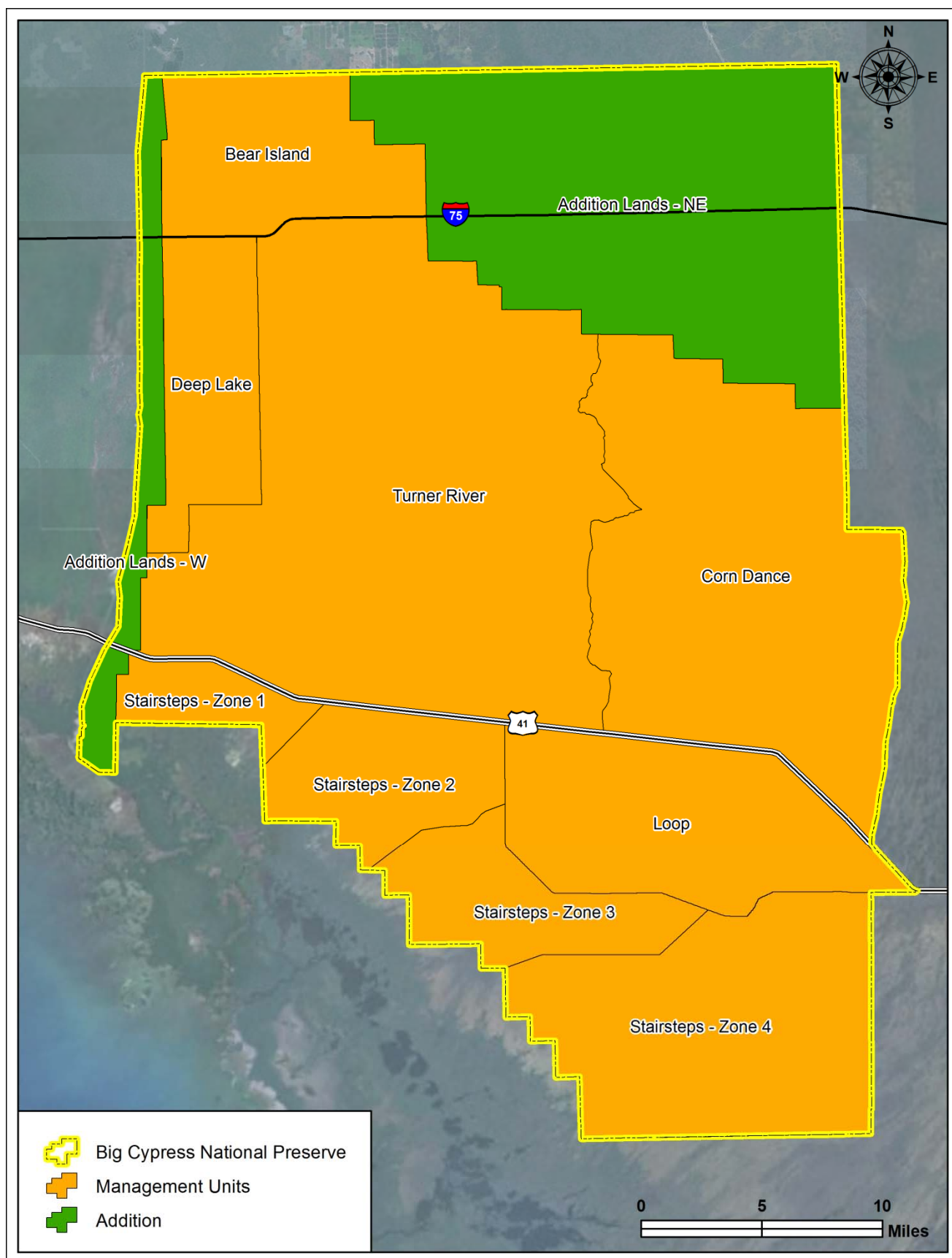


Figure 3-4 – Big Cypress National Preserve Management Units and Addition

VISITOR USE

VISITOR USE AND EXPERIENCE / RECREATIONAL OPPORTUNITIES

Recreational Visitation Data

Table 3-3 shows the annual number of recreational visitors to Big Cypress National Preserve from 1989 to 2010. Approximately 400,000 to 500,000 recreational visitors were recorded annually at the Preserve between 2000 and 2004. In 2005, the Preserve changed its counting methods, adding visitor counts from the Oasis Visitor Center parking lot and vehicle counts from the east and west ends of the Loop Road. This change contributed to the higher visitation figures from 2005 to present (NPS 2010a).

Table 3-3 – Recreational Visits (1989–2010)

Year	Recreational Visitors
1989	81,157
1990	127,790
1991	159,172
1992	212,682
1993	234,830
1994	294,307
1995	365,463
1996	424,920
1997	462,553
1998	474,895
1999	503,110
2000	505,062
2001	409,771
2002	449,481
2003	400,902
2004	385,194
2005	768,687*
2006	825,857
2007	822,864
2008	813,790
2009	812,207
2010	665,523

Source: NPS 2011d

* Change in counting methods.

The Visitor Services Project and Cooperative Park Studies Unit of the University of Idaho

conducted a general visitor survey for Big Cypress National Preserve in the spring of 2007 (Papadogiannaki, Le, & Hollenhorst 2007).

Length of Visit. As part of the 2007 visitor study, visitors to the Preserve were asked whether they spent more or less than 24 hours at the Preserve. Twenty-four percent of visitor groups responded that their trip lasted longer than 24 hours (at least one full day). Within this 24% of visitors whose group stayed at the Preserve for one day or longer, 30% of visitors spent seven or more days at the Preserve, and a total of 46% of visitor groups stayed for two or three days (see figure 3-5) (Papadogiannaki et al. 2007).

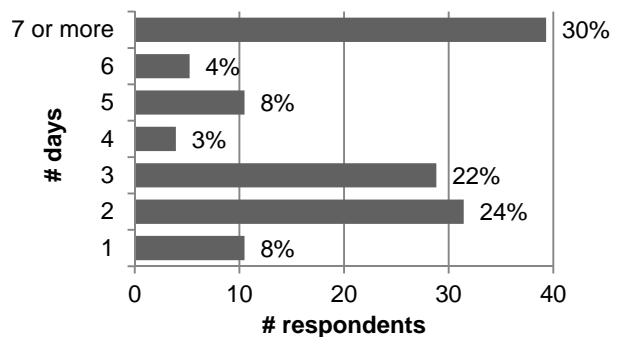


Figure 3-5 – Number of Days Spent Visiting the Preserve

Source: Papadogiannaki et al. 2007

N = 131 visitor groups

Visitor Activities

As part of the 2007 visitor study, one of the questions that visitors were asked was, “On this visit to Big Cypress National Preserve, what activities did you and your group participate in?” The most common activities visitor groups participated in were: viewing wildlife (other than birds) (69%), taking a scenic drive (66%), driving through to another destination (52%), and birdwatching (48%) (see figure 3-6). “Other” activities (6%)

included: biking, taking a boat tour, visiting the Clyde Butcher Gallery or other art galleries, viewing alligators, viewing vegetation, bird song recording, bringing other visitors, taking a cruise, participating in sports,

visiting the visitor center, riding the trolley, visiting the beach, picking up trash, removing Florida holly (i.e., Brazilian-pepper), scouting for hunting, eating at a restaurant, and using restrooms (Papadogiannaki et al. 2007).

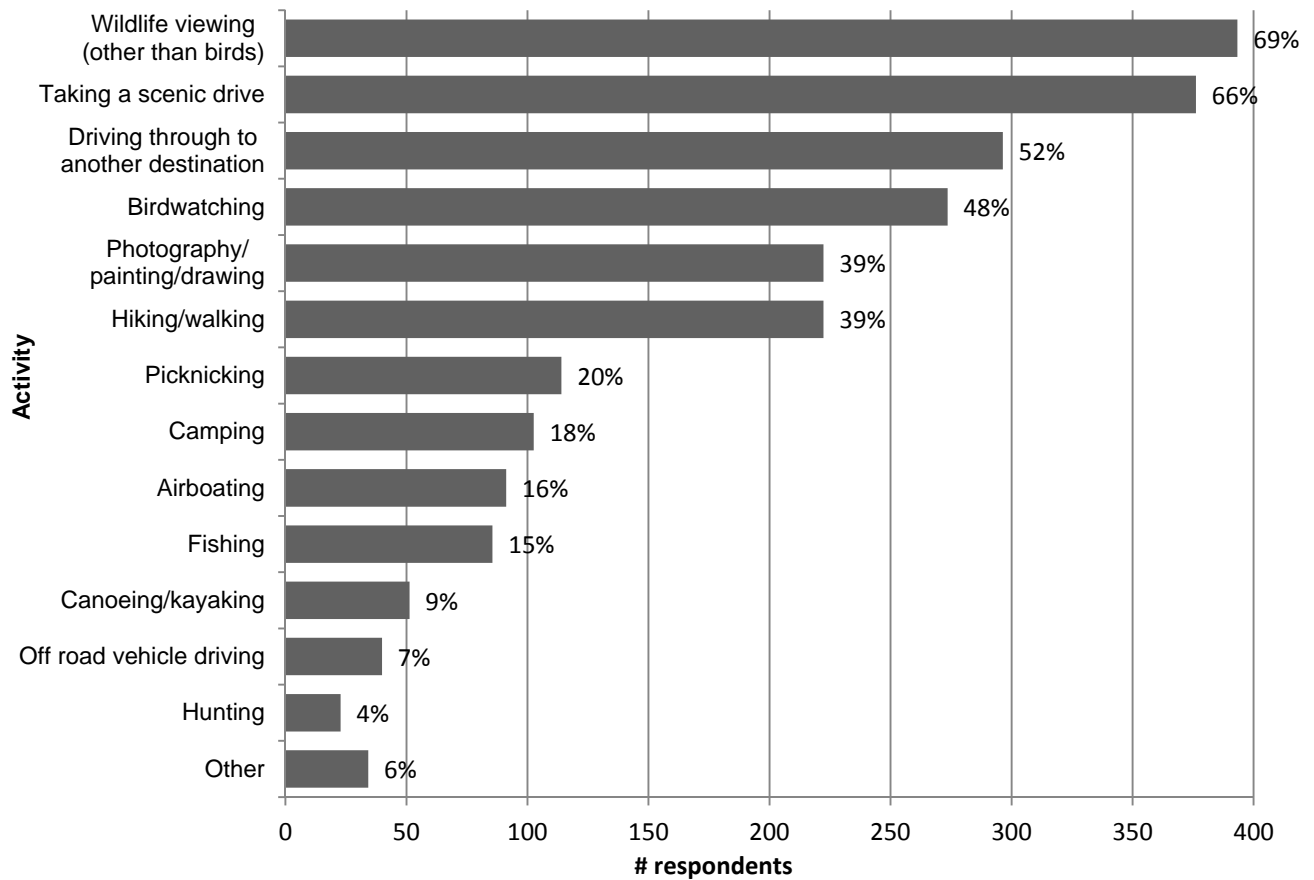


Figure 3-6 – Visitor Activities Participated In

Source: Papadogiannaki et al. 2007

N = 570 visitor groups

Note: Total percentages do not equal 100 because visitors could select more than one answer.

Recreational Opportunities

According to the Addition GMP (NPS 2010a) the primary recreational activities within the Preserve include the following, with the areas in which the activities are currently permissible noted in parentheses:

- frontcountry driving, sightseeing, and visitor centers (original Preserve)
- Walking and hiking (original Preserve and the Addition)
- bird-watching and wildlife viewing (original Preserve and the Addition)
- paddling (original Preserve and the Addition)
- motorboating (original Preserve and limited in the Addition)
- camping (original Preserve and the Addition)
- bicycling (original Preserve and limited in the Addition)
- riding ORVs (original Preserve)
- fishing and frogging (fishing permissible in original Preserve and the Addition; frogging permissible in the original Preserve)
- hunting (original Preserve)⁵
- opportunities to experience peace and quiet in a natural environment (original Preserve and the Addition)⁶

These primary activities are described below in greater detail. Although other recreational activities may occur (e.g., horseback riding), these listed activities account for the dominant types of use.

Frontcountry Driving, Sightseeing, and Visitor Centers. Several major highways transect or run adjacent to the Big Cypress National Preserve. Interstate 75, also known as Alligator Alley, crosses the northern portion of the Preserve for approximately 30 miles, about 19 of which are within the Addition and are currently used almost solely as a

nonrecreationally based travel corridor.

Although this highway is the primary transit route between Fort Lauderdale and Naples, it does offer views into the undeveloped land in the Preserve. U.S. 41, also known as the Tamiami Trail, is a paved highway that crosses the southern portion of the Preserve for about 36 miles, 1 mile of which is in the Addition. State Road 29 is a paved highway that runs north/south along the western border of the Addition for approximately 29 miles. Wildlife underpasses have been and are being constructed under Interstate 75 and SR 29 to protect drivers and animals, specifically the Florida panther, from being killed in automobile accidents (NPS 2010a).

Unpaved, graded, gravel-based roads in the original Preserve include the approximately 24-mile Loop Road (south of U.S. 41), the approximately 23-mile Turner River Road, the 10-mile Birdon Road, the almost 3-mile Wagonwheel Road that crosses the Addition for almost 1 mile, and the 3-mile access road to the Burns Lake site. A graded dirt administrative road known as Bear Island Grade exists in the northwestern corner of the Addition and provides access into the Bear Island Unit from SR 29. Other graded roads in the Addition include Bundschu Grade and Nobles Grade, each extending approximately 4 miles into the Addition, north of Interstate 75, although neither of these routes is maintained (NPS 2010a).

Other than the main paved highways, the unpaved roads listed previously, and several rights-of-way to private in-holdings, no other public access roads exist within the Preserve. Numerous unimproved jeep and ORV trails exist in the Preserve (NPS 2010a). A maximum of 130 miles of primary trails would be designated in the Addition as part of the ORV trail system⁷ (NPS 2011e).

⁵ Recreational hunting in the Preserve is discussed in the "Hunting" section.

⁶ Opportunities to experience peace and quiet in a natural environment are discussed in the "Noise / Soundscapes" section.

⁷ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

Preserve headquarters, the Big Cypress Swamp Welcome Center, and the Oasis Visitor Center are on U.S. 41 in the original Preserve. The Big Cypress Swamp Welcome Center and the Oasis Visitor Center offer interpretive displays, printed materials and books for sale, and wildlife viewing platforms. Currently, no visitor centers exist in the Addition (NPS 2010a). According to the ROD for the Addition GMP, a new visitor contact station and some outdoor orientation and interpretive panels would be developed along I-75 (NPS 2011e).

Walking and Hiking. Within the original Preserve, the Florida National Scenic Trail received national designation in 1983. The trail is currently incomplete but is planned to extend approximately 1,300 miles from the Preserve to the Gulf Islands National Seashore in Florida's western panhandle. The trail, which is the only designated hiking trail longer than 2.5 miles in the original Preserve, provides backcountry hiking experiences to visitors. Section 1 of this trail (from the Oasis Visitor Center to the original Preserve boundary) was established by the Florida Trail Association in the early 1970s. Section 1 will soon begin at the visitor center trailhead and extend about 35 miles to a rest area along Interstate 75. A temporary trail informally follows Nobles Grade, a nonmaintained road north of Interstate 75, up to the Preserve boundary (NPS 2010a).

Although there are no designated trails or pathways and no facilities in the Addition, existing, nonmaintained roads or trails serve as primary access routes for visitors (NPS 2010a). As stated above, a maximum of 130 miles of primary trails would be designated in the Addition as part of the ORV trail system⁸; these trails would be available for walking and hiking. Conceptual hiking trails – one completing a north-south connection and one completing an east-west connection through

the Addition – are also being developed (NPS 2011e).

Bird-watching and Wildlife Viewing.

Within the original Preserve, formal wildlife observation platforms are located at the H.P. Williams Picnic Area, the Kirby Storter Boardwalk, the Big Cypress Swamp Welcome Center, and at the Oasis Visitor Center. Bird-watching opportunities are prevalent in the original Preserve because of the large acreage and accessibility along roads, developed trails, boardwalks, and in both frontcountry and backcountry areas. Within the Addition, wildlife viewing and bird-watching opportunities are relatively primitive in nature and self-directed because no infrastructure is available. Most bird-watching and wildlife viewing activities in the Addition consist of individual ventures, as well as formal and informal organized group outings (NPS 2010a).

Paddling. Within the original Preserve, most paddling opportunities are south of U.S. 41 where accessible water routes provide deep enough water. The Turner River Canoe Trail and the Halfway Creek Canoe Trail provide the opportunity for nonmotorized paddling experiences. Other areas are open to all boats. In the Addition, the lakes and streams adjacent to Everglades City and Plantation Island are open to paddlers and provide a coastal marsh and mangrove experience (NPS 2010a). According to the ROD for the Addition GMP, new paddling trails would be developed in the tidal areas south of U.S. 41 in the western portion of the Addition (NPS 2011e).

Motorboating. Motorboating in the original Preserve and in the Addition is generally restricted to the deeper water estuarine environments south of U.S. 41 outside of Everglades City and the L-28 Interceptor Canal in the Northeast Addition. Motorboat use in the Addition is generally restricted to smaller vessels because of the shallow waters and tight turning radii in the creeks and open waters. All commercial boat operations are prohibited within the Addition. According to the ROD for the Addition GMP, additional motorized boating opportunities in the

⁸ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

Addition would be phased in over time (NPS 2011e).

Motorized vessels are regulated by the FWC, who serves as the state boating law administrator, and by the U.S. Coast Guard navigation rules. All vessels must comply with applicable federal and state laws (NPS 2010a).

Camping.

Developed campgrounds — In the original Preserve, two developed campgrounds (Monument Lake and Midway), and six primitive campgrounds (Bear Island, Burns Lake, Pinecrest, Mitchell's Landing, Pink Jeep, and Gator Head) exist. No developed campgrounds currently exist in the Addition (NPS 2010a).

Backcountry camping — Backcountry camping is allowed in the entire Preserve, and such camping is subject to Preserve backcountry camping regulations. The NPS maintains regularly updated and published backcountry regulations (NPS 2010a).

Bicycling. In the original Preserve, bicycling occurs along many of the gravel roads and on several of the ORV trails. However, because many of the ORV trails in the original Preserve are in rough condition (i.e., relatively large deep ruts and seasonal standing water), they are oftentimes not conducive to bicycle use. Bicycling in the Addition is currently only allowed on Nobles and Bear Island grades (NPS 2010a).

Riding Off-road Vehicles. The use of off-road vehicles is a popular recreational activity in the original Preserve. In the original Preserve, ORV use is heaviest during the fall, winter, and spring hunting seasons. The greatest use is on opening weekends of hunting seasons and holidays. In the original Preserve, several types of off-road vehicles are used to access the backcountry. These include street-legal four-wheel-drive vehicles (4 x 4s), light-weight all-terrain cycles (ATCs) swamp buggies, and airboats. Recreational activities that can involve the use of ORVs in the Preserve include hunting, fishing, bird-

watching, general exploring, and recreational driving. All ORVs are required to have a permit. Within the original Preserve, ORV permit numbers have ranged from 633 in 1995 to 2,271 in 1999, 1,702 in 2006, and 2,000 in 2008. Fluctuations in the number of ORV permits issued each year primarily reflect water levels within the Preserve, with fewer registered vehicles in the wetter years (e.g. 1995) when portions of the Preserve were closed to hunting (NPS 2010a).

ORV use by the general public is currently prohibited within the Addition (NPS 2010a). According to the ROD for the Addition GMP, ORV use would be phased in over time in the Addition. A maximum of 130 miles of primary trails would be designated in the Addition as part of the ORV trail system. All ORVs used for recreation would be required to have a permit. A maximum of 650 ORV permits would be issued annually for the Addition. This number of ORV permits is based on the ratio of available annual permits to ORV primary trail mileage in the original Preserve (NPS 2011e)⁹.

Management of off-road vehicles in the original Preserve is guided by the *Final Recreational Off-Road Vehicle Management Plan Supplemental Environmental Impact Statement* (NPS 2000d). Management of ORVs in the Addition is guided by the Addition GMP (NPS 2010a). Therefore, direct impacts of ORV use associated with hunting will not be analyzed as part of *this Hunting Management Plan*.

Fishing and Frogging. The original Preserve has been designated by the state as a WMA, and the NPS permits fishing and frogging by the public in accordance with state laws and regulations. Fishing is permitted within the Addition subject to applicable laws and regulations. Frogging is currently prohibited within the Addition. Direct impacts

⁹ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

of fishing and frogging are not analyzed as part of this *Hunting Management Plan*.

The visitor use features described above are depicted in figure 3-7.

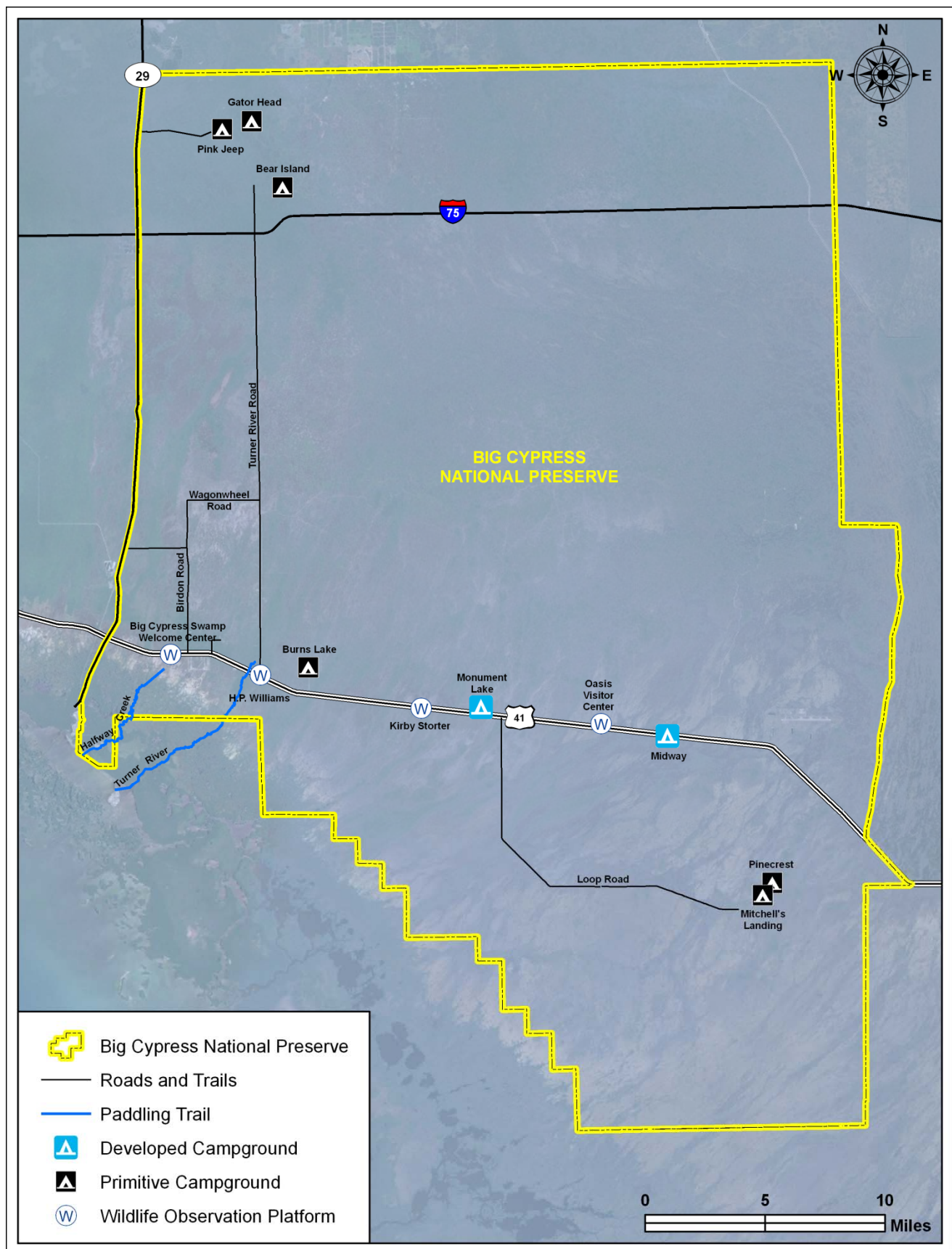


Figure 3-7 – Visitor Use Features Map

Hunting

The original Preserve has been designated by the state as a WMA, and the NPS permits hunting by the public in accordance with state laws and regulations. The Addition has never been open to public hunting either before or after its acquisition. Therefore, the following information applies only to hunting within the original Preserve.

The NPS and the FWC have concurrent jurisdiction for enforcing game and fish laws in the Preserve. Although the NPS has authority to manage wildlife within the Preserve, the NPS has assigned the management of hunting to the FWC. The FWC consults with the NPS before issuing regulations that affect hunting within the Preserve. Likewise, the NPS consults with the FWC before establishing any temporary or permanent closures or public use limits. This partnership for concurrent management of hunting in the original Preserve is outlined in the *Cooperative Partnership Agreement Between the NPS and the FWC* (2010) (see appendix B).

Current hunting regulations in the Preserve are outlined for the public in the *FWC Big Cypress WMA Regulations (2011-2012 Hunting Season)* brochure (see appendix C), which states:

Persons using [WMAs] are required to have appropriate licenses, permits and stamps. The following persons are exempt from all license and permit requirements (except for quota permits when listed as "no exemptions," recreational use permits, antlerless deer permits and the Migratory Bird Hunting and Conservation Stamp [federal duck stamp]): Florida residents who are 65 years of age or older; residents who possess a Florida Resident Disabled Person Hunting and Fishing Certificate; residents in the U.S. Armed Forces, not stationed in Florida, while home on leave for 30 days or less, upon submission of orders; and children under 16 years of age. Children under 16 years of age are exempt from the federal duck stamp. Anyone born on or after June 1,

1975 and 16 years of age or older must have passed a Commission-approved hunter-safety course prior to being issued a hunting license, except the Hunter Safety Mentoring exemption allows anyone to purchase a hunting license and hunt under the supervision of a licensed hunter, 21 years of age or older, for one year.

The brochure provides detailed information on quota permit information, ORV permit requirements, general area regulations, public access and vehicles, check stations, dogs, camping, bag and possession limits, archery season, muzzleloading gun season, modern gun season, small game season, trapping (which is prohibited), spring turkey season, migratory bird seasons, fishing and frogging (not covered as part of this plan), and general NPS rules and information (FWC 2011a). While these regulations can change from year to year, the following summarizes some of the current hunting regulations in place for the original Preserve (FWC 2011a).

Quota Permit Information. Quota permits in the Preserve are issued for the first nine days of muzzleloading gun season (in the Bear Island Unit) and the first nine days of modern gun season (in the Bear Island and Turner River units). Hunters must submit electronic applications for quota permits (FWC 2011a).

ORV Permit Requirements. Vehicle operators must be state licensed (regular or learner's permit) and obtain an ORV operator's permit from the NPS for all vehicles, including airboats, used off-road. All ORVs and their operators must be permitted and the vehicles inspected prior to operation in the original Preserve (FWC 2011a).

General Area Regulations. All general laws and regulations relating to wildlife apply in the original Preserve unless specifically exempted. Hunting or the taking of wildlife is allowed only during the open seasons and in accordance with regulations (FWC 2011a).

Public Access and Vehicles. The original Preserve is open to public access year round in

accordance with all local, state, and federal laws and regulations, permit requirements, and posted signage (FWC 2011a).

Check Stations. All hunters shall check in at a designated check station when entering the area, retain in their possession a check station pass while hunting, check out at the same check station when exiting the area, and shall check all game taken (FWC 2011a).

Dogs. Bird dogs and waterfowl retrievers are the only dogs permitted for hunting. Hunting deer or wild hog with dogs is prohibited. Dogs are also prohibited in the Loop Unit. Additionally, leashed dogs may not be used for trailing wounded game (FWC 2011a).

Camping. Camping is allowed in accordance with the regulations of the NPS (FWC 2011a).

Bag and Possession Limits. During quota hunts, host hunter and guest must share all bag and possession limits. The following bag and possession limits are currently in place in the Preserve (FWC 2011a):

- deer – daily limit (one), annual limit (two) (all seasons combined), except in Zone 3 of the Stairsteps Unit where the bag limit for deer is one annually; hunting deer in Zone 4 is prohibited¹⁰
- wild hog – daily limit (one), annual limit (two) (all seasons combined)
- turkey – Daily limit (one), season limit (two), possession limit (two)
- gray squirrel, quail and rabbit – daily limit (12), possession limit (24) for each
- raccoon, opossum, armadillo, beaver, coyote, skunk, and nutria – no bag limits
- bobcat and otter – prohibited
- Migratory birds – regulated by the *Migratory Bird Hunting Regulations* pamphlet

¹⁰ The current hunting restrictions for deer hunting in the Stairsteps Unit were put into place by FWC EO 10-37.

Archery Season. Archery season currently runs from September 3rd through October 2nd in all units of the Preserve and from November 12th through January 1st in the Deep Lake Unit only. The following permits, stamps, and licenses are required to hunt in the Preserve during archery season: check station pass, hunting license, management area permit, archery permit, deer permit (if hunting deer), migratory bird permit (if hunting migratory birds), and both a state waterfowl permit and a federal duck stamp (if hunting waterfowl). Other regulations regarding which game species can be hunted (and sizes) also apply (FWC 2011a).

Muzzleloading Gun Season.

Muzzleloading gun season currently runs from October 8th through 23rd, except in the Deep Lake Unit. The following permits, stamps, and licenses are required to hunt in the Preserve during muzzleloading gun season: quota permit (if hunting Bear Island Unit October 8th to 16th), check station pass, hunting license, management area permit, muzzleloading gun permit, deer permit (if hunting deer), and migratory bird permit (if hunting migratory birds). Other regulations regarding which game species can be hunted (and sizes) also apply (FWC 2011a).

Modern Gun Season. Modern gun season currently runs from November 12th through January 1st, except in the Deep Lake Unit. The following permits, stamps, and licenses are required to hunt in the Preserve during modern gun season: quota permit (if hunting November 12th to 20th in the Bear Island or Turner River units), check station pass, hunting license, management area permit, deer permit (if hunting deer), migratory bird permit (if hunting migratory birds), and both a state waterfowl permit and a federal duck stamp (if hunting waterfowl). Other regulations regarding which game species can be hunted (and sizes) also apply (FWC 2011a).

Small Game Season. Small game season currently runs from January 2nd through February 1st. The following permits, stamps, and licenses are required to hunt in the Preserve during small game season: check

station pass, hunting license, management area permit, migratory bird permit (if hunting migratory birds), and both a state waterfowl permit and a federal duck stamp (if hunting waterfowl). It is legal to hunt gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria, and migratory birds in season (FWC 2011a).

Trapping. Trapping is prohibited in the Preserve (FWC 2011a).

Spring Turkey Season. Spring turkey season currently runs from March 3rd through April 8th. The following permits, stamps, and licenses are required to hunt in the Preserve during spring turkey season: check station pass, hunting license, management area permit, and wild turkey permit. It is legal to hunt bearded turkey or gobbler (FWC 2011a).

Migratory Bird Seasons. Duck may be hunted during the special September season in all units except the Bear Island and Deep Lake units. Rail, common moorhen, mourning dove, white-winged dove, snipe, duck, geese, coot, woodcock, and crow may be hunted during seasons established by the FWC for those species that coincide with the archery, muzzleloading gun, modern gun, or small game seasons. The following permits, stamps, and licenses are required to hunt in the Preserve during migratory bird seasons: quota permit (if hunting during any quota period), check station pass, hunting license, management area permit, migratory bird permit, and both a state waterfowl permit and a federal duck stamp (if hunting waterfowl) (FWC 2011a). Which species are legal to hunt are outlined in the *Migratory Bird Hunting Regulations* pamphlet.

NOISE / SOUNDSCAPES

In accordance with NPS *Management Policies* (2006) and Director's Order 47: *Sound Preservation and Noise Management* (NPS 2000c), an important part of the NPS mission is preservation of natural soundscapes associated with national park units. The NPS defines a soundscape as (NPS 2000c):

... the total ambient acoustic environment associated with a given environment (sonic environment) in an area such as a national park. It also refers to the total ambient sound level for the park. In a national park setting, this soundscape is usually composed of both natural ambient sounds and a variety of human-made sounds.

The NPS Natural Sounds Program differentiates between the use of *sound* and *noise*, since these definitions have been used inconsistently in the literature (NPS 2011f). Humans perceive *sound* as an auditory sensation created by pressure variations that move through a medium such as water or air and is measured in terms of amplitude and frequency (Harris 1998; Templeton and Sacre 1997). Although *noise* is sometimes incorrectly used as a synonym for sound, the NPS defines noise as “an unwanted or undesired sound, often unpleasant in quality, intensity or repetition” (NPS 2000c). Sounds found desirable during times of rest and relaxation are referred to as natural quiet, and include natural, outdoor ambient sounds, without the intrusion of human-caused sounds.

Sound levels are usually measured in A-weighted decibels [dB(A)], and a descriptor such as the energy equivalent noise level (Leq) is commonly used to account for fluctuations of sound over time. Generally, a 3 dB(A) increase in sound level is considered the minimum threshold at which most people can detect a change in the sound environment; an increase of 10 dB(A) is perceived as a doubling of the sound level.

Natural sounds throughout the Preserve – including flowing water, animals, and rustling leaves – are not considered noise. The enjoyment of natural sounds in the Preserve enhances the visitor's experience, and natural quiet can be essential in order for some individuals to achieve a feeling of peace and solitude. However, sound levels in the Preserve can vary greatly, depending on the area and activities. Ambient sound levels in the Preserve generally range between 24 dB(A) and 40 dB(A), depending on the contribution of sound by insects (NPS 2010a). Since

environmental conditions in the Addition are similar to those in the original Preserve, these noise levels are also representative of those that are expected in the Addition. Some of the sounds that can typically be heard in areas of the Preserve are listed in Table 3-4.

Table 3-4 – Typical Sounds in Big Cypress National Preserve

Sound	Approximate Level [dB(A)]
Threshold of human hearing at 1 kHz	0
Leaves rustling	20
Whispering (1.5 meters/5 feet)	20
Crickets (5 meters/16 feet)	40
Distant bird calls	45
Rainfall	50
Normal conversation	60
Freeway traffic	70
Motorboats	85 - 115
Thunder	100 - 120
Gunfire	150 - 170

Sources: Center for Hearing and Communication 2011, NPS 2011f

There are no absolute standards that define unacceptable levels, duration, or qualities of environmental noise (NPS 2010a). The U.S. Forest Service (1980) has established subjective audibility guidelines to assess noise impacts for various recreational opportunities. These guidelines are included in Table 3-5, and they relate recreational opportunities to the corresponding acceptable level above ambient sound levels. The U.S. Department of Energy suggests that there is a “strong likelihood of individual complaints” when the intruding noise is greater than 10 dB above ambient sound levels.

Table 3-5 – Acceptable Levels above Ambient Sound Levels for Various Recreational Opportunities

Recreational Opportunity	Acceptable Level (dBA)
Appropriate for primitive recreational area; intruding noise not detectable	0
Appropriate for trail camps; will not wake most sleepers; intruding noise normally not detectable	5
Appropriate for undeveloped roadside camps and those accessible by four-wheel drive and all-terrain vehicles	10
Appropriate for roadside camps accessible by highway vehicles	20
Appropriate for highly developed campgrounds in a quiet, suburban neighborhood	40

Source: U.S. Forest Service 1980

Noise

Current noise sources in the Preserve include: human noise sources (e.g., NPS management activities, recreational activities), hunting-related firearm use, ORVs, oil and gas development noise, aircraft noise, and highway noise (NPS 2010a). While some of these noise sources exist throughout the Preserve, noise from hunting, ORVs, and oil and gas development is mainly confined to the original Preserve.

Hunting Noise. Hunting activities in the original Preserve are long-established and include bow, muzzleloading, and modern gun seasons. Gun hunting is permitted only during limited times of the year (e.g.; during October, November, and December). Sound levels for hunting activities would primarily be associated with the weapons used for hunting (e.g., rifles). The sound of an average rifle ranges from 155 dB(A) to 170 dB(A), depending on weapon type (Center for Hearing and Communication 2011). The sound of an average shotgun ranges from 150 dB(A) to 160 dB(A) (Center for Hearing and Communication 2011). Using a commonly accepted sound level drop-off rate of a 6 dB

reduction in noise for every doubling of distance from the source, and not accounting for the effects of terrain, ground cover, and atmospheric conditions; firearm noise of this magnitude would be expected to be plainly evident at distances of more than 2 miles. Such noises associated with hunting in the Preserve would be expected to be sporadic and occur only during hunting seasons and hours.

ORV Noise. Management of ORVs in the original Preserve is guided by the *Final Recreational Off-Road Vehicle Management Plan Supplemental Environmental Impact Statement* (NPS 2000d). Management of ORVs in the Addition is guided by the Addition GMP (NPS 2010a). Therefore, direct impacts of ORV use on the soundscape at the Preserve will not be analyzed as part of this *Hunting Management Plan*.

Oil and Gas Development Noise. The Preserve soundscape can be affected by oil and gas development, including geophysical operations, drilling, production, abandonment, and reclamation. According to the Addition GMP (NPS 2010a), noise levels associated with drilling operations in the Preserve were documented by Vibra-Tech South Corporation in 1986. The study was conducted for Exxon Company in December 1985 during typical rotary drilling operations and conductor casing drive hammer operations at the Collier 2B4 well. Noise levels were recorded at varying distances from the operation, ranging from 10 feet to 12,000 feet. During conductor casing drive hammer operations, decibel levels were highest within 10 feet of the drilling rig [93 dB(A)] and lowest [40 dB(A) or less] at distances of 10,000 feet or greater from the rig. During rotary drilling operations, 85 dB(A) was recorded 10 feet from the rig and 40 dB(A) or less was recorded 9,200 feet from the drilling operation. It is important to note that the noise level recording equipment used in this study had a minimum detection limit of 40 dB(A). Using 40 dB(A) as a maximum ambient level, noise from rotary drilling operations can be detected up to 8,500 feet (1.61 miles) from a rig, and noise generated from a conductor casing drive

hammer operation can be detected up to 9,200 feet (1.74 miles) from a rig in the Preserve.

Aircraft Noise. According to the Addition GMP (NPS 2010a), natural soundscapes throughout the Preserve are affected by aircraft noise from a variety of overflight sources. These include high-altitude, commercial jet traffic; military activity; general aviation; NPS administrative operations, such as resource management, prescribed fire activities, emergency response, and facility maintenance; municipal and commercial air traffic from surrounding counties; and the air flight training operating out of the Dade-Collier Training and Transition Airport known locally as the Jetport (NPS 2010a).

In order to minimize aircraft noise, the Federal Aviation Administration recommends a minimum altitude of 2000 feet. The Federal Aviation Administration also limits and regulates noise levels generated by aircraft as authorized under 14 CFR Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification." To be certified for operation within the United States, all aircraft must meet established noise limits based on aircraft type, speed capabilities, operational category (commercial, agricultural, etc.), and age of aircraft. Propeller-driven aircraft, jet aircraft, and helicopters are all included (NPS 2010a).

Helicopter use is of particular interest within the Preserve because this type of aircraft is often used to access the backcountry. The acoustical impact of a helicopter is a function of the size and the type of engine used, as well as the movement of the rotor blades through the atmosphere as they produce lift (NPS 2010a).

Highway Noise. According to the Addition GMP (NPS 2010a), Interstate 75 creates a considerable impact on the natural soundscape in the northern portion of the Addition as a result of the nearly constant traffic. To a lesser degree, SR 29 and U.S. 41 also impact the natural soundscape within the Preserve. The level of highway traffic noise depends on (1) the volume of the traffic, (2)

the speed of the traffic, and (3) the number of trucks in the flow of the traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks. Vehicle noise is a combination of the noises produced by the engine, the exhaust, and the tires. The loudness of traffic noise can also be increased by defective mufflers or other faulty equipment on vehicles. As a person moves away from a highway, traffic noise levels are reduced by distance, terrain, vegetation, and natural and man-made obstacles (Federal Highway Administration 1995). A 61-meter (about 200-foot) width of dense vegetation, for example, can reduce noise by 10 decibels, which reduces the loudness of traffic noise by half (Federal Highway Administration 1995).

PUBLIC HEALTH AND SAFETY

NPS Management Policies (2006) states that the NPS “will not intervene in natural biological or physical processes, except: when directed by Congress; in emergencies in which human life and property are at stake; to restore natural ecosystem functioning that has been disrupted by past or ongoing human activities; or when a park plan has identified the intervention as necessary to protect other park resources, human health and safety, or facilities.”

Big Cypress National Preserve contains many remote and rugged areas and natural resources that can pose potential hazards to visitors. Additionally, hunting in the Preserve, similar to many other recreational activities, involves some potential safety risks.

NPS staff strictly enforces regulations at the Preserve to help protect the resources present at the Preserve as well as visitors from health and safety risks.

Hunting Safety

Hunting Incident Statistics. Hunting incidents are designated as Class A, B, C, or D. Class A incidents are hunting related shooting injuries or fatalities. Class B incidents are nonshooting hunting related injuries or fatalities, such as falls from treestands. Class C includes nonhunting related shooting injuries. Class A incidents are applicable to this plan in reference to hunting and nonhunting visitors in the Preserve. Class B incidents are applicable to this plan only in reference to hunters in the Preserve. Class D incidents are property damage reports. Class C and D incidents are not applicable to this plan.

Figure 3-8 shows the nationwide annual sports injuries associated with different sporting activities, including hunting. A total of 239 Class A injuries reported out of approximately 14.6 million individuals participating in hunting for 2007 (International Hunter Education Association 2008).

Of the 239 Class A incidents reported nationwide in 2007, 19 incidents were fatal and 220 were nonfatal, and 66 were self-inflicted while 173 were not self-inflicted (International Hunter Education Association 2008). The major factors attributed to the majority of the Class A incidents included (the number of incidents is noted in parentheses):

- shooter swinging on game (50)
- failure to identify the target (32)
- careless handling of a firearm (29)
- victim out of site of the shooter (29)
- victim moved into the line of fire (15)
- failure to check beyond target (13)
- trigger caught on object (10)
- other or unknown factors (61)

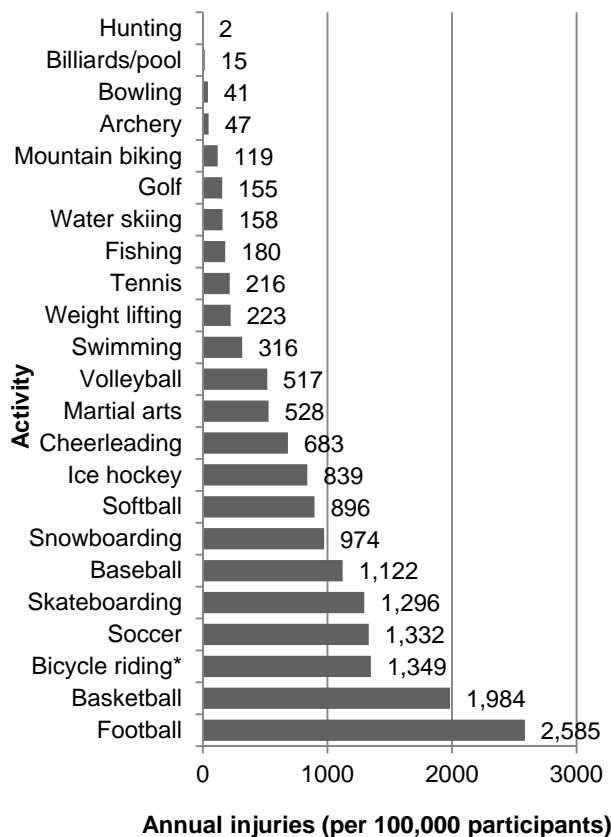


Figure 3-8 – Nationwide Annual Sports Injuries

Sources: National Safety Council 2008; International Hunter Education Association 2009; compiled by Unified Sportsmen of Florida 2009

* Excludes mountain biking.

Note: Because the number of participants, frequency, and duration of the sport varies with the respective sports, these numbers are approximations. Participant numbers include those seven years of age or older who participated more than once per year, except for bicycle riding and swimming, which include those who participated six or more times. Injury numbers include only injuries treated in hospital emergency facilities.

In 2007, there were 106 Class B hunting incidents reported nationwide. The majority of these incidents were tree stand related. Nationally, over 50% of all hunting incidents are related to elevated stands (Maryland DNR 2011). Current research shows that an overwhelming majority (82%) of hunters who experience tree stand accidents were not using a fall restraint system (Neale et al. 2011), and most accidents occurred when climbing into or

out of the elevated stand (International Hunter Education Association 2002).

Hunter Safety Education Requirements.

If a person who was born on or after June 1, 1975, wishes to purchase a Florida hunting license, he or she must first have passed a hunter safety course. The hunter safety certification must be presented when purchasing or being issued a hunting license. For those born after May 31, 1975, and who are 16 years of age or older, they may hunt without a valid hunter safety certificate if they are under the direct supervision of an adult (21 years or older) who holds a valid Florida hunting license. Children under the age of 16 may hunt with adult (21 years or older) supervision without taking a hunter safety course (Fresh Air Educators 2008).

The FWC offers two options – a traditional classroom course and a CD/online course – for fulfilling the Florida hunter safety education requirements to obtain a hunting license in Florida. The traditional hunter safety course covers the knowledge, skills, and attitude needed to be a safe hunter through a 12-hour classroom course, exam, and three-hour range course. The online hunter safety course allows the student to learn a majority of the knowledge portion of the course via distance learning (i.e., online). The remainder of the course is covered in a 4-hour classroom course, exam, and a 3-hour range course (FWC 2011b).

The free Florida online hunter safety course covers the following topics: game care, wildlife (wildlife conservation, wildlife identification, and conservation laws), survival and first aid (orienteeing and survival), firearms (firearms, ammunition, shooting skills, and firearm maintenance), bow hunting and muzzleloading, hunter responsibilities, tree stands, transportation (ORVs and boating), and additional concerns (turkey hunting and trapping) (Neale et al. 2011).

Hunter Orange Requirement. When hunting deer or accompanying a person who is hunting deer on public land, each person is required to wear a minimum of 500 square

inches of hunter orange as an outer garment, above the waistline and/or on the head. This rule is not applicable during the archery-only season (Fresh Air Educators 2008).

Outdoor / Preserve Safety

Travel Notification and Emergency

Contacts. Before entering backcountry areas of the Preserve, visitors need to fill out a backcountry permit. The forms and instructions are located at each trailhead kiosk. It is also a good idea for visitors to file an itinerary with family and friends. When possible, carrying a personal locator beacon can also reduce the risk to visitors in case of an emergency. In case of an emergency, Preserve Dispatch can be contacted at (800) 788-0511 (NPS 2011c).

Driving. Most visitor injuries and accidental deaths in the Preserve result from vehicle accidents. While driving is a great way to see the preserve, it can also be dangerous. Visitors can reduce the risk of vehicle accidents by staying alert, following posted speed limits, watching for wildlife that may be crossing the road (especially at night), watching for bicyclists and pedestrians that are sharing the roads in the Preserve, and driving with headlights on (NPS 2011c).

Navigation. Navigating in the backcountry areas of Big Cypress National Preserve can be difficult, even for experienced outdoor enthusiasts. Visitors can reduce the risk of getting lost in the Preserve by familiarizing themselves with the designated trails before entering the Preserve, carrying a global positioning system unit, and carrying a map and compass (NPS 2011c).

Proper Attire and Equipment. Proper attire and equipment can help visitors to reduce the risk of injury or illness when visiting Big Cypress National Preserve. Proper clothing (i.e., hat, long pants, long-sleeved shirt) can help to protect from sun exposure, as well as frequent application of sunscreen (see “weather” section). Similar clothing (i.e., long pants, long-sleeved shirt, closed-toed

shoes) can help visitors to protect themselves from skin abrasions, cuts, and scrapes that could be caused by vegetation or exposed rocks. Proper attire is also important for hunters (see “hunter orange requirement” section). Equipment that should be carried while visiting the Preserve includes a first aid kit, flashlight, whistle, extra food and water, bug spray, warm clothing, and matches or a fire starter (NPS 2011c).

Weather. Extreme weather conditions, such as tropical heat and lightning, are concerns in the South Florida region.

The average high temperature in Florida during the summer months is around 95 degrees. Factoring in humidity, the heat index often soars to over 100 degrees. It is very easy to get overheated or dehydrated while participating in outdoor activities. Visitors can reduce the risks of overheating and dehydration by carrying plenty of clean drinking water (water collection in the backcountry is not recommended due to the risk of microscopic organisms), wearing sunscreen, wearing protective clothing (i.e., hat, long pants, long-sleeved shirt), and conducting outdoor activities such as walking/hiking in the early morning or late evening during times of the year when the temperature peaks.

South Florida receives more lightning strikes than anywhere else in the country, and there are more casualties from lightning strikes than all other natural hazards combined. Thunderstorms are common in the summer months; in the winter months, storms and lightning are less frequent but may be as severe. Visitors can reduce the risks of lightning strikes by avoiding outdoor activities in the Preserve during inclement weather conditions and following lightning avoidance practices when caught in a storm (i.e., stay as close to the ground as possible and stay away from tall trees or isolated tall objects) (NPS 2011c).

Dangerous or Venomous Wildlife. The Preserve is home to a variety of wildlife, including large species such as panthers,

alligators, and black bears, and venomous animals such as snakes, scorpions, and spiders. Although they sometimes appear tame, all of the animals in the Preserve are wild and could pose a threat to visitors' health and safety if visitors attempt to approach or feed them. While most wildlife move away when they become aware of humans in the area, important safety measures regarding potentially dangerous wildlife include not walking/hiking alone, not approaching wildlife, not feeding wildlife, keeping food appropriately contained, and properly disposing of garbage. Visitors can also report sightings of potentially dangerous wildlife to a ranger. Visitors can reduce the risk of a venomous animal or insect bite by inspecting shoes and sleeping bags before use and always carrying a flashlight at night. For additional protection from snake bites, high boots or protective leggings can be worn by visitors. If bitten by a snake, it is important for the visitor to exit the Preserve and go to the nearest emergency room (NPS 2011c).

Poisonous Plants. Two poisonous plants can be found throughout the Preserve – poison ivy and poisonwood (*Metopium toxiferum*). Poison ivy is very common throughout the Preserve, usually found as a creeping vine. Poisonwood is found in the southern portion of the Preserve. Both species can cause red, itchy rashes. Some people may also have a similar reaction to Brazilian-pepper, a nonnative shrub found commonly throughout the preserve (NPS 2011c).

Fire. Fire danger is always an important safety consideration in the Preserve. Visitors should always exercise caution with the use of camp fires, gas stoves, charcoal grills, and cigarettes. The Preserve occasionally experiences drought conditions necessitating restrictions in the use of these heat sources. Closures in areas of the Preserve may also be necessary in the case of prescribed burns or wildfires (NPS 2011c).

Visitor Study – Safety

The Visitor Services Project and Cooperative Park Studies Unit of the University of Idaho conducted a general visitor survey for Big Cypress National Preserve in the winter of 1999. Visitors were asked to rate how safe they felt on this visit to Big Cypress National Preserve. Fifty-three percent of visitor groups reported feeling extremely safe, while only 5% felt extremely unsafe (see figure 3-9). The most commonly given reasons for feeling unsafe were: hunters, presence of juvenile prison, other visitors, and lack of people (see table 3-6) (Meehan 1999).

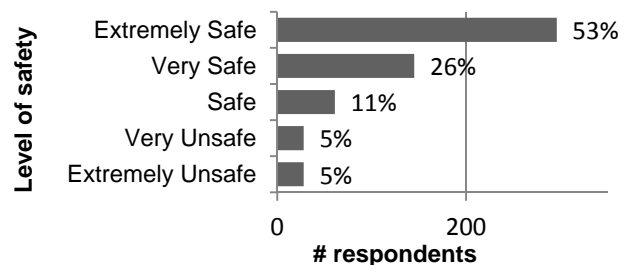


Figure 3-9 – How safe did you and your group feel?

Source: Meehan 1999
N = 558 visitor groups

Table 3-6 – Reasons for Feeling Unsafe

Comment	Number of times mentioned
Hunters	7
Presence of juvenile prison	6
Other visitors	4
Lack of people	4
Lack of rangers	3
Wild animals	3
Other campers	2
Visitors driving too fast	2
ORV users	2
Presence of guns	2
Other comments	4

Source: Meehan 1999
N = 39 comments; some visitors made more than one comment.

SOCIOECONOMIC ENVIRONMENT

SOCIOECONOMICS

As stated in the Addition GMP, Collier County is the primary geographic unit for analysis of the socioeconomic impacts in regards to the Preserve. However, actions at the Preserve also have the potential to cause socioeconomic impacts to surrounding counties. Additionally, when data permit, socioeconomic characteristics for Everglades City, the Big Cypress Seminole Indian Reservation, and the Miccosukee Indian Reservation will also be discussed in this section (NPS 2010a).

Collier County is located on southwest Florida's Gulf Coast, about 150 miles south of Tampa and 100 miles west of Fort Lauderdale, and is comprised of an area of 1,998 square miles (NPS 2010a; U.S. Census Bureau 2011). The Preserve encompasses most of the eastern half of the county (NPS 2010a). The counties overlying the edges and adjacent to the Preserve in the South Florida region are also discussed, including Broward, Lee, Palm Beach, Hendry, Miami-Dade, and Monroe counties.

A discussion of demographic and economic data for Everglades City, the Big Cypress Seminole Indian Reservation, and the Miccosukee Indian Reservation is included. Everglades City, a 1.2 square mile municipality located within Collier County at the southernmost part of the county, is included because it is the closest incorporated area to the Preserve, less than 10 miles from headquarters, and the city caters to visitors to both Everglades National Park and the Preserve. The Big Cypress Seminole Indian Reservation is an 81.97 square mile tract of land that borders the Northeast Addition to the north and lies mostly in Hendry County. The Miccosukee Indian Reservation is a 128.26 square mile tract of land that borders the Northeast Addition to the east and lies mostly in Broward County (NPS 2010a; U.S. Census Bureau 2011).

Demographics

Preserve Visitors. The Visitor Services Project and Cooperative Park Studies Unit of the University of Idaho conducted a general visitor survey for Big Cypress National Preserve in the spring of 2007 (Papadogiannaki et al. 2007).

Group size — Visitors were asked, "For this visit to [the Preserve], how many people were in your personal group, including yourself?" Forty-eight percent of visitor groups were in groups of two, 31% were in groups of three or four, and 13% were in groups of five or more (see figure 3-10) (Papadogiannaki et al. 2007).

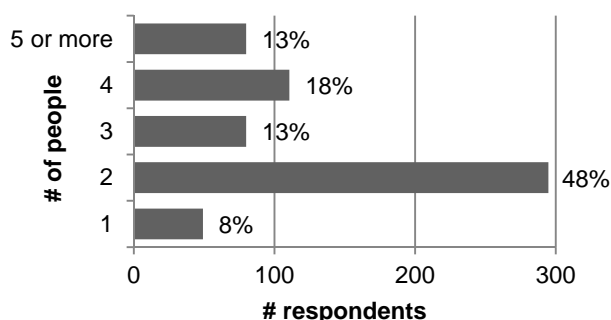


Figure 3-10 – Visitor Group Size

Source: Papadogiannaki et al. 2007
N = 614 visitor groups

Group type — Visitors were first asked whether they were visiting the Preserve with a personal group or with a commercial guided tour group. Ninety-six percent of visitors were traveling with a personal group. Visitors were then asked what type of personal group they were traveling with on this visit to the Preserve. Fifty-two percent of visitor groups responding to this question were comprised of family member groups, 22% were with friends, and 10% were alone (see figure 3-11) (Papadogiannaki et al. 2007).

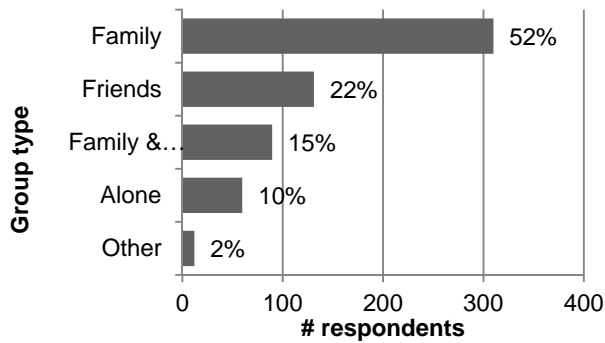


Figure 3-11 – Visitor Group Type

Source: Papadogiannaki et al. 2007
N = 596 visitor groups

Residence — Visitors were asked about their country and state of residence. International visitors comprised 14% of total visitation to the Preserve during the survey period. Forty-eight percent of international visitors came from Canada, 18% came from Germany, and 13% came from the United Kingdom. A smaller percentage of international visitors came from a total of 12 other countries. U.S. visitors comprised 86% of total visitation to the Preserve during the survey period, and 34% of those visitors identified Florida as their state of residency (see figure 3-12) (Papadogiannaki et al. 2007).

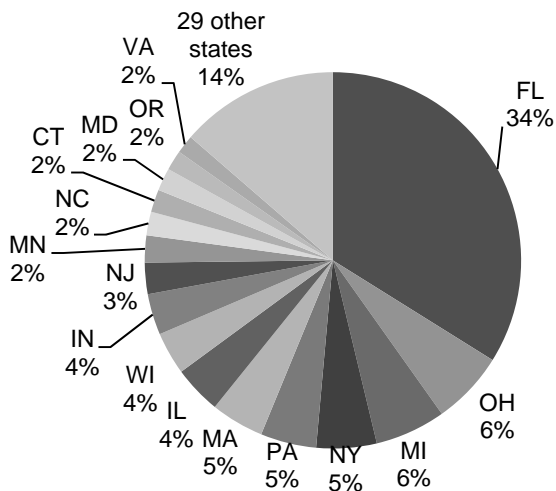


Figure 3-12 – U.S. Visitors' State of Residency

Source: Papadogiannaki et al. 2007
N = 1,334 individual visitors

Age — Visitors were asked about their current age at the time of their visit to the Preserve. Visitor ages ranged from one to 91 years old. Fifty-six percent of visitors to the Preserve were between the ages of 51 and 70, while 5% were 10 or younger, 4% were 11 to 20, and 5% were 21 to 30 (see figure 3-13) (Papadogiannaki et al. 2007).

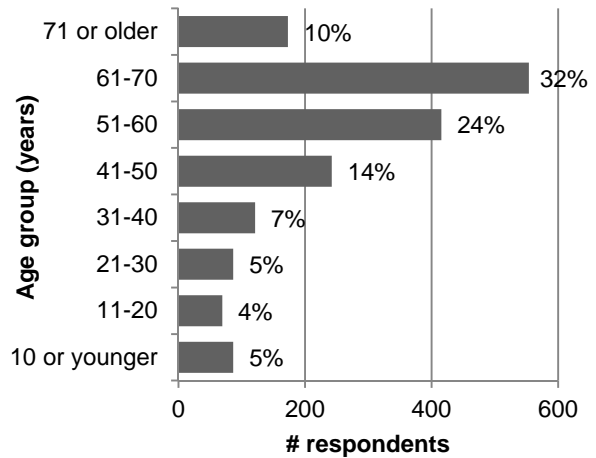


Figure 3-13 – Visitor Age

Source: Papadogiannaki et al. 2007
N = 1,731 individual visitors

Collier County.

Population — The population of Collier County has grown from 38,040 in 1970 to 321,520 in 2010, with an average annual growth rate of 18.63% (see figure 3-14) (U.S. Census Bureau 2011).

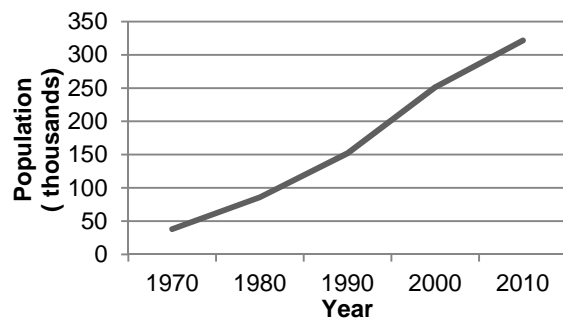


Figure 3-14 – Collier County Population Growth

Source: U.S. Census Bureau 2011

Age distribution — The median age of Collier County residents is 47 years, with the largest represented age bracket being 65 to 69 years of age (7.7% of total county population) (U.S. Census Bureau 2011).

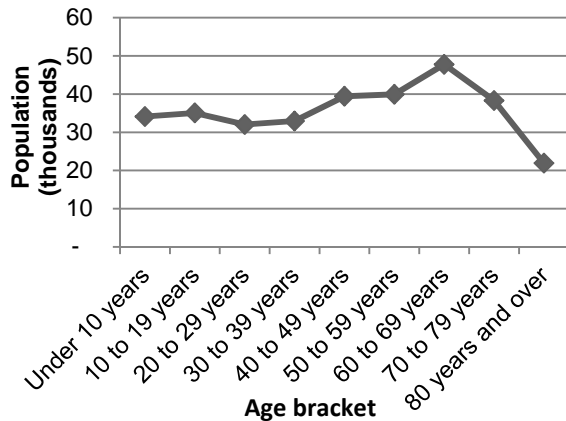


Figure 3-15 – Collier County Age Distribution (2009)

Source: U.S. Census Bureau 2011

Areas within Collier County.

Population — Everglades City has seen an increase in population from 481 in 2000 to 616 in 2009, an average annual population growth rate of 3.12%. The median age in Everglades City is 51 years (U.S. Census Bureau 2011).

Big Cypress Seminole Indian Reservation reported a population increase from 142 in 2000 to 591 in 2010, an average annual population growth rate of 31.62%. The median age for the Big Cypress Seminole Indian Reservation is 27 years (U.S. Census Bureau 2011).

The Miccosukee Indian Reservation has no reported population statistics from either the 2000 or 2010 census (U.S. Census Bureau 2011).

Surrounding Areas.

Population — Current populations of each county as reported by the 2010 U.S. Census are as follows: Miami-Dade – 2,496,435;

Broward –1,748,066; Monroe – 73,090; Palm Beach – 1,320,134; Lee – 618,754; and Hendry – 39,140 (U.S. Census Bureau 2011).

Economy and Employment

Collier County. Bureau of Labor Statistics data for May 2010 for the Naples-Marco Island metropolitan area show a mean annual wage of \$39,830 (BLS 2011). Tourism has long been a major industry in Collier County, with nearly \$11 million in tourism tax revenue collected annually over the last ten years (see figure 3-16). Figure 3-17 shows the monthly 10-year averages of the tourism taxes in Collier County, illustrating a seasonal fluctuation in tourism (Naples, Marco Island, Everglades Convention & Visitors Bureau 2011).

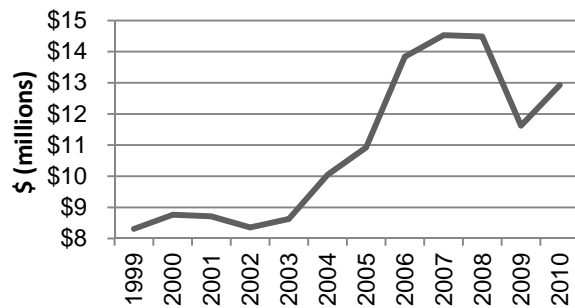


Figure 3-16 – Total Collier County Tourism Taxes (1999–2010)

Source: Naples, Marco Island, Everglades Convention & Visitors Bureau 2011

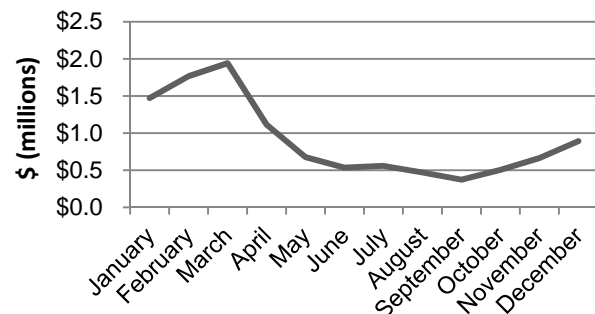


Figure 3-17 – Monthly 10-year Averages of Tourism Taxes (1999–2010)

Source: Naples, Marco Island, Everglades Convention & Visitors Bureau 2011

Employment — According to the Bureau of Labor Statistics for September 2011, Collier County had a civilian workforce of 140,100 and an unemployment rate of 11.4%. May 2010 occupation statistics indicate that 15,300 jobs were in the food preparation and serving industry, 14,120 jobs in the sales industry, and 4,810 jobs in the transportation industry (BLS 2011).

Personal income — The January 2011 cost of living index for Collier County was 90.4 (U.S. average is 100). The per capita income for Collier County was \$36,942 in 2009 with a median household income of \$58,133. By contrast, the state of Florida's per capita income was \$26,503, with a median household income was \$47,450 (U.S. Census Bureau 2011).

Tourism industry — The tourism industry is the primary driver of economic activity and leading employer in Collier County, responsible for 31,300 jobs. Nearly 1.4 million visitors in 2007 spent over \$791 million, resulting in a total annual economic impact of over \$1.17 billion within Collier County (Collier County 2011).

Areas within Collier County. As of 2000, Everglades City had 424 citizens within the labor force of Collier County with the majority being in the 25 to 54 years of age range and a 3% unemployment rate (BLS 2011). The tourism industry is the primary economic engine for the city and includes three hotels and two campgrounds. Attractions include tours of the nearby Everglades in various vehicles as well as popular fishing locations (Everglades City 2010).

As of the 2000 census, 63% of the population of the Big Cypress Seminole Indian Reservation over the age of 16 was employed in the workforce, with an unemployment rate of 9% of qualified workers (U.S. Census Bureau 2011). On the Big Cypress Reservation, tourism is the major economic driver, with a museum as well other tourist attractions and Everglades tours. No data are available for the Miccosukee Indian Reservation.

Surrounding Areas.

Employment — According to the state of Florida, the state had over 76.8 million visitors in 2004, which had a \$57 billion direct impact on the economy of the state. Other major economic contributors in the state include the agriculture industry and university system. The agriculture industry of Florida represents 75% of the oranges in the U.S. as well as 40% of the world's orange juice supply. The state university system of Florida has over \$500 million a year in sponsored research grants. The state had a 10.6% unemployment rate as of September 2011 (Florida 2011).

Personal income — Florida reported per a capita income for 2009 of \$26,503 and median household income of \$47,450 (U.S. Census Bureau 2011). In the same period of time, Miami-Dade and Hendry counties had lower per capita incomes and lower median household incomes. However, Lee, Palm Beach, Broward, and Monroe counties had higher per capita incomes and median household incomes with Monroe County being the most similar to Collier County. Collier County had the highest in both statistics of all the counties illustrated below (see figure 3-18).

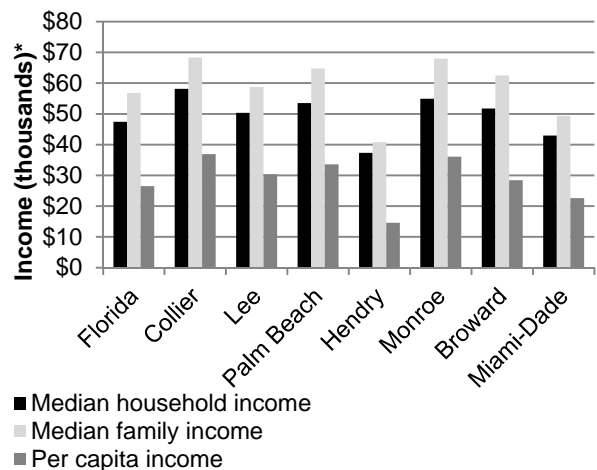


Figure 3-18 – Incomes for Selected Florida Counties (2009)

Source: U.S. Census Bureau 2011

* Income in 2009 inflation-adjusted dollars.

Economic Impact of Visitor Use

The Visitor Services Project and Cooperative Park Studies Unit of the University of Idaho conducted a general visitor survey for Big Cypress National Preserve in the spring of 2007. A portion of the questions asked for this study pertained to the economic impact of visitor groups visiting the Preserve (Papadogiannaki et al. 2007).

Primary Reason for Visit. Of the visitors surveyed as part of the 2007 visitor study, 21% of visitors to the Preserve were residents of the local area. Nonresident visitors to the Preserve were asked, “What was your primary reason for visiting the South Florida region (areas south of Lake Okeechobee)?” The most common reason for nonresidents visiting the Preserve was visiting other attractions in the area, while 22% of those responding listed visiting the Preserve as the primary reason for visiting the South Florida region (see figure 3-19). “Other” reasons for visiting included primarily recreational activities (e.g., camping, fishing, hiking, hunting, kayaking, sailing, wildlife viewing/birdwatching, etc.) (Papadogiannaki et al. 2007).

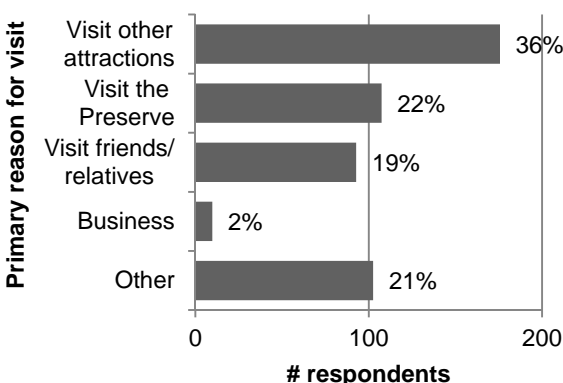


Figure 3-19 – Primary Reason for Visiting the South Florida Region

Source: Papadogiannaki et al. 2007
N = 488 visitor groups

Total Expenditures. The 2007 visitor study conducted by Papadogiannaki et al. questioned visitor groups about expenditures inside the Preserve, expenditures inside and outside the Preserve associated with their trip to the Preserve, expenditures on the east coast (Atlantic coast) associated with their trip to the Preserve, and expenditures on the west coast (Gulf coast) associated with their trip to the Preserve. The results of the expenditure data analysis from the 2007 visitor study (Papadogiannaki et al. 2007) are discussed in the following sections.

Inside the Preserve — Visitor groups were asked to report all expenditures for the current visit that occurred within the Preserve. The average expenditure of visitor groups inside the Preserve was \$26, with an average total expenditure per person (per capita) of \$11. Fifty-four percent of the visitor groups spent no money, while 15% of visitor groups reported spending \$51 or more (see figure 3-20) (Papadogiannaki et al. 2007).

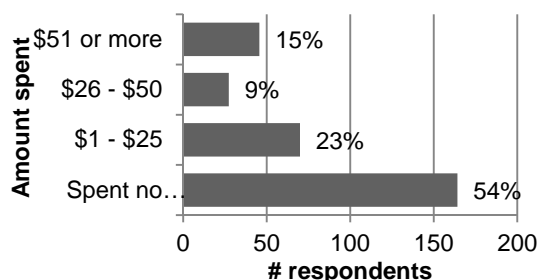


Figure 3-20 – Total Expenditures Inside the Preserve

Source: Papadogiannaki et al. 2007
N = 304 visitor groups

Visitor groups were also asked to list the details of their expenditures inside the Preserve. Of the visitor groups that spent money inside the Preserve, the largest proportion of the total expenditures (56%) was spent on camping fees and charges (see figure 3-21) (Papadogiannaki et al. 2007).

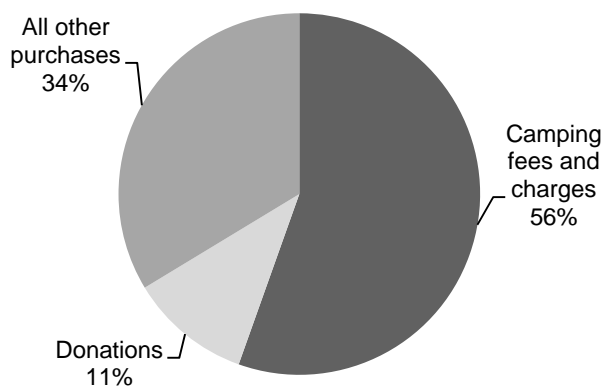


Figure 3-21 – Proportions of Total Expenditures Inside the Preserve

Source: Papadogiannaki et al. 2007
N = 304 visitor groups

Inside and outside the Preserve — Visitor groups were asked to report all expenditures for the current visit to the Preserve and the surrounding areas (areas south of Lake Okeechobee). Surrounding area residents were asked to only include expenditures that were directly related to their visit to the Preserve. The average expenditure of visitor groups was \$1,073, with an average total expenditure per person (per capita) of \$484. Eight percent of the visitor groups spent no money, while 40% of visitor groups reported spending \$601 or more (see figure 3-22) (Papadogiannaki et al. 2007).

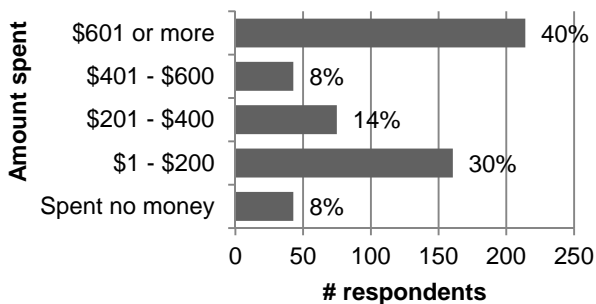


Figure 3-22 – Total Expenditures Inside and Outside the Preserve

Source: Papadogiannaki et al. 2007
N = 535 visitor groups

Visitor groups were also asked to list the details of their expenditures inside and outside the Preserve. The largest proportion of the total expenditures was spent on lodging (36%), restaurants and bars (18%), and groceries and takeout food (11%). Other expenditures that comprised at least 5% of the total proportion of expenditures were: gas and oil (9%), other transportation expenses (6%), and camping fees and charges (5%). Other expenditures comprised 3% or less of the total proportion of expenditures (Papadogiannaki et al. 2007).

East coast (Atlantic coast) — Visitor groups were asked to list their group's expenditures in the surrounding area (areas south of Lake Okeechobee) on the east coast (Atlantic coast). The average expenditure of visitor groups on the east coast was \$609, with an average total expenditure per person (per capita) of \$257. One-quarter of the visitor groups spent no money in the surrounding area on the east coast, while 29% of visitor groups reported spending \$601 or more (see figure 3-23) (Papadogiannaki et al. 2007).

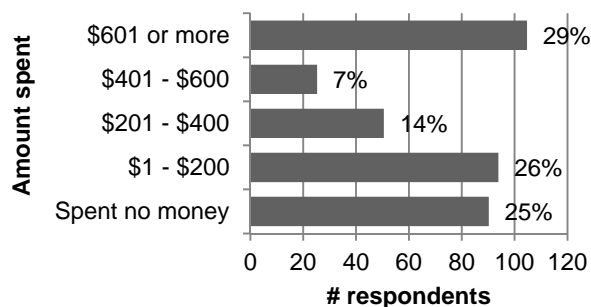


Figure 3-23 – Total Expenditures on the east coast (Atlantic coast)

Source: Papadogiannaki et al. 2007
N = 361 visitor groups

Visitor groups were also asked to list the details of their expenditures on the east coast. The largest proportion of the total expenditures was spent on lodging (35%), restaurants and bars (17%), and groceries and takeout food (12%). Other expenditures that comprised at least 5% of the total proportion of expenditures were: gas and oil (11%), other transportation expenses (5%), and camping fees and charges (5%). Other expenditures

comprised 3% or less of the total proportion of expenditures (Papadogiannaki et al. 2007).

West coast (Gulf coast) — Visitor groups were asked to list their group's expenditures in the surrounding area (areas south of Lake Okeechobee) on the west coast (Gulf coast). The average expenditure of visitor groups on the west coast was \$872, with an average total expenditure per person (per capita) of \$396. Fifteen percent of the visitor groups spent no money in the surrounding area on the west coast, while 37% of visitor groups reported spending \$601 or more (see figure 3-22) (Papadogiannaki et al. 2007).

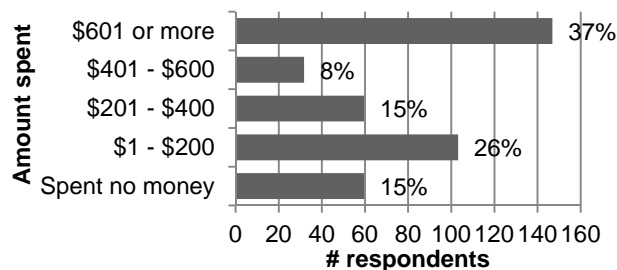


Figure 3-24 – Total Expenditures on the west coast (Gulf coast)

Source: Papadogiannaki et al. 2007
N = 397 visitor groups

Visitor groups were also asked to list the details of their expenditures on the west coast. The largest proportion of the total expenditures was spent on lodging (39%), restaurants and bars (20%), and groceries and takeout food (10%). Other expenditures that comprised at least 5% of the total proportion of expenditures were: gas and oil (8%) and other transportation expenses (6%). Other expenditures comprised 3% or less of the total proportion of expenditures (Papadogiannaki et al. 2007).

Hunting Licenses, Tags, Permits, and Stamps. Table 3-7 provides the hunting license data for Florida collected by the USFWS. Information collected annually includes the number of paid license holders; the number of resident and nonresident licenses, tags, permits and stamps issued; and the gross cost associated with all of the licenses, tags, permits, and stamps purchased. As of November 2011, 176,539 paid license holders were recorded for the year, which represents a gross cost of almost six million dollars. These numbers have remained fairly stable over the last ten years (see table 3-7) (USFWS 2011b).

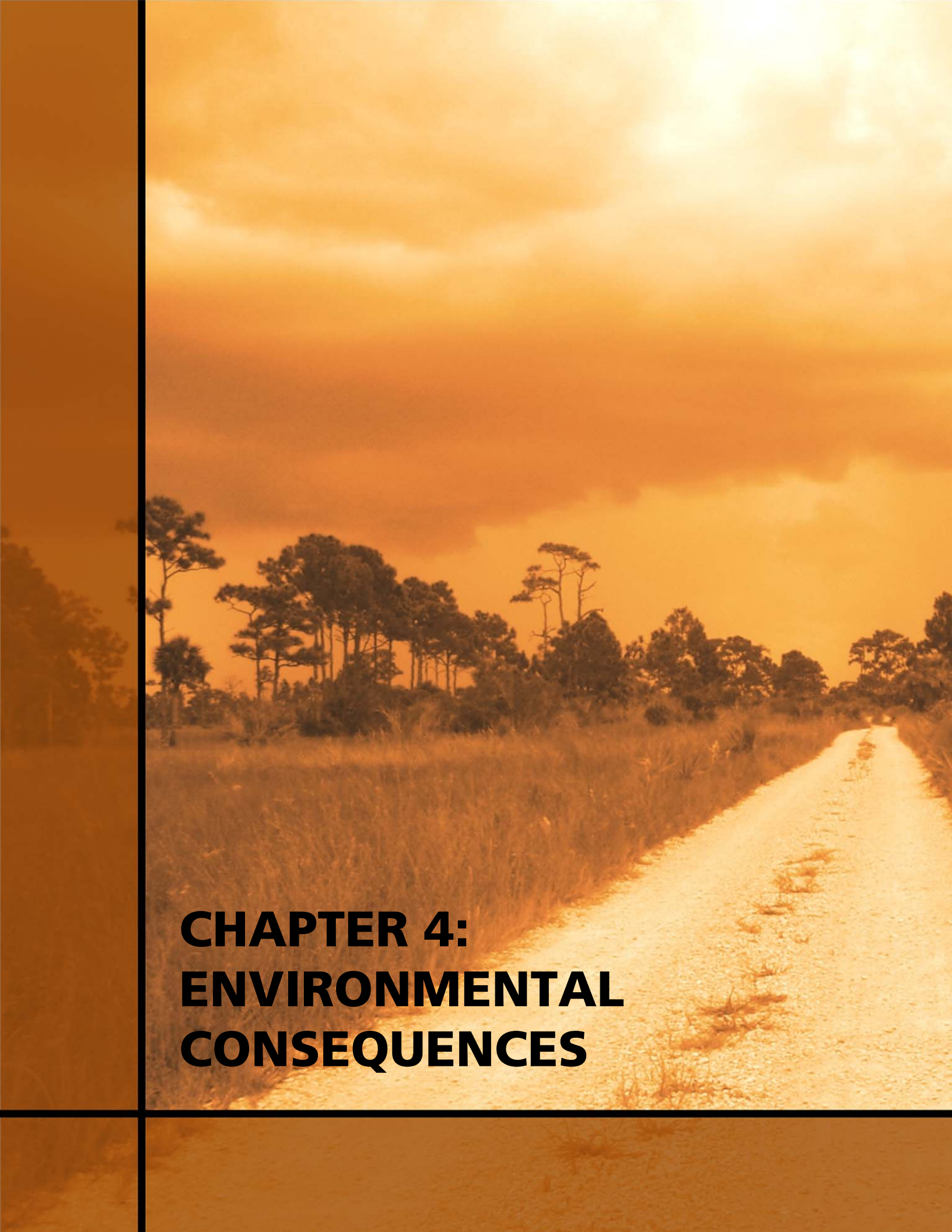
Table 3-7 – USFWS National Hunting License Data (Florida)

Year	Paid License Holders ¹	Resident Licenses, Tags, Permits, and Stamps	Nonresident Licenses, Tags, Permits, and Stamps	Total Licenses, Tags, Permits, and Stamps	Gross Cost
2011	176,539	315,149	12,824	327,973	\$5,956,378
2010	170,554	309,961	12,484	322,445	\$5,851,620
2009	170,282	151,755 ²	7,315	159,070 ²	\$3,505,738 ²
2008	167,524	269,212	11,431	280,643	\$5,002,224
2007	161,273	288,426	6,298	294,724	\$4,975,506
2006	175,067	317,592	6,761	324,353	\$5,308,511
2005	176,320	313,151	8,028	321,179	\$4,717,719
2004	181,857	331,120	7,649	338,769	\$4,816,008
2003	176,320	313,151	8,028	321,179	\$4,717,719
2002	181,857	331,120	7,649	338,769	\$4,816,008
2001	181,635	332,760	7,090	339,850	\$4,787,608
2000	177,116	315,772	6,511	322,283	\$4,690,698

Source: USFWS 2011b

¹ A paid license holder is one individual regardless of the number of licenses purchased.

² There appears to be an anomaly in these data numbers for 2009.

The background image is a landscape photograph with a strong orange and yellow color cast, suggesting a sunset or sunrise. A dirt road curves from the bottom right towards the center of the frame. The road is flanked by tall, dry grass. In the middle ground, there is a line of trees, including several tall, thin pine trees. The sky is filled with soft, glowing clouds. The overall mood is serene yet dramatic.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

For each impact topic discussed in “Chapter 3: Affected Environment,” the environmental consequences, or potential impacts, of each of the alternatives are analyzed. This section analyzes both anticipated beneficial and adverse impacts that would likely result from the implementation of any of the alternatives considered. This section also explains the general methodology used to analyze impacts, including definitions of impact thresholds for measuring the intensity of impacts.

METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS BY RESOURCE

The general approach for measuring the effects of the alternatives on each resource category includes general analysis methods as described in basic assumptions, thresholds used to define the level of impact resulting from each alternative, and methods used to evaluate the cumulative effects. The analysis of impacts follows CEQ guidelines and Director’s Order 12 procedures (NPS 2011a).

General Analysis Method

Potential impacts of all alternatives are described in terms of type (Are the effects beneficial or adverse?), context (Are the effects site-specific, local, or regional?), duration (Are the effects short-term or long-term?), and intensity (Are the effects negligible, minor, moderate, or major?). Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this document. In some cases, alternatives are grouped together in the analysis when impacts were determined to be similar, in order to minimize redundancy.

Each alternative is compared to a baseline to determine the context, duration, and intensity of the resource impacts. For purposes of the impact analysis, the environmental baseline is

alternative 2. In the absence of quantitative data, best professional judgment was used to determine impacts. In general, impacts were determined using existing literature, federal and state standards, and consultation with subject matter experts, Preserve staff, and other agencies.

For the purposes of analysis the following assumptions are used for all impact topics:

Beneficial. A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

Adverse. A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.

Context. The affected environment within which an impact would occur, such as local, Preserve-wide, regional, global, affected interests, society as whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic.

Duration. The duration of the impact varies according to the impact topic evaluated. However, for the purposes of this analysis, the following assumptions are used for all impact topics:

Short-term impacts — Those impacts occurring in the immediate future or during plan implementation (usually from one to six months or up to one year). For natural systems (vegetation, wildlife, wetlands), recovery would take less than one year.

Long-term impacts — Those impacts occurring after plan implementation through the next 10 years; for natural systems (vegetation, wildlife, wetlands), recovery would take more than one year. Although an impact may only occur for a short duration at one time, if it occurs regularly over a longer

period of time, the impact may be considered to be a long-term impact. For example, the noise from firearm shots would be heard for a short time and intermittently, but because firearm shots would occur every hunting season throughout the life of the plan, the impact on the natural soundscape would be considered to be long-term.

Intensity. Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed (see table 4-1).

Table 4-1 – Impact Intensity Definitions by Impact Topic

Impact Topic	Negligible	Minor	Moderate	Major
Natural Resources				
Vegetation and Habitat				
Native Vegetative Communities and Habitat	The action might result in a change in vegetation, but the change would not be measurable or would be at the lowest level of detection.	The action might result in a detectable change, but the change would be slight. This could include changes in the abundance, distribution, or composition of individual species in a local area, but would not include changes that would affect the viability of vegetation communities. Changes to local ecological processes would be minimal.	The action would result in a clearly detectable change in a vegetation community and could have an appreciable effect. This could include changes in the abundance, distribution, or composition of nearby vegetation communities, but would not include changes that would affect the viability of plant populations in the Preserve. Changes to local ecological processes would be of limited extent.	The action would be severely adverse to a vegetation community. The impacts would be substantial and highly noticeable, and they could result in widespread change. This could include changes in the abundance, distribution, or composition of a nearby vegetation community or plant populations in the Preserve to the extent that the population would not be likely to recover. Key ecological processes would be altered, and "landscape-level" (regional) changes would be expected.
Protected Plant Species				
Nonnative Invasive Plant Species				

Table 4-1 – Impact Intensity Definitions by Impact Topic

Impact Topic	Negligible	Minor	Moderate	Major
Wildlife				
Protected Wildlife Species	<p>There would be no effect on the species. There would be no observable or measurable impacts on the species, their habitats (including designated critical habitat), or the natural processes that sustain them. This impact intensity would equate to a determination of “no effect” under Section 7 of the Endangered Species Act.</p>	Adverse		
		<p>The effects of the action would be discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated). Individuals may temporarily avoid areas. Impacts would not affect critical periods (i.e., breeding, nesting, denning, feeding, resting) or habitat. In addition, essential features of critical habitat would not be impacted. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.</p>	<p>Individuals may be impacted by disturbances that interfere with critical periods (i.e., breeding, nesting, denning, feeding, resting) or habitat; however, the level of impact would not result in physical injury, mortality, or extirpation from the Preserve. Some essential features of designated critical habitat would be reduced; however the integrity of the habitat would be maintained. This impact intensity would equate to a determination of “likely to adversely affect” under Section 7 of the Endangered Species Act.</p>	<p>Individuals may suffer physical injury or mortality, or populations may be extirpated from the Preserve. Essential features of designated critical habitat would be reduced, affecting the integrity of the designated unit. This impact intensity would equate to a determination of “likely to adversely affect” under Section 7 of the Endangered Species Act.</p>
		Beneficial		
		<p>Impacts would result in slight increases to viability of the species in the Preserve because species-limiting factors (i.e., habitat loss, competition, and mortality) would be kept in check. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.</p>	<p>Impacts would result in improved viability of the species, population structure, and species population levels in the Preserve, because species limiting factors (e.g., habitat loss, competition, and mortality) would be reduced. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.</p>	<p>Impacts would result in highly noticeable improvements to species viability, population structure, and species population levels in the Preserve, because species limiting factors (e.g., habitat loss, competition, and mortality) would be nearly eliminated. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.</p>

Table 4-1 – Impact Intensity Definitions by Impact Topic

Impact Topic	Negligible	Minor	Moderate	Major
Major Game Species	The action might result in a change in game species, but the change would not be measurable or would be at the lowest level of detection.	The action might result in a detectable change, but the change would be slight. This could include changes in the abundance or distribution of individual game species in a local area, but not changes that would affect the viability of local game populations. Changes to local ecological processes would be minimal.	The action would result in a clearly detectable change in a game population and could have an appreciable effect. This could include changes in the abundance or distribution of local game populations, but not changes that would affect the viability of regional game populations. Changes to local ecological processes would be of limited extent.	The action would be severely adverse or exceptionally beneficial to a population. The effects would be substantial and highly noticeable, and they could result in widespread change and be permanent. This could include changes in the abundance or distribution of a local or regional population of a game species to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Important ecological processes would be altered, and “landscape-level” (regional) changes would be expected.
Nonnative / Invasive Wildlife Species	The action might result in a change in nonnative/invasive wildlife species, but the change would not be measurable or would be at the lowest level of detection.	The action might result in a detectable change, but the change would be slight. This could include changes in the abundance or distribution of individual nonnative/invasive wildlife species in a local area, but not changes that would affect the viability of local native wildlife populations. Changes to local ecological processes would be minimal.	The action would result in a clearly detectable change in nonnative/invasive wildlife species and could have an appreciable effect. This could include changes in the abundance or distribution of local native wildlife populations, but not changes that would affect the viability of regional native wildlife populations. Changes to local ecological processes would be of limited extent.	The action would be severely adverse. The effects would be substantial and highly noticeable, and they could result in widespread change and be permanent. This could include changes in the abundance or distribution of a local or regional population of nonnative/invasive wildlife species to the extent that the native wildlife population would not be likely to recover. Important ecological processes would be altered, and “landscape-level” (regional) changes would be expected.

Table 4-1 – Impact Intensity Definitions by Impact Topic

Impact Topic	Negligible	Minor	Moderate	Major
Wilderness Resources and Values				
Wilderness	An action would have no discernible effects on wilderness resources and values.	An action would have detectable effects on wilderness resources and values, affecting the ability for a small area to meet wilderness eligibility criteria or improving and protecting its wilderness characteristics.	An action would have clearly detectable effects on wilderness resources and values, affecting the ability of an area to meet wilderness eligibility criteria or improving and protecting its wilderness characteristics. The impact would be visible to visitors.	An action would have substantial effects on wilderness resources and values, eliminating the characteristics that make substantial areas eligible as wilderness or improving and protecting its wilderness characteristics. The impact would be easily visible to visitors.
NPS Management and Operations				
Preserve Management and Operations	The effect would be at or below the level of detection, and would not have an appreciable effect on Preserve operations and management.	The effects would be detectable, but would be of a magnitude that would not have an appreciable effect on Preserve operations and management.	The effects would result in a change in Preserve operations and management in a manner readily apparent to staff and possibly to the public.	The effects would result in a substantial and widespread change in Preserve operations and management in a manner readily apparent to staff and the public.
Visitor Use				
Visitor Use and Experience / Recreational Opportunities	Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable changes in visitor use and/or experience or in any defined indicators of visitor satisfaction or behavior.	Changes in visitor use and/or experience would be slight but detectable, but would not appreciably diminish or enhance critical characteristics of the visitor experience. Visitor satisfaction would remain stable.	Few critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be altered. The visitor would be aware of the effects associated with implementation of the alternative and would likely be able to express an opinion on the changes. Visitor satisfaction would begin to either decline or increase as a direct result of the effect.	Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly decline or increase.

Table 4-1 – Impact Intensity Definitions by Impact Topic

Impact Topic	Negligible	Minor	Moderate	Major
Noise / Soundscapes	Natural sounds would prevail; activities associated with noise (human-generated sound) would be very infrequent or absent.	Natural sounds would predominate within the Preserve; human-generated sounds from appropriate recreational activities could be heard occasionally.	Natural sounds would predominate, but activities associated with noise would occur occasionally at low to moderate levels. Human activity associated with noise is consistent with Preserve objectives, noise would predominate during daylight hours during periods of peak use. Noise (activity) would not be overly disruptive to noise-sensitive visitor activities and natural sounds could still be heard.	Natural sounds would be impacted by activities associated with noise frequently or for periods of extended time. Where activities associated with human-generated noise are consistent with Preserve objectives, the natural soundscape would be impacted most of the day throughout the week during the peak season. Noise would disrupt conversation for long periods of time and make enjoyment of other activities in the area difficult.
Public Health and Safety	Public health and safety would not be affected, or the effects would be at the lowest levels of detection and would not have an appreciable effect on the health and safety of visitors, and/or park and concessioner staff.	The effect would be detectable but short-term, would be limited to a relatively small number of visitors and/or park and concessioner staff at a localized area, and would not have an appreciable effect on public health and safety.	The effects would be readily apparent, short-term or long-term, would affect a relatively large number of visitors and/or park and concessioner staff on a local scale, and result in substantial, noticeable effects on public health and safety.	The effects would be apparent, long-term, would affect public health and safety on a regional scale, and result in substantial, noticeable effects on public health and safety.
Socioeconomic Environment				
Socioeconomics	The effect would be below detectable levels or detectable only through direct means, with no discernible effect on the character of the social and economic environment. Effects identified as neutral would be actions that do not produce any changes at all to the social and economic environment.	The effect would be detectable but limited in geographic extent or size of population affected and not expected to alter the character of the established social and economic environment.	The effect would be readily detectable across a broad geographic area or segment of the community and could have an appreciable effect on the social and economic environment.	The effect would be readily apparent, affect a large segment of the population across the entire community and region, and would have substantial effect on the social and economic environment.

Analysis Area

The analysis area for each of the impact topics is shown in table 4-2 below.

Table 4-2 – Analysis Area by Impact Topic

Impact Topic	Analysis Area
Natural Resources [Native Vegetative Communities and Habitat, Protected Plant Species, Nonnative Invasive Plant Species, Major Game Species, Nonnative/Invasive Wildlife Species, and Protected Wildlife Species (except the Florida Panther)]	The boundaries of the Preserve
Protected Wildlife Species (Florida Panther)	The current range of the Florida panther population which inhabits the Preserve
Wilderness Resources and Values	The boundaries of the Preserve
Preserve Management and Operations	NPS staff which spend all or part of their time working on the Preserve. Also, FWC staff assigned to hunting management or enforcement at the Preserve
Visitor Use (Visitor Use and Experience / Recreational Opportunities, Noise / Soundscapes, and Public Health and Safety)	All visitors and NPS staff during their time within the boundaries of the Preserve, and all members of the public not within the boundaries of the Preserve but otherwise directly impacted by visitor activities occurring at the Preserve
Socioeconomic Environment	Collier County

Mitigation Measures

The NPS Organic Act charged the NPS with managing the lands under its stewardship “in

such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” As a result, NPS staff routinely evaluate and implement mitigation measures whenever conditions occur that could adversely affect the sustainability of national park system resources. To ensure that implementation of any of the alternatives protects natural and cultural resources that are unimpaired and the quality of the visitor experience, a consistent set of mitigation measures would be applied to actions proposed in this plan. The NPS would prepare appropriate environmental compliance documentation (i.e., those required by the NEPA and other relevant legislation) for any future actions. As part of the environmental compliance, the NPS would avoid, minimize, and mitigate adverse impacts when practicable.

The following mitigation measures would be applied to avoid or minimize potential impacts from implementation of any of the alternatives:

Natural Resources. Visitors would be informed of the importance of protecting the Preserve’s natural resources and leaving these areas undisturbed for the enjoyment of future generations.

Protected Wildlife Species. Protection of federally listed wildlife species would continue to be maintained through current and future compliance with Section 7 of the Endangered Species Act.

Nonnative / Invasive Species. Visitors would be encouraged to check equipment and vehicles to avoid the spread of nonnative nonnative plant species.

Game Species. Existing monitoring efforts would continue.

Visitor Use and Experience. Appropriate closures, guarding, gating, and education would be used as necessary to provide for visitor health and safety.

Hunting. Hunters in the Preserve would be required to have the proper licenses, permits, and stamps to hunt, in accordance with state laws and regulations.

Hunters in the Preserve would be required to complete the hunter safety education course, in accordance with state laws and regulations.

All hunters in the Preserve would be required to comply with the hunter orange requirement.

Hunters would be encouraged to use a fall arrest system or full body harness when hunting from an elevated position.

Nonhunting visitors to the Preserve would be provided with education materials about hunting safety.

Cumulative Impacts Analysis

Cumulative impacts are defined in the CEQ implementing regulations of NEPA (40 CFR 1508.7) as:

... the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

This “Cumulative Impacts Analysis” section is designed to provide the reader with a broad overview of the past, present, and reasonably foreseeable future actions in the South Florida region that may have an impact on the Preserve over a range of impact topics. Each impact topic section below includes a discussion of cumulative impacts in reference to each particular impact topic and may reference the projects discussed here.

Table 4-3 shows a selection of the past, present, and reasonably foreseeable future actions which may have cumulative impacts on the Preserve.

Table 4-3 – Selected Plans and Projects with a Cumulative Impact on the South Florida Region

Plan / Project	Description
Big Cypress National Preserve Plans / Projects	
Original Preserve GMP	The GMP completed in 1991 for the original Preserve was mandated by the National Parks and Recreation Act (1978). This document guides visitor use, natural and cultural resource management, and general development for a period of 10 to 15 years. It provides a clearly defined direction for resource management and preservation as well as appropriate visitor use and interpretation of the resources within the original Preserve boundaries. This document also articulated the need to manage hunting within the Preserve.
Addition GMP	The purpose of the Addition GMP, completed in 2010, is “to provide a comprehensive direction for resource preservation and visitor use and a basic foundation for decision-making for the Addition for the next 15 to 20 years” (NPS 2010a). The Addition GMP outlines diverse frontcountry and backcountry recreational opportunities, enhanced day use and interpretive opportunities along road corridors, and enhanced recreational opportunities with new facilities and services. A substantial amount of ORV access and riding opportunities and a moderate amount of proposed wilderness are also proposed in this document. This document also articulated the need for an independent plan to manage hunting within the Preserve.
Recreational ORV Management Plan	The NPS completed this ORV management plan for the original Preserve in 2000. Included in this plan are the establishment of 15 ORV access points and no more than 400 miles of designated primary trails. A maximum of 2,000 permits per year can be granted to ORV users. The plan requires monitoring of field conditions and impacts from ORVs and outlines an adaptive management framework to do so.

Table 4-3 – Selected Plans and Projects with a Cumulative Impact on the South Florida Region

Plan / Project	Description
Commercial Services Plan	The <i>Commercial Services Plan</i> is intended to address the existing conditions and law in a manner that will be compliant with the 1998 National Park Service Concessions Management Improvement Act (PL 105-391) and regulations. As an implementation plan, this <i>Commercial Services Plan</i> must also be consistent with the established planning direction in the 1991 <i>General Management Plan</i> for the Preserve and achieve the desired future conditions or goals for the Preserve. This plan covers the original Preserve only; the Addition would be addressed in an addendum to this plan to be completed in the future.
Long-Range Interpretive Plan	This plan provides the vision for visitor experiences in the Preserve based on the purpose, significance, and mission put forth in the "Preserve's Strategic Plan." The <i>Interpretive Plan</i> proposes both development and management activities to satisfy current visitor demands, and identifies a media and activity action plan to meet future visitor needs. The interpretive plan was meant to guide the Preserve's interpretation direction for 10 years.
Oil and Gas Operations	Plans for future oil and gas operations are a reasonably foreseeable expectation for the Preserve. Future oil and gas proposals would likely include conducting a geophysical survey and could include the use of specialized off-road equipment that would travel cross-country. An environmental analysis of these proposals and their potential cumulative impacts would be conducted for such submissions.
Everglades National Park Plans / Projects	
Everglades National Park General Management Plan	The NPS is developing a new GMP for Everglades National Park. The plan also includes a wilderness study for the East Everglades Addition, an area added to the park boundary in 1989. The general management plan will provide broad guidance for decisions about natural and cultural resource protection, appropriate types and levels of visitor activities, and facility development. The plan will articulate the park's mission, purpose, and significance, and define the resource conditions and visitor experiences that should be achieved and maintained over time. The plan will consider Everglades National Park both as a unit of the national park system and in a broader ecosystem context that includes the surrounding South Florida region.
Modified Water Deliveries to Everglades National Park	<p>Originally initiated by Congress as part of the 1989 Everglades Expansion and Protection Act, this project aims to improve water deliveries into Everglades National Park. Since the implementation of the Central & Southern Florida Project, artificial distributions of water have left some areas of the park unnaturally wet, while others remain too dry. This project endeavors to restore a more natural flow of water to Northeast Shark Slough, thereby alleviating western Shark Slough from unusually high water levels. Because the <i>Modified Water Deliveries</i> project is expected to increase water levels around some developed areas, full implementation likely remains years away. Project partners must carefully consider the full effects of their actions for endangered species, public roadways, and private residents. It is expected, however, that once such issues have been resolved, the plan will yield new life for the Everglades through enhanced water flows (NPS 2010b).</p> <p>There are five major components of the Modified Water Delivers to Everglades National Park Project (SFWMD 2008):</p> <ul style="list-style-type: none"> • Tamiami Trail Modifications • L-67A Conveyance Features • 8.5 Square Mile Area Protection Features • S-356 Pump Station • Taylor Slough Bridge

**Table 4-3 – Selected Plans and Projects with a
Cumulative Impact on the South Florida Region**

Plan / Project	Description
Experimental Program of Water Deliveries to Everglades National Park	Public Law 98-181, enacted in November 1983, authorized the USACE, with the concurrence of the SFWMD and the NPS to implement the Experimental Water Deliveries Program. Congress authorized the USACE, in concurrence with the SFWMD and the NPS, to experiment with the delivery of water to Everglades National Park in order to provide ecosystem benefits and reverse the ecological decline in the park. Furthermore, the law authorized the USACE to construct the necessary measures to provide flood protection for homes in order to meet the goals of the program. The law also authorized the USACE to acquire agricultural lands threatening the realization of these objectives. The program was re-authorized every two years until 1989 when permanent authority was issued pending the completion of permanent structural modifications approved under the Everglades Expansion Act of 1989. This legislation provided the USACE with the authority to use the Experimental Water Deliveries Program as an iterative field testing program for developing optimum water delivery plans for Everglades National Park (Van Lent, Snow, and James 1999).
Regional Protected Species Plans / Projects	
Interagency Florida Panther Response Plan	The USFWS, in partnership with the NPS and the FWC, prepared a final response plan in October 2008 that includes guidelines for the agencies responding to human-panther interactions and depredations. The plan also provides guidelines for developing an outreach and education program to help people understand panther behavior and actions humans should take when living or recreating in panther habitat.
Florida Panther Recovery Plan	This recovery plan includes specific recovery objectives and criteria to be met in order to reclassify (downlist) and eventually delist the Florida panther under the Endangered Species Act. The plan also includes provisions that contemplate reintroduction of panthers in locations across the Southeast. Last updated in 2008, this is the third update of the plan since 1981 when the first plan was crafted. The revised plan supersedes the panther chapter in the Service's <i>Multi-Species Recovery Plan</i> as well as its range-wide species recovery plan for the panther.
South Florida Multi-Species Recovery Plan	This plan was written to recover multiple species by restoring ecological communities throughout the South Florida ecosystem (26,002 square miles). There are more than 600 species considered either rare or imperiled in South Florida, 68 of which are federally listed as threatened or endangered. A number of limiting factors for habitat-limited species are outlined, including habitat loss, fragmentation, and degradation as a result of urbanization, agriculture or other land-use conversions, wetland drainage and alteration of hydrological patterns, invasion of nonnative species, fire suppression, soil subsidence, degradation of water quality, and increased levels of contaminants. Recovery objectives are identified at the species level, while recovery criteria are identified at the species and community level. Recovery actions have been developed to provide consistency between each of the 68 species, and habitat level recovery actions have been developed to facilitate the integration of individual species needs at the community level. The plan does not replace existing approved species recovery plans, but rather outlines South Florida's contribution to range-wide recovery. A number of threatened and endangered species reside within the Preserve, and the Preserve is a critical habitat link in the ecosystem.
Florida Panther National Wildlife Refuge Comprehensive Conservation Plan	The National Wildlife Refuge System Improvement Act of 1997 requires the USFWS to develop comprehensive conservation plans for all lands and waters of the National Wildlife Refuge System. The <i>Florida Panther National Wildlife Refuge Comprehensive Conservation Plan</i> meets the requirements of the act. The refuge was established to conserve fish, wildlife, and plants listed as endangered and/or threatened species under the Endangered Species Act of 1973, specifically the Florida panther. The Refuge abuts the northwest boundary of the Preserve and functions as a vital habitat linkage for panthers.

Table 4-3 – Selected Plans and Projects with a Cumulative Impact on the South Florida Region

Plan / Project	Description
Everglades Restoration Transition Plan	<p>The purpose of this plan is to define water management operating criteria for Central and Southern Florida Project features and the constructed features of the Modified Water Deliveries and Canal-111 projects until a Combined Operational Plan is implemented. The plan objectives include improving conditions in Water Conservation Area 3A for the endangered Everglade snail kite, wood stork and wading bird species while maintaining protection for the endangered Cape Sable seaside sparrow (CSSS) and Congressionally authorized purposes of the Central and Southern Florida Project.</p> <p>This plan incorporates more flexible operating criteria to better manage Water Conservation Area 3A for the benefit of multiple species and represents a positive step towards balancing the competing needs of a complex system (USACE 2011).</p>
Regional Restoration Plans / Projects	
Comprehensive Everglades Restoration Plan	<p>This plan is a framework and guide to restore, protect, and preserve the water resources of central and southern Florida, including the Preserve. The plan was approved in the Water Resources Development Act (2000), and it is a component of the world's largest ecosystem restoration effort, encompassing 16 counties and an 18,000-square-mile area. The comprehensive plan includes more than 60 elements designed to capture, store, and redistribute fresh water. Implementation of the comprehensive plan is expected take more than 30 years to complete and would improve the quality, quantity, timing, and distribution of water flows through the Preserve. Some of the major elements of CERP include:</p> <ul style="list-style-type: none"> • Big Cypress / L-28 Interceptor Modifications • WCA-3 Decompartmentalization and Hydropattern Restoration feature • ENP Seepage Management • C-111 Spreader Canal • River of Grass Initiative
Final Environmental Impact Statement and South Florida and Caribbean Parks Exotic Plant Management Plan	<p>This plan outlines the management of nonnative plants in nine South Florida and Caribbean parks, including the Preserve. The plan promotes restoration of native plant communities and habitat conditions in ecosystems that have been invaded by nonnative plants and protects resources, values, visitors, staff, and area residents from adverse effects resulting from nonnative plant presence and control activities. The plan takes a collaborative approach to managing nonnative plants across the nine parks, improving effectiveness and efficiency and providing a consistent management framework for responding to this threat. The plan also seeks to establish plant and treatment location priorities, reduce new nonnative plant introductions, and reduce the number of individually targeted plants to protect natural resources (NPS 2010b).</p>
Conceptual Management Plan for the Everglades Complex of WMAs	<p>The Everglades Complex is part of the Kissimmee-Okeechobee-Everglades basin and lies within three counties — southwestern Palm Beach, western Broward, and northwestern Miami-Dade. It includes three management areas — Holey Land, Rotenberger, and Everglades-Francis S. Taylor. Through a cooperative management agreement with the South Florida Water Management District, the FWC has management authority over Everglades Complex WMA lands (mainly lands in Water Conservation Areas 2 and 3) for game and fresh water fish preservation, protection, propagation, and recreational use. The plan lists 28 state and federally listed and endangered or threatened species and their habitat. The majority of the complex is east and northeast of the Preserve; however, the southwest corner of Everglades-Francis S. Taylor WMA abuts the eastern boundary of the Preserve from the Tamiami Ranger Station north to the Broward County line.</p>
Regional Recreation Plans / Projects	
CERP Master Recreation Plan	<p>The <i>CERP Master Recreation Plan</i> takes "a system-wide approach to identify, evaluate, and address the impacts of CERP implementation on existing recreational use within the South Florida Ecosystem and identify and evaluate potential new recreation, public use and public educational opportunities. A particular focus will be on the identification of additional public use and recreational opportunities to compensate for public use facilities that may be lost" (USACE, SFWMD, et al. 2004).</p>

Table 4-3 – Selected Plans and Projects with a Cumulative Impact on the South Florida Region

Plan / Project	Description
I-75 Recreational Access Plan	The Addition Act directed the NPS to cooperate with the state to develop three recreation access points along I-75 within the Preserve. Many of the requirements and recommendations included in this access plan are incorporated in the 1991 GMP. The development of recreational access points along I-75 was also included as a component of the Addition GMP.
State Comprehensive Outdoor Recreation Plan	This plan assesses recreational supply, demand, and needs for 11 regions in the state. Region 9 (Southwest Florida) includes the Preserve and the surrounding area. The plan identifies goals for recreational opportunities and facilities, including hiking, bicycling, horseback riding, camping, fishing, and ORV use.
Regional Development Plans / Projects	
Regional Growth and Development Projects	<p>Based on the most recent data from the Southwest Florida Regional Planning Council, southwest Florida is one of the most rapidly growing areas of the nation. Since April 1, 2000, the southwest Florida population has grown by at least 24% and is expected to continue growing at an average rate of 3.4% per annum. It is estimated that the region will double its current capacity by the year 2030. Historically, development has occurred to the east and west of the Addition along the coasts. As population growth continues, the likelihood is greater that natural and agricultural lands close to the Addition will be developed. Recently, private lands northwest of the Addition have received approval for major developments. As this growth occurs, increasing demand will occur on all of the region's resources. The following projects are among those that could have cumulative impacts:</p> <ul style="list-style-type: none"> • Town of Ave Maria – This project includes the build out of 11,000 housing units on approximately 5,000 acres, including a private university. Some of the housing units, business units, and the university has already been built and is currently open. Current and future development is planned to expand on the existing development. • Town of Big Cypress – This project includes the proposed town of Big Cypress, which would include 9,000 housing units on approximately 3,600 acres. • Florida Gulf Coast University – Florida Gulf Coast University opened as a state university in 1997. Student housing on campus opened in 1998. Current construction projects at Florida Gulf Coast University include new academic buildings and student housing. Future construction projects and land acquisition at Florida Gulf Coast University could be anticipated for the next several decades.
Growth Management Plan	This plan was required under the 1985 Florida Growth Management Act and is to be consistent with state and regional plans. The elements of this plan provide the framework to effectively guide future development, while providing for the protection of open space; natural resources; and public health, safety, and welfare. Development in Collier County directly impacts natural resources in the Preserve. Therefore, managed growth policies outlined in this plan are necessary to reduce negative impacts of development and ensure that the Preserve is protected for future generations.

NATURAL RESOURCES

VEGETATION AND HABITAT

This section addresses the potential consequences of the proposed actions and alternatives to native vegetation communities and habitat, protected plant species, and nonnative invasive plant species, which are considered together for the purposes of this impact analysis. The vegetation communities included as part of this analysis are the five major native vegetation communities that can be found on the Preserve as outlined in “Chapter Three: Affected Environment”: Cypress – cypress strands and domes, mixed-hardwood swamps, and sloughs; Prairie – prairies and marshes; Mangrove; Pinelands; and Hammocks. The thresholds for evaluating impacts on vegetation and habitat (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework. Impacts throughout the Preserve would be similar in nature; however, the intensity of impacts could be expected to be greater in the Addition since hunting is not currently allowed in this area.

Impacts to vegetation and habitat and protected plant species would be negligible in the original Preserve and potentially slightly greater (although still negligible) in the Addition since hunting is not currently allowed in this area. These impacts would be long-term (repeated short-term direct impacts while hunters are in the area) and consist of minor

trampling of native vegetation, protected plant species, etc.

Impacts from nonnative invasive plants would be negligible in the original Preserve and potentially slightly greater (although still negligible) in the Addition since hunting is not currently allowed in this area. These impacts would be long-term and consist of unintentional seed dispersal of nonnative invasive plants by hunters.

Throughout the Preserve, long-term, negligible, adverse impacts to vegetation and habitat and protected plant species attributable to trampling of native vegetation and protected plant species and long-term, negligible, adverse impacts from nonnative invasive plants from unintentional seed dispersal would result from the selection of alternative 1.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP approved development of a maximum of 130 miles of ORV trails¹¹ that would fragment native habitat and degrade natural conditions in certain areas of the Addition. Impacts would be reduced by the use of a designated trail system, thereby limiting changes to natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) outside of the trail system. Impacts would be long-term, moderate, and adverse.

Implementation of the 2000 *Recreational Off-road Vehicle Management Plan* within the original Preserve would have a beneficial effect on vegetation and habitat. Since ORVs are currently permitted in the original Preserve, implementation of this plan would limit the

¹¹ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

use of these ORVs to the trail system, thereby reducing current impacts, such as trampling, injury, or loss of plant cover, of ORVs on vegetation and habitat. The impact would be long-term, minor to moderate, beneficial, and localized.

The NPS *South Florida and Caribbean Parks Exotic Plant Management Plan* (NPS 2010b) outlines the management of nonnative plants in nine South Florida and Caribbean parks, including the Preserve. The plan promotes restoration of native plant communities and habitat conditions in ecosystems that have been invaded by nonnative plants and protects resources, values, visitors, staff, and area residents from adverse effects resulting from nonnative plant presence and control activities. Implementation of this plan in the Preserve would have a long-term, moderate, and beneficial effect on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) in the Preserve.

Implementation of future oil and gas proposals could have adverse impacts on vegetation; however, it is unknown what plant communities would be affected. If such proposals included using off-road equipment and constructing roads and pads, this would alter vegetation. The impacts of these activities would be reduced because NPS approval of the operations plan would require mitigation measures. Short-term impacts on vegetation would be adverse, moderate, and localized; long-term impacts would be adverse, minor, and localized.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve sheet flow and hydrologic connectivity, which would affect plant communities and would likely improve plant vigor, abundance, and spatial pattern. The impact of these efforts on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) would be expected to be long-term, minor to moderate, and beneficial.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. Increasing urbanization, fragmentation of habitat, and the loss of natural areas have led to the degradation of natural resources and ecosystem function in the region. The impact of these activities on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) is expected to be long-term, moderate, and adverse.

Collectively, beneficial impacts on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) would accrue from ecosystem restoration projects, implementation of the *Exotic Plant Management Plan*, and ORV management in the original Preserve. Adverse impacts would be expected from creation of ORV trails in the Addition, future oil and gas operations, and regional growth and development projects. Overall, the projects discussed above would have a beneficial effect on the natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) in the region, due to the anticipated benefits from regional ecosystem restoration projects.

When the likely effects of implementing the actions contained in alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) in the region. The actions contained in alternative 1 would contribute a negligible adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on native vegetation communities and protected plant species and impacts from nonnative invasive plants from alternative 1 would be long-term, negligible, and adverse throughout the Preserve.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, current hunting management would continue in the original Preserve and there would continue to be no public hunting in the Addition.

Within the original Preserve, impacts would be the same as those described under alternative 1. Long-term, negligible, adverse impacts to vegetation and habitat and protected plant species attributable to trampling of native vegetation and protected plant species and long-term, negligible, adverse impacts from nonnative invasive plants from unintentional seed dispersal would result from the selection of alternative 2.

In the Addition, no direct or indirect short- or long-term adverse impacts to native vegetation communities or protected plant species or from nonnative invasive plant species would occur with implementation of this alternative.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) in the region. The actions contained in alternative 2 would contribute a negligible adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on native vegetation communities and protected plant species and from nonnative invasive plant species from alternative 2 would be long-term, negligible, and adverse within the original Preserve; no direct or indirect short- or long-term adverse impacts to native vegetation communities or protected plant species or

from nonnative invasive plant species would occur within the Addition.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. The impacts of this alternative to native vegetation communities and protected plant species and from nonnative invasive plant species would be very similar to those of alternative 1. Long-term, negligible, adverse impacts to vegetation and habitat and protected plant species attributable to trampling of native vegetation and protected plant species and long-term, negligible, adverse impacts from nonnative invasive plants from unintentional seed dispersal would result from the selection of alternative 3. However, with alternative 3, additional flexibility would exist with the adaptive management strategy that would allow for changes in hunting regulations if a specific need arises to protect native vegetation communities or protected plant species or if a specific problem arises with nonnative invasive plant species.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on natural resources (native vegetation communities and habitat, protected plant species, and nonnative invasive plant species) in the region. The actions contained in alternative 3 would contribute a negligible adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on native vegetation communities and protected plant species and from nonnative invasive plant species from alternative 3 would be long-term,

negligible, and adverse throughout the Preserve.

WILDLIFE – PROTECTED WILDLIFE SPECIES

This section address the potential consequences of the proposed actions and alternatives to federal threatened and endangered wildlife species, which are considered together for the purposes of this impact analysis, with the exception of the Florida panther. The federally listed wildlife species included as part of this analysis that can occur on the Preserve, as outlined in “Chapter Three: Affected Environment,” are the West Indian manatee, red-cockaded woodpecker, wood stork, Everglade snail kite, American crocodile, and eastern indigo snake. The potential consequences of the proposed actions and alternatives to the Florida panther are addressed separately below, when impacts are anticipated to differ from the impacts to the other species listed above. The thresholds for evaluating impacts on protected wildlife species are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework. Impacts throughout the Preserve would be similar in nature; however, the intensity of impacts could be expected to be greater in the Addition since hunting is not currently allowed in this area.

The federally listed species present in the Preserve are the Florida panther, West Indian manatee, Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile,

eastern indigo snake, and American alligator. Impacts to the Florida panther are discussed in the following section. Since this *Hunting Management Plan* only addresses terrestrial hunting activities, no impacts would be anticipated to occur to the West Indian manatee. The federally listed avian species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, and wood stork) could be impacted by indirect adverse effects resulting from human use such as flushing and short-term displacement, etc. These impacts would be long-term (repeated short-term impacts while hunters are in the area each season), but since hunting is a seasonal activity and hunters would be spread over a large number of acres in the Preserve, the impacts would be negligible. The eastern indigo snake could also be impacted by similar flushing and short-term displacement; however, since no construction or other permanent ground disturbing activities are associated with this project, impacts to the eastern indigo snake would be negligible as well. Finally, similar flushing and short-term displacement impacts could occur to the American crocodile and American alligator. Since hunting of alligators is not permitted in the Preserve, no other impacts would be anticipated to occur to these species.

No impacts would occur to the West Indian manatee. Long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) attributable to minor impacts from flushing and short-term displacement would result from the selection of alternative 1.

Florida panther — Direct impacts to the Florida panther could occur from misidentification of target by hunters (very rare) and automobile / panther collisions (a common cause of panther deaths¹²). Increased visitation could lead to increases in direct panther mortality from both of these causes.

¹² The FWC documented 24 panther deaths in 2011. Of those mortalities, nine panthers died after being struck by vehicles.

The impacts to the Florida panther from misidentification of target by hunters would be long-term, very negligible, and adverse, while the impacts of vehicle accidents would be long-term, minor, and adverse, since visitation is only expected to increase by a minor amount. These impacts would be expected to have an impact on the panther population of the entire Preserve since the animals tend to use a range of several hundred square miles.

Indirect adverse effects to the Florida panther would result from hunting impacts to the panther prey populations (e.g., deer, hogs, and small mammals) and repeated human use such as flushing and displacement of panthers.

Repeated human use would only be expected to cause negligible to minor impacts since hunters would only be occupying areas of the Preserve for a short period of time and hunters would only be present during hunting season. Therefore, these impacts would be long-term (repeated short-term impacts over time), negligible to minor, seasonal, and adverse.

Indirect impacts to the Florida panther population from reduction in the prey base resulting from hunter take would occur with implementation of this alternative. As stated in the 2008 *Florida Panther Recovery Plan* (3rd Revision), the following actions are required to reach the recovery goals, objectives, and criteria for the Florida panther (USFWS 2008):

1. Maintain, restore, and expand the panther population and its habitat in south Florida.
2. Expand the breeding portion of the population in south Florida to areas north of the Caloosahatchee River.
3. Identify potential reintroduction areas within the historic range of the panther.
4. Reestablish viable panther populations outside of south and south-central Florida within the historic range.
5. Secure, maintain, and restore habitat in reintroduction areas.
6. Facilitate panther conservation and recovery through public awareness and education.

The panther's preferred prey is white-tailed deer. Consequently, if deer populations decline, it could be anticipated to have an impact on the Florida panther population in the area. Since hunting management protocol could not be adaptively managed based on annual deer population numbers and hunter take, it would be difficult to make a timely change in hunting regulations if it was determined by the NPS and FWC that the prey base (primarily deer and hogs) for the Florida panther had dropped below a sustainable level as a result of hunting pressure. Therefore, it is anticipated that implementation of alternative 1 would have long-term, moderate, adverse impact on the Florida panther.

Partnerships between the NPS, FWC, and the USFWS would continue and would contribute to the monitoring and improved understanding of the species, which would have a long-term, moderate, beneficial effect on the Florida panther.

Collectively, long-term, moderate, adverse impacts to the Florida panther would result from reduction in the panther's prey base, human use / disturbance related to hunting activities (e.g., flushing, displacement, and automobile collisions), and misidentification of intended target by hunters. Long-term, moderate, beneficial effects would result from continued monitoring and improved understanding of the Florida panther. Due to the extended range of the Florida panther, all impacts would be expected to be regional.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP approved development of a maximum of 130 miles of ORV trails¹³ that would fragment native habitat and degrade natural conditions in certain areas of the Addition. In general, panther population centers appear to indicate a preference toward large, remote tracts with

¹³ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

adequate prey, cover, and reduced levels of human disturbance. Therefore, fragmentation and human disturbance associated with ORVs in the Addition would be expected to have an adverse impact on the Florida panther. Impacts would be reduced by the use of a designated trail system, thereby limiting changes to threatened and endangered species' habitat. Impacts would be long-term, moderate, and adverse for all federally listed threatened and endangered wildlife species, including the Florida panther.

Implementation of the 2000 *Recreational Off-road Vehicle Management Plan* within the original Preserve would have a beneficial effect on federally listed species and their habitat, including the Florida panther. Since ORVs are currently permitted in the original Preserve, implementation of this plan would limit the use of these ORVs to the trail system, thereby reducing current impacts, such as trampling, injury, or loss of plant cover, of ORVs on threatened and endangered species and their habitat. The impact would be long-term, minor to moderate, beneficial, and localized.

The *Interagency Florida Panther Response Plan*, *Florida Panther Recovery Plan*, and *Florida Panther National Wildlife Refuge Comprehensive Conservation Plan* would all be expected to have a long-term beneficial impact on the Florida panther population in the South Florida region. These plans would lead to improved monitoring and management, increased public education, and a better understanding of the Florida panther population in South Florida. This would have a long-term, moderate, beneficial, regional effect on the Florida panther.

The NPS *South Florida and Caribbean Parks Exotic Plant Management Plan* (NPS 2010b) outlines the management of nonnative plants in nine South Florida and Caribbean parks, including the Preserve. The plan promotes restoration of native plant communities and habitat conditions in ecosystems that have been invaded by nonnative plants and protects resources, values, visitors, staff, and area residents from adverse effects resulting from nonnative plant presence and control activities. Implementation of this plan in the

Preserve would have a long-term, moderate, and beneficial effect on threatened and endangered species' habitat in the Preserve.

Implementation of future oil and gas proposals could have adverse impacts on threatened and endangered species' habitat; however, it is unknown what plant communities would be affected. If such proposals included using off-road equipment and constructing roads and pads, this would alter vegetation. The impacts of these activities would be reduced because NPS approval of the operations plan would require mitigation measures. Short-term impacts on threatened and endangered species' habitat would be adverse, moderate, and localized; long-term impacts would be adverse, minor, and localized.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve sheet flow and hydrologic connectivity, which would affect plant communities and would likely improve plant vigor, abundance, and spatial pattern. The impact of these efforts on threatened and endangered species' habitat would be expected to be long-term, minor to moderate, and beneficial.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. Increasing urbanization, fragmentation of habitat, and the loss of natural areas have led to the degradation of natural resources and ecosystem function in the region. The impact of these activities on threatened and endangered species' habitat is expected to be long-term, moderate, and adverse.

Collectively, beneficial impacts on threatened and endangered species' habitat would accrue from ecosystem restoration projects, implementation of Florida panther plans and projects, implementation of the *Exotic Plant Management Plan*, and ORV management in the original Preserve. Adverse impacts would be expected from creation of ORV trails in the Addition, future oil and gas operations, and regional growth and development projects.

Overall, the projects discussed above would have beneficial effects on threatened and endangered species' habitats (including Florida panther habitat) in the region due to the anticipated benefits from regional ecosystem restoration projects.

When the likely effects of implementing the actions contained in alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on federally listed species and their habitat in the region, except for the Florida panther, which would have a long-term, minor, beneficial result. The actions contained in alternative 1 would not contribute any increment to the cumulative impact of other projects for the West Indian manatee, would contribute a negligible adverse increment for seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator), and would contribute a moderate adverse increment for the Florida panther.

Conclusion. Collectively, no impacts would occur to the West Indian manatee, and long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) would result throughout the Preserve from the selection of alternative 1. Impacts on the Florida panther from alternative 1 would be long-term, moderate, and adverse throughout the Preserve.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, current hunting management would continue in the original Preserve and there would continue to be no public hunting in the Addition.

Within the original Preserve, impacts would be the same as those described under alternative 1. No impacts would occur to the West Indian manatee. Long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) attributable to minor impacts from flushing and short-term displacement would result from the selection of alternative 2. In the Addition, no direct or indirect short- or long-term adverse impacts to federally listed wildlife species or their habitat (except the Florida panther) would occur with implementation of this alternative.

Florida panther — Impacts to the Florida panther would be the same as those described under alternative 1 since the panther uses a range of several hundred square miles and the animals could be expected to wander in and out of the original Preserve and the Addition. Throughout the Preserve, adverse impacts to the Florida panther would result from reduction in the panther's prey base, human use / disturbance related to hunting activities (e.g., flushing, displacement, and automobile collisions), and misidentification of intended target by hunters. Beneficial effects would result from continued monitoring and improved understanding of the Florida panther. Due to the extended range of the Florida panther, all impacts would be expected to be regional.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on threatened and endangered species' habitat in the region. The actions contained in alternative 2 would not contribute any increment to the cumulative impact of other projects for the West Indian manatee, would contribute a negligible adverse increment for seven

federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator), and would contribute and a moderate adverse increment for the Florida panther.

Conclusion. Collectively, within the original Preserve, no impacts would occur to the West Indian manatee, and long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) would result from the selection of alternative 2; in the Addition, no direct or indirect short- or long-term adverse impacts to federally listed wildlife species or their habitat (except the Florida panther) would occur with implementation of this alternative. Impacts on the Florida panther from alternative 2 would be long-term, moderate, and adverse throughout the Preserve.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. The impacts of this alternative to federally listed wildlife species and their habitat would be similar to those of alternative 1, except for impacts to the Florida panther. Throughout the Preserve, no impacts would occur to the West Indian manatee. Long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) attributable to minor impacts from flushing and short-term displacement would result from the selection of alternative 3. However, with alternative 3, the NPS would have more flexibility to make changes to hunting regulations in order to minimize any future potential impacts to protected species if a specific need is identified (e.g., if a new colony

of wood storks becomes established in a particular area of the Preserve which experiences a high rate of human disturbance from hunting). Additionally, while alligator hunting is currently prohibited in the Preserve, if the Preserve is opened to an alligator hunt, impacts to the crocodile would have to be considered.

Florida panther — Adverse impacts to the Florida panther would be very similar to those of alternative 1, as discussed above, with the exception of the impacts on the panther prey base. Since this alternative includes a monitoring component for white-tailed deer and Florida panthers, these data could be used under the science-based adaptive management framework in conjunction with traditional and innovative hunting management tools (e.g., quotas, season dates, bag limits, season limits) to provide for a sustainable prey base for the Florida panther. Therefore, impacts to the Florida panther population would be expected to be minimized with this alternative and result in long-term, negligible to minor, adverse, regional impacts to the Florida panther.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on federally listed species and their habitat in the region, except for the Florida panther, which would have a long-term, minor, beneficial result. The actions contained in alternative 3 would not contribute any increment to the cumulative impact of other projects for the West Indian manatee, would contribute a negligible adverse increment for seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator), and would contribute a negligible to minor adverse increment for the Florida panther.

Conclusion. Collectively, no impacts would occur to the West Indian manatee, and long-term, negligible, adverse impacts to seven federally listed wildlife species (Cape Sable seaside sparrow, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, eastern indigo snake, and American alligator) would result throughout the Preserve from the selection of alternative 3. Impacts on the Florida panther from alternative 3 would be long-term, negligible to minor, and adverse throughout the Preserve.

WILDLIFE – MAJOR GAME SPECIES

Of the 13 game species in the Preserve, white-tailed deer, wild turkey, and feral hogs require special management consideration because of their importance to recreational hunters. The white-tailed deer is the most important game species in the Preserve in addition to being the most common prey item for the Florida panther (NPS 2010a). Feral hogs are second to deer in importance as game animals and serve as a secondary food item for the Florida panther (NPS 2010a). Wild turkeys are also occasionally a prey resource for the Florida panther and are one of the principal game animals in the area (NPS 2010a).

This section addresses the potential consequences of the proposed actions and alternatives to white-tailed deer, feral hogs, and wild turkey, which are considered together for the purposes of this impact analysis. The major game species included as part of this analysis that occur on the Preserve are outlined in “Chapter Three: Affected Environment.” It is not anticipated that any of the alternatives would have adverse impacts on small game animals or migratory birds in the Preserve; therefore, these were not evaluated as part of the impact analysis. The thresholds for evaluating impacts on major game species are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework. Impacts throughout the Preserve would be similar in nature; however, the intensity of impacts could be expected to be greater in the Addition since hunting is not currently allowed in this area.

The lands in the Addition would be expected to be incorporated into the Big Cypress WMA, and hunting regulations would be applied according to the current requirements, seasons, season limits, and bag limits in the original Preserve. Within the original Preserve, the impacts to major game species would be minor and adverse; in the Addition, the impacts would be minor to moderate and adverse. These impacts would be long-term and consist of repeated short-term direct impacts from hunter take and from human use such as flushing and short-term displacement, etc. While hunting can serve as an effective wildlife management tool, the impacts from hunter take would be considered to be minor to moderate and adverse under this alternative. Since hunting management protocol could not be adaptively managed based on annual population numbers and hunter take, it would be difficult to make a timely change in hunting regulations if it was determined by the NPS and FWC that the game populations had dropped below a sustainable level as a result of hunting pressure combined with predation pressure from the Florida panther.

Long-term, moderate, beneficial effects would result from harvesting and management of game populations, such as disease mitigation and improvements in the diversity of population genetics. The NPS partnership with the FWC would continue and would contribute

to the monitoring and improved understanding of these game populations.

Long-term, minor, adverse impacts to major game species within the original Preserve and long-term, minor to moderate, adverse impacts in the Addition would accrue from hunter take and from flushing and short-term displacement from the selection of alternative 1.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP approved development of a maximum of 130 miles of ORV trails¹⁴ that would fragment native habitat and degrade natural conditions in certain areas of the Addition. Impacts would be reduced by the use of a designated trail system, thereby limiting impacts to major game species. Impacts would be long-term, moderate, and adverse for the major game species in the Preserve.

Implementation of the 2000 *Recreational Off-road Vehicle Management Plan* within the original Preserve would have a beneficial effect on game species. Since ORVs are currently permitted in the original Preserve, implementation of this plan would limit the use of these ORVs to the trail system, thereby reducing current impacts to game species and their habitat, such as flushing and displacement of animals, and trampling, injury, or loss of vegetation. The impact would be long-term, minor to moderate, beneficial, and localized.

The *Interagency Florida Panther Response Plan*, *Florida Panther Recovery Plan*, and *Florida Panther National Wildlife Refuge Comprehensive Conservation Plan* would all be expected to have a long-term beneficial impact on the Florida panther population in the South Florida region. These plans would lead to improved monitoring and

management, increased public education, and a better understanding of the Florida panther population in South Florida. Since these plans are expected to contribute to the further recovery of the Florida panther population and the major game species in the Preserve also serve as the main food items for the panther, these plans would be anticipated to have a long-term, minor, adverse impact on game species because of the additional pressure from panther predation.

The NPS *South Florida and Caribbean Parks Exotic Plant Management Plan* (NPS 2010b) outlines the management of nonnative plants in nine South Florida and Caribbean parks, including the Preserve. The plan promotes restoration of native plant communities and habitat conditions in ecosystems that have been invaded by nonnative plants and protects resources, values, visitors, staff, and area residents from adverse effects resulting from nonnative plant presence and control activities. Implementation of this plan in the Preserve would have a long-term, moderate, and beneficial effect on game species and their habitat in the Preserve.

Implementation of future oil and gas proposals could have adverse impacts on game species and their habitat. If such proposals included using off-road equipment and constructing roads and pads, this would alter natural habitats and cause flushing and displacement of animals. The impacts of these activities would be reduced because NPS approval of the operations plan would require mitigation measures. Short-term impacts on game species and their habitat would be adverse, moderate, and localized; long-term impacts would be adverse, minor, and localized.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve sheet flow and hydrologic connectivity, which would affect plant communities and would likely improve plant vigor, abundance, and spatial pattern. The impact of these efforts on game species and their habitat would be expected to be long-term, minor to moderate, and beneficial.

¹⁴ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. Increasing urbanization, fragmentation of habitat, and the loss of natural areas have led to the degradation of natural resources and ecosystem function in the region. The impact of these activities on game species and their habitat is expected to be long-term, moderate, and adverse.

Collectively, beneficial impacts on game species and their habitat would accrue from ecosystem restoration projects, implementation of the *Exotic Plant Management Plan*, and ORV management in the original Preserve. Adverse impacts would be expected from creation of ORV trails in the Addition, implementation of Florida panther plans and projects, future oil and gas operations, and regional growth and development projects. Overall, the projects discussed above would have a beneficial effect on game species and their habitat in the region due to the anticipated benefits from regional ecosystem restoration projects. When the likely effects of implementing the actions contained in alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on game species and their habitat in the region. The actions contained in alternative 1 would contribute a minor to moderate adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to game species and their habitat from alternative 1 would be long-term, minor, and adverse within the original Preserve and long-term, minor to moderate, and adverse in the Addition.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, current hunting management would continue in the

original Preserve and there would continue to be no public hunting in the Addition.

Within the original Preserve, impacts would be the same as those described under alternative 1. Long-term, moderate, beneficial effects would result from harvesting and management of game populations, such as disease mitigation and improvements in the diversity of population genetics. The NPS partnership with the FWC would continue and would contribute to the monitoring and improved understanding of these game populations. Long-term, minor, adverse impacts to major game species would accrue from hunter take and from flushing and short-term displacement from the selection of alternative 2.

In the Addition, no direct or indirect short- or long-term adverse impacts to game species or their habitat would occur with implementation of this alternative.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on game species and their habitat in the region. The actions contained in alternative 2 would contribute a minor to moderate adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to game species and their habitat from alternative 2 would be long-term, minor, and adverse within the original Preserve; in the Addition, no direct or indirect short- or long-term adverse impacts to game species or their habitat would occur with implementation of this alternative.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process.

The lands in the Addition would be expected to be incorporated into the Big Cypress WMA, and hunting would be cooperatively managed by the NPS and FWC, in consultation with the USFWS. Under this alternative, the adaptive management goals outlined in chapter 2 would be used in conjunction with traditional (e.g., quotas, season dates, bag limits, season limits) and innovative hunting management tools by the NPS and FWC, in consultation with the USFWS, to manage hunting in the Preserve. The goals would be reviewed on an ongoing basis by NPS and FWC, in consultation with the USFWS, and changes made as necessary based on changing ecological conditions, monitoring data, and/or public input.

The adaptive management goals include monitoring of key game species (white-tailed deer) and threatened and endangered species (Florida panther) in the Preserve, as necessary to determine the appropriate actions for managing hunting in the Preserve, and conducting ecosystem management actions in the Preserve to “sustain an ample, healthy, and diverse wildlife community, including a sustainable deer population in the Preserve...” Hunting management actions could also be adjusted, as necessary, in response to events such as extended high water events, disease, tropical storm / hurricane events, and drought, to manage a health ecosystem in the Preserve. Additionally, ecosystem management actions would be taken to control invasive nongame wildlife species in the Preserve to the lowest level practicable.

Allowing hunting in the entire Preserve under this science-based adaptive management framework would be expected to have long-term, moderate, beneficial effects on all game species. Long-term (repeated short-term) adverse impacts would still result, as with alternative 1, from human use causing flushing and displacement of animals.

Similar to alternative 1, long-term, moderate, beneficial effects would result from harvesting and management of game populations, such as disease mitigation and improvements in the diversity of population genetics.

Collectively, long-term beneficial effects would accrue from science-based adaptive management of hunting in the entire Preserve and from harvesting and management of game populations (e.g., disease mitigation, genetic population diversification). Long-term (repeated short-term) adverse impacts would result from human use causing flushing and displacement of animals.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on game species and their habitat in the region. The actions contained in alternative 3 would contribute a moderate beneficial increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to game species and their habitat from alternative 3 would be long-term, moderate, and beneficial throughout the Preserve.

WILDLIFE – NONNATIVE / INVASIVE WILDLIFE SPECIES

This section addresses the potential consequences of the proposed actions and alternatives from nonnative invasive wildlife species, which are considered together for the purposes of this impact analysis. Nonnative wildlife species include invertebrate species such as the red imported fire ant (*Solenopsis invicta*) and the Mexican bromeliad weevil (*Metamasius callizona*) as well as vertebrate species such as the feral hog, Burmese python (*Python molurus bivittatus*), and fish (walking catfish, spotted tilapia, oscar, etc.). Although

feral hogs are considered nonnative invasive wildlife, this species was addressed in the major game species section due to its status as a game species for recreational hunting as well as its importance as a prey item for the endangered Florida panther. Nonnative wildlife species included as part of this analysis can be found on the Preserve as outlined in “Chapter Three: Affected Environment.” The thresholds for evaluating impacts from nonnative wildlife species are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework. Impacts throughout the Preserve would be similar in nature; however, the intensity of impacts could be expected to be greater in the Addition since hunting is not currently allowed in this area.

The impacts from nonnative species would consist of potential spread of invertebrate species throughout areas of the Preserve where hunters trek. These impacts would be long-term (repeated short-term direct impacts while hunters are in the area), negligible, and adverse. Anticipated impacts would not be likely to have any effect on the viability of local native wildlife populations. Additionally, no impacts would be expected in regards to nonnative, invasive vertebrate or fish species.

Long-term, negligible, adverse impacts from nonnative wildlife species would result throughout the Preserve from the selection of alternative 1.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP approved development of a maximum of 130

miles of ORV trails¹⁵ that would fragment native habitat and degrade natural conditions in certain areas of the Addition. While impacts would be reduced by the use of a designated trail system, the use of ORVs in the Addition would most likely contribute to the spread of nonnative, invasive, invertebrate species. Impacts to native wildlife populations would be long-term, negligible, and adverse.

Implementation of the 2000 *Recreational Off-road Vehicle Management Plan* within the original Preserve would have a beneficial effect on native wildlife populations in reference to nonnative invasive wildlife. Since ORVs are currently permitted in the original Preserve, implementation of this plan would limit the use of these ORVs to the trail system, thereby reducing current impacts. The impact to native wildlife populations would be long-term, negligible, beneficial, and localized.

Implementation of future oil and gas proposals could have adverse impacts on native wildlife populations from the spread of nonnative invasive wildlife species; however, it is unknown what invasive wildlife species would be affected. If such proposals included using off-road equipment and constructing roads and pads, this would alter vegetation. The impacts of these activities would be reduced because NPS approval of the operations plan would require mitigation measures. Long-term impacts on native wildlife populations from the spread of nonnative invasive wildlife species would be adverse, negligible, and localized.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve sheet flow and hydrologic connectivity, which would affect plant communities and would likely improve plant vigor, abundance, and

¹⁵ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

spatial pattern. The impact of these efforts on native wildlife populations would be long-term, minor to moderate, and beneficial from the control of nonnative invasive wildlife species.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. Increasing urbanization, fragmentation of habitat, and the loss of natural areas have led to the degradation of natural resources and ecosystem function in the region. The impact of these activities on native wildlife population from nonnative invasive wildlife species is expected to be long-term, minor, and adverse.

Collectively, beneficial impacts to native wildlife populations from the control of nonnative invasive wildlife would accrue from ecosystem restoration projects and implementation of ORV management in the original Preserve. Adverse impacts would be expected from creation of ORV trails in the Addition, future oil and gas operations, and regional growth and development projects. Overall, the projects discussed above would have a long-term, minor, beneficial effect of native wildlife populations from the control of nonnative invasive wildlife species in the region, due to the anticipated benefits from regional ecosystem restoration projects, which would be slightly reduced by regional growth and development.

When the likely effects of implementing the actions contained in alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, beneficial cumulative impact to native wildlife species from the control of nonnative invasive wildlife species in the region. The actions contained in alternative 1 would contribute a negligible, adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to native wildlife populations from nonnative invasive wildlife species from alternative 1 would be long-term, negligible, and adverse throughout the Preserve.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, current hunting management would continue in the original Preserve and there would continue to be no public hunting in the Addition.

Within the original Preserve, impacts would be the same as those described under alternative 1. Long-term, negligible, adverse impacts from nonnative wildlife species would result from the selection of alternative 2.

In the Addition, no direct or indirect short- or long-term adverse impacts to native wildlife species from nonnative invasive wildlife species would occur with implementation of this alternative.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, beneficial cumulative impact to native wildlife species from the control of nonnative invasive wildlife species in the region. The actions contained in alternative 2 would contribute a negligible, adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to native wildlife species from nonnative invasive wildlife species from alternative 2 would be long-term, negligible, and adverse within the original Preserve; in the Addition, no direct or indirect short- or long-term adverse impacts to native wildlife species from nonnative invasive wildlife species would occur with implementation of this alternative.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. The adverse impacts of this alternative from nonnative invasive wildlife species would be very similar to those of alternative 1.

With this alternative the NPS and FWC, in consultation with the USFWS, would have the option of making changes to hunting management protocol if a need arises to control nonnative invasive wildlife species, such as the Burmese python. The ability to institute a hunting season (or other hunting regulations) for nonnative invasive wildlife species that pose a threat to native wildlife populations would have a long-term, minor to moderate, beneficial impact on native wildlife populations in the entire Preserve.

Long-term, negligible, adverse impacts from nonnative wildlife species throughout the Preserve would result from the selection of alternative 3. Long-term, minor to moderate, beneficial effects to native wildlife populations would occur throughout the Preserve as a result of the ability to implement special hunting regulations to target control of nonnative invasive wildlife species that pose a problem.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing the actions contained in alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, beneficial cumulative impact to native wildlife species from the control of nonnative invasive wildlife species in the region. The actions contained in alternative 3 would contribute a minor to moderate, beneficial increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to native wildlife populations from the control of

nonnative invasive wildlife species from alternative 3 would be long-term, minor to moderate, and beneficial throughout the Preserve.

WILDERNESS RESOURCES AND VALUES

WILDERNESS

The Addition GMP proposed 47,067 acres of land to be designated as wilderness (NPS 2010a). The NPS is currently in the process of formally designating these lands as wilderness by legislative act. Lands identified as being suitable for wilderness designation, wilderness study areas, proposed wilderness, and recommended wilderness (including potential wilderness) must be managed to preserve the wilderness character and values in the same manner as “designated wilderness” until Congress has acted on the recommendations (NPS 2011a). Therefore, for the purpose of this impact analysis, the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] located in the Addition were treated as designated wilderness. Direct impacts to these areas as well as impacts to the wilderness experience of visitors were considered in the impact analysis of all alternatives. The thresholds for evaluating impacts on wilderness are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve, including the provision of walk-in hunting in the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] located in the Addition. Within the original Preserve boundaries where no designated wilderness exists, hunting would continue as currently managed, and no designated wilderness would be affected. Within the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] in the

Addition, since hunting would only be permitted via walk-in access, the impacts to the wilderness quality of these lands would be negligible to minor. These impacts would be long-term and consist of direct impacts while hunters are in the wilderness area (such as trampling vegetation) and indirect impacts on the wilderness character of the area caused by hunter take of wildlife.

Both beneficial and adverse effects to the wilderness experience would occur for recreational visitors that chose to visit the proposed and eligible wilderness areas of the Addition. For those recreational visitors that choose to participate in hunting activities, the wilderness experience would be enhanced in the long-term by a minor and beneficial amount because of the ability to hunt in the proposed and eligible wilderness areas. For those recreational visitors that choose to participate in other approved activities, such as experiencing opportunities for solitude and primitive and unconfined recreation, in the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)], the wilderness experience would be adversely impacted by the potential presence of hunters in the area and the sporadic sound of firearm shots, and these impacts are anticipated to be minor, seasonal, and long-term.

No direct or indirect, short- or long-term adverse impacts to wilderness would result within the original Preserve from the selection of alternative 1. Long-term, negligible to minor adverse impacts to the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] in the Addition would result from the selection of alternative 1. Long-term, beneficial, and minor effects to the wilderness experience would be experienced by recreational visitors that participate in hunting activities in the proposed wilderness areas and areas eligible for wilderness designation. Long-term,

adverse, and minor effects to the wilderness experience would be experienced by visitors that choose to participate in approved nonhunting activities in the proposed and eligible [as determined by the Addition GMP (NPS 2010a)] wilderness areas.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP proposed 47,067 acres for wilderness designation in the Addition (66% of those lands considered eligible and 32% of the Addition's total acreage) (NPS 2010a). No impacts would occur to these lands proposed as designated wilderness or those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)]. The special status and protection afforded to these lands under the Wilderness Act would preserve their wilderness resources and values in perpetuity – a moderate to major beneficial effect. Opportunities for solitude and primitive and unconfined recreation would continue to be preserved and available. Overall, the impacts of this designation on wilderness resources and values are long-term, moderate, and beneficial (NPS 2010a).

The preferred alternative in the Addition GMP also approved development of a maximum of 130 miles of ORV trails¹⁶ in the Addition outside of wilderness eligible areas. ORV use in areas adjacent to wilderness would adversely affect the natural soundscape of the area. Impacts would be reduced by the use of a designated trail system, thereby limiting changes to natural conditions and wilderness character outside of the trail system. Impacts would be long-term, minor, and adverse.

Implementation of future oil and gas proposals could have adverse impacts on wilderness resources and values. If such proposals included using off-road equipment and constructing roads and pads, this would create

human disturbances and alter natural habitats. NPS approval of the operations plan would require mitigation to eliminate or reduce the impact of activities on natural resources. Short-term impacts on wilderness resources and values would be moderate, adverse, and localized; residual long-term impacts would be minor, adverse, and localized.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve sheet flow and hydrologic connectivity, which would affect natural communities. Restoring natural conditions is expected to have a long-term, moderate, beneficial impact on wilderness resources and values.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. Increasing urbanization, fragmentation of habitat, and the loss of natural areas have led to the degradation of natural resources, ecosystem function, and natural soundscapes in the region. The impact of these activities occurring nearby and adjacent to wilderness resources is expected to be long-term, minor, and adverse.

Collectively, beneficial impacts on wilderness resources and values would accrue from regional ecosystem restoration projects, implementation of the wilderness plan in the Addition GMP, and implementation of the *Exotic Plant Management Plan*. Adverse impacts associated with ORV use would be expected from implementation of the preferred alternative in the Addition GMP. Adverse impacts would be expected from oil and gas operations and regional growth and development. Overall, the projects discussed above would likely be beneficial to wilderness resources and values in the region, due to the anticipated benefits from regional ecosystem restoration projects.

When the likely effects of implementing alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, beneficial cumulative

¹⁶ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

impact on wilderness resources and values in the region. Alternative 1 would contribute a negligible to minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on wilderness resources and values from alternative 1 would be long-term, negligible to minor, and adverse within the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)].

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, no direct or indirect short- or long-term adverse impacts to designated wilderness or lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] would occur with implementation of the alternative. Within the original Preserve boundaries where no designated wilderness exists, hunting would continue as currently managed, and no designated wilderness would be affected. Within the Addition, the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] would be protected from any potential hunting impacts since hunting in the Addition is prohibited under this alternative. Additionally, nonhunting visitors would be able to continue to enjoy the wilderness experience unhindered by potential hunting impacts.

No direct or indirect short- or long-term adverse impacts to wilderness would result from the selection of alternative 2.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a

long-term, minor, beneficial cumulative impact on wilderness resources and values in the region. Alternative 2 would not contribute any adverse or beneficial effects to this cumulative impact.

Conclusion. No direct or indirect short- or long-term adverse impacts on wilderness resources and values would result from alternative 2.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. Walk-in hunting would be permitted in the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] located in the Addition. The impacts of this alternative would be very similar to those of alternative 1. However, the NPS would have more flexibility to manage hunting in the future if the need is documented to provide additional protection for the proposed or eligible wilderness areas.

No direct or indirect, short- or long-term adverse impacts to wilderness resources and values would result within the original Preserve from the selection of alternative 3. Long-term, negligible to minor adverse impacts to the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)] in the Addition would result from the selection of alternative 3.

Long-term, beneficial, and minor effects to the wilderness experience would be experienced by recreational visitors that participate in hunting activities in the proposed wilderness areas and areas eligible for wilderness designation. Long-term, adverse, and minor effects to the wilderness experience would be experienced by visitors that choose to participate in approved nonhunting activities in the proposed and eligible [as determined by

the Addition GMP (NPS 2010a)] wilderness areas.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, beneficial cumulative impact on wilderness resources and values in the region. Alternative 3 would contribute a negligible to minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on wilderness resources and values from alternative 3 would be long-term, negligible to minor, and adverse within the 47,067 acres of proposed wilderness and those lands eligible for wilderness designation [as determined by the Addition GMP (NPS 2010a)].

NPS MANAGEMENT AND OPERATIONS

PRESERVE MANAGEMENT AND OPERATIONS

The impact analysis for Preserve management and operations evaluated the effects of the alternatives on NPS operations at the Preserve, including all six management divisions (administrative, interpretation, maintenance, resource management, resource and visitor protection, and fire and aviation). Since none of the alternatives involve any new facilities or changes to existing facilities, the analysis focused on how NPS staffing and operations might be impacted by the alternatives. Staffing resources of FWC staff assigned to hunting management and enforcement at the Preserve were also considered in the analysis. The analysis is qualitative rather than quantitative because of the nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact. The thresholds for evaluating impacts on Preserve management and operations are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve and managed through the existing framework.

The existing hunting management framework (i.e., *NPS/FWC Cooperative Partnership Agreement*) would be used to manage hunting in the original Preserve. Existing management (i.e., managing hunting in the original Preserve and enforcing hunting prohibition in the Addition) places a long-term, minor, adverse impact on Preserve management and operations.

This alternative would add an additional 147,000 acres of land in the Addition to hunting areas in the Preserve, which would require management. This could place an additional burden on top of the current demands on existing enforcement staff from the NPS and FWC to enforce hunting regulations; however, it is currently necessary to enforce the prohibition of hunting in the area, so impacts to staffing would be expected to be negligible. Consequently, this would not be expected to result in any adverse impacts to Preserve management and operations.

Under this alternative, the existing management framework would be utilized for the entire Preserve, which would continue to cause long-term, minor, adverse impacts to Preserve management and operations. The impacts of managing an additional 147,000 acres (the Addition) of hunting area in the Preserve to NPS staff resources would be neutral due to the fact that the prohibition of hunting in these areas currently has to be enforced anyway.

Cumulative Impacts. Implementation of various existing plans and projects in the Preserve, such as the Addition GMP (NPS 2010a), 2000 *Recreational ORV Management Plan*, *Commercial Services Plan*, and *South Florida and Caribbean Parks Exotic Plant Management Plan* (NPS 2010b), would have a long-term and adverse impact on Preserve management and operations due to the additional time and budget requirements put on NPS staff. All of the plans and projects would put increased responsibility on the administration division of the Preserve.

Implementation of ORV management plans would require additional staff time and budgetary resources from the maintenance division. The *South Florida and Caribbean Parks Exotic Plant Management Plan* (NPS 2010b) would require additional funds and staff time from the resource management division. The expansion of commercial services offered in the original Preserve would require

time from staff spent managing the commercial service authorizations and leases. However, the impacts of these plans and projects would only be minor since proper management of Preserve resources under these plans would allow the NPS to more efficiently use their staff resources and budget.

Expansion of nearby communities (including the towns of Ave Maria and Big Cypress), regional restoration activities, and oil and gas exploration activities would require time and attention by senior NPS staff. Cooperation and coordination with neighboring agencies and entities regarding planning, land use resources, and development proposals near the Preserve also would require substantial amounts of staff time and result in minor to moderate, long-term, adverse impacts.

Collectively, long-term, minor, adverse impacts to Preserve management and operations would result from implementation of existing Preserve plans and projects; long-term, minor to moderate, adverse impacts to Preserve management and operations would result from expansion of nearby communities (including the towns of Ave Maria and Big Cypress), regional restoration activities, and oil and gas exploration activities.

When the likely effects of implementing alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor to moderate, adverse cumulative impact on Preserve management and operations. Alternative 1 would contribute a minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on Preserve management and operations from alternative 1 would be long-term, minor, and adverse.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, current

hunting management would continue in the original Preserve and there would continue to be no public hunting in the Addition.

The existing hunting management framework (i.e., *NPS/FWC Cooperative Partnership Agreement*) would be used to manage hunting in the original Preserve. Existing management (i.e., managing hunting in the original Preserve and enforcing hunting prohibition in the Addition) places a long-term, minor, adverse impact on Preserve management and operations.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor to moderate, adverse cumulative impact on Preserve management and operations. Alternative 2 would contribute a minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on Preserve management and operations from alternative 2 would be long-term, minor, and adverse.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process that allows the NPS and FWC, in consultation with the USFWS, to have flexibility to make changes to hunting protocol over time in response to changing ecological conditions, monitoring data, and/or public input.

This alternative would add an additional 147,000 acres of land in the Addition to hunting areas in the Preserve, which would require management. This could place an additional burden on existing enforcement staff from the NPS and FWC to enforce

hunting regulations; however, it is currently necessary to enforce the prohibition of hunting in the area, so impacts to staffing would be expected to be negligible. Consequently, this would not be expected to result in any adverse impacts to Preserve management and operations.

Key impacts of this alternative to Preserve management and operations would consist mainly of additional monitoring efforts in addition to that which is conducted currently. However, the NPS would be able to gather some of this data from other sources which conduct research in the Preserve (e.g., FWC, USFWS, universities, etc.). NPS staff would also have to meet with FWC staff, in consultation with USFWS staff, on an annual basis to review currently hunting management protocol and consider changes based on the previous year(s) ecological conditions, monitoring data, and public input. While this would have a long-term adverse impact on Preserve management and operations, the impacts of implementing this adaptive management framework would be minor to moderate since proper management of Preserve resources under this science-based framework would allow the NPS to more efficiently use their staff resources and budget.

The impacts of managing an additional 147,000 acres (the Addition) of hunting area in the Preserve to NPS staff resources would be neutral due to the fact that the prohibition of hunting in these areas currently has to be enforced anyway. The new science-based adaptive management framework would cause long-term, minor to moderate, adverse impacts to Preserve management and operations due to the additional monitoring and coordination (with the FWC, in consultation with the USFWS) required.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor to moderate, adverse

cumulative impact on Preserve management and operations. Alternative 3 would contribute a minor to moderate adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on Preserve management and operations from alternative 3 would be long-term, minor to moderate, and adverse.

VISITOR USE

VISITOR USE AND EXPERIENCE / RECREATIONAL OPPORTUNITIES

NPS *Management Policies* (2006) addresses “enjoyment of park resources and values by the people of the United States” as “part of the fundamental purpose of all parks.” The NPS is committed to “providing appropriate, high-quality opportunities for visitors to enjoy the parks,” by maintaining “an atmosphere that is open, inviting, and accessible” (NPS 2006). Impacts to recreational opportunities and associated visitor use and experience are addressed in this section. Impacts to public health and safety are analyzed in the “Public Health and Safety” section. Perceived impacts to visitor safety are discussed in this section in regards to the effect on visitor experience. Noise impacts which may have an effect on visitor experience are discussed in the “Noise / Soundscapes” section. The thresholds for evaluating impacts on visitor use and experience and recreational opportunities are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework. Impacts throughout the Preserve would be similar in nature; however, the intensity of impacts could be expected to be greater in the Addition since hunting is not currently allowed in this area.

In general, this alternative could be expected to increase visitation in the Preserve. From 2006 to 2009, the Preserve received approximately 800,000 recreational visitors annually (NPS 2011d). Since the Addition

accounts for twenty percent of the total land in the Preserve, opening this area to an additional recreational activity (i.e., hunting) would be expected to increase visitation to the Preserve by at least a minor amount in the long-term. Increased visitation could result in increased congestion and user conflicts, which would be a long-term adverse impact.

Two types of impacts would occur from implementation of alternative 1 – beneficial impacts to hunters due to the continued allowance of hunting in the original Preserve and the additional 147,000 acres available in the Addition for hunting and adverse impacts to nonhunting visitors from the presence of hunters and hunting activities occurring throughout the Preserve during hunting season.

Beneficial effects to hunters would be moderate and long-term since this alternative would allow continued hunting opportunities in the original Preserve and increase the available hunting areas in the Preserve by twenty-five percent (from 582,000 acres to 729,000 acres).

Adverse impacts to nonhunting visitors would consist of a decreased aesthetic experience from both hunter presence and the take of game species, and a perceived safety risk to nonhunting visitors from hunting activities occurring in proximity. As discussed in chapter 3, a visitor study conducted in the Preserve allowed visitors to express both how safe they felt in the Preserve as well any reasons for feeling unsafe; while only 5% of visitor groups reported feeling “extremely unsafe,” the most commonly given reason for feeling unsafe was hunters / hunting in the area (Meehan 1999). While the allowance of hunting throughout the Preserve would only cause a negligible adverse impact on public health and safety in the Preserve (with the majority of risk being taken on by those participating in hunting as opposed to nonhunting visitors), as discussed in the “Public Health and Safety” section, this

perceived safety risk could cause a long-term, minor, seasonal (i.e., during hunting season), adverse impact on the visitor experience of nonhunting visitors. The impact to nonhunting visitors would be expected to be minor and seasonal. These impacts would be most likely to be noticed while participating in nonhunting activities such as wildlife viewing, bird watching, photography / painting / drawing, hiking / walking, and other activities which are normally experienced in relative peace and quiet.

Collectively, adverse impacts to visitor use and experience would accrue from anticipated increased visitation to the Preserve. Long-term, minor, seasonal, adverse impacts would also occur to nonhunting visitors from the presence of hunters and hunting activities. Moderate, long-term, seasonal, beneficial effects would occur for hunters in terms of both visitor use and experience and recreational opportunities from continued allowance of hunting in the original Preserve and from the opening of an addition 147,000 acres of land for hunting.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP (NPS 2010a) would provide diverse frontcountry and backcountry recreational opportunities, enhance day use and interpretive opportunities along road corridors, and enhance recreational opportunities with new facilities and services. Implementation of the preferred alternative in the Addition GMP (NPS 2010a) would provide a substantial amount of ORV access and riding opportunities, provide a moderate amount of proposed wilderness, provide nonmotorized trail opportunities and new camping opportunities, and develop a partnership approach to visitor orientation. New visitor and operations facilities along the I-75 corridor would also be provided. Overall, this would have a long-term, moderate, beneficial effect on visitor use and experience in the local area.

Implementation of the 2000 *Recreational ORV Management Plan* would provide up to 400 miles of designated ORV trails, 15 ORV access points, and up to 2,000 annual permits

in the original Preserve. The quantity of trail miles and permits provides abundant opportunities for operating off-road vehicles. This would have long-term, moderate, beneficial impacts on ORV users in the local area.

Implementation of the *Commercial Services Plan* would initially only affect the original Preserve. The Addition would be addressed in an addendum to the *Commercial Services Plan* to be completed in the future. The *Commercial Services Plan* proposes to enhance the original Preserve's visitor services through the development of one or more new facilities; a new backcountry camping complex; hunting and fishing guides; buggy, van, and hiking tours; boat and bicycle rentals; and expanded opportunities for birding, wildlife viewing, and photography. Enhanced and expanded opportunities in the Preserve, before an addendum to include the Addition, would increase visitation and might result in increased congestion and user conflicts. Impacts resulting from increased visitation and congestion at access points and along the primary and secondary ORV trail network would result in long-term, minor, adverse impacts on visitors. When the Addition is addressed in an addendum, visitor opportunities to explore and use the Addition could be expanded. Impacts from implementing the *Commercial Services Plan* would be long-term, minor to moderate, and beneficial as a result of expanded opportunities.

Implementation of future oil and gas proposals could adversely impact the experience of visitors. If included in the proposals, the construction of roads and pads and the use of off-road equipment could detract from the experience of those seeking a primitive experience and natural soundscape. Impacts resulting from a reduction in the natural settings of the Preserve due to the operation of oil and gas equipment would be long-term, minor, and adverse in localized areas.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve

sheet flows and hydrologic connectivity and likely restore natural conditions in the Preserve. This effort would enhance the visitor use and experience by providing increased opportunities for wildlife viewing and experiencing natural settings.

Regional recreation plans and projects, such as the *CERP Master Recreation Plan*, *I-75 Recreational Access Plan*, and *State Comprehensive Outdoor Recreation Plan* would provide a long-term, moderate, beneficial effect on visitor use and experience in the region. These plans and projects would enhance the visitor use and experience for the public and provide additional recreational opportunities in the region by providing additional facilities, opportunities and access points to visitors in the region.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. More visitations over time might result in increased congestion and user conflicts at access points and along the primary and secondary ORV trail network. Impacts from growth and development would be long-term, minor to moderate, and adverse as a result of increased congestion and user conflict.

Collectively, adverse impacts to visitor use and experience and recreational opportunities would accrue from future oil and gas proposals in the Preserve and regional growth and development projects in the South Florida area. Long-term beneficial impacts would accrue in the Preserve from implementation of the Addition GMP (NPS 2010a), the 2000 *Recreational ORV Management Plan*, and the *Commercial Services Plan*. Regionally, long-term beneficial effects would result from South Florida ecosystem restoration and recreation plans and projects.

The likely effects of implementing the preferred alternative in combination with the effects of other past, present, and reasonably foreseeable future actions described above would result in long-term, moderate, beneficial cumulative impacts on visitor use and experience. The actions contained in

alternative 1 would contribute a moderate beneficial increment to the cumulative impact of other projects for hunters and a minor adverse increment for nonhunters.

Conclusion. Collectively, impacts on visitor use and experience and recreational opportunities throughout the Preserve from alternative 1 would be long-term, moderate, seasonal, and beneficial for hunters and long-term, minor, seasonal, and adverse for nonhunters.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, the recreational opportunities and associated visitor use and experience would remain unchanged in the Preserve.

Within the original Preserve, long-term, negligible to minor, seasonal, adverse impacts would also occur to nonhunting visitors from the presence of hunters and hunting activities. Long-term, moderate, beneficial effects would be experienced by hunters from the opportunity to participate in hunting in the original Preserve.

In the Addition, the recreational opportunities and associated visitor use and experience would remain unchanged since hunting would continue to be prohibited in this area. Long-term, minor, adverse impacts would be experienced by hunters from the prohibition of hunting in this area. Beneficial effects would be experienced by nonhunting visitors since the opportunity would still exist to participate in nonhunting recreational activities free from the presence of hunting in the Addition. These effects would be long-term, moderate, and beneficial.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other

past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on visitor use and experience in the region. The actions contained in alternative 2 would contribute a minor beneficial increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on visitor use and experience and recreational opportunities in the original Preserve from alternative 2 would be long-term, moderate, seasonal, and beneficial for hunters and long-term, minor, seasonal, and adverse for nonhunters. In the Addition, impacts on visitor use and experience and recreational opportunities would be long-term, minor, seasonal, and adverse for hunters and long-term, moderate, year-round, and beneficial for nonhunters with the implementation of this alternative.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. The impacts of this alternative would be very similar to those of alternative 1. However, the NPS would have the flexibility of potentially changing hunting regulations (i.e., area closures, season dates, etc.) if a specific visitor conflict arises.

Collectively, adverse impacts to visitor use and experience would accrue from anticipated increased visitation to the Preserve. Long-term, minor, seasonal, adverse impacts would also occur to nonhunting visitors in the Addition from the presence of hunters and hunting activities. Moderate, long-term, seasonal, beneficial effects would occur for hunters in terms of both visitor use and experience and recreational opportunities from the opportunity to hunt in the original Preserve and the opening of an addition 147,000 of land for hunting.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting*

Management Plan would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, beneficial cumulative impact on visitor use and experience in the region. Alternative 3 would contribute a minor beneficial increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on visitor use and experience and recreational opportunities throughout the Preserve from alternative 3 would be long-term, moderate, seasonal, and beneficial for hunters and long-term, minor, seasonal, and adverse for nonhunters.

NOISE / SOUNDSCAPES

For the purposes of this analysis, impacts to the natural ambient soundscape will reference visitor experiences and existing conditions. Context, time of day, duration and intensity of noise together determine the level of impact for an activity associated with human-generated sound. The thresholds for evaluating impacts on soundscapes are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework.

Hunting is a long-established recreational activity in the original Preserve that includes bow, muzzleloading, and modern gun seasons. Gun hunting is permitted only during limited

times of the year (e.g., during October, November, and December). During a 2010 NPS study, ambient sound levels in the Preserve were found to range from approximately 24 to 40 dB(A), depending upon time of day and nearby activity. Since environmental conditions in the Addition are similar to those in the original Preserve, these noise levels are also representative of those that are expected in the Addition.

No short-term effects to the soundscape of the Preserve or the Addition are expected to occur as a result of alternative 1 since the project only involves a change in the hunting status in the Addition and no construction activities would occur.

Any long-term adverse effects to the soundscape of the Preserve associated with alternative 1 are directly attributable to hunting-related firearm noise. Discrete occurrences of firearm shots typically result in very short-duration peak noise levels that can be as high as 170 dB(A) depending upon weapon type. Such events are expected to be plainly and clearly evident during periods when gun hunting is permitted. However, firearm-related noise is expected to be intermittent since hunters typically minimize using their weapons unless presented with a target of consequence so as not to frighten their intended prey target away. Additionally, indiscriminate shooting such as target practice is prohibited according to existing state hunting regulations in force in the Preserve. Impacts to the soundscape from other noted sources of noise in the Preserve and the Addition such as aircraft and highway traffic are unaffected by this alternative.

Given these factors, disturbances from firearm noise due to alternative 1 are expected to be adverse, intermittent, and long-term, and are expected to result in a minor affect to wildlife, nonhunting visitors, and private residences located in proximity to the Preserve.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP would create a maximum of 130 miles of ORV

trails¹⁷. ORV use would adversely affect the natural soundscape of the area. Impacts would be reduced by the use of a designated trail system, limiting noise impacts to areas surrounding the trail system. Impacts to the soundscape would be long-term, moderate, and adverse.

Implementation of the 2000 *Recreational Off-road Vehicle Management Plan* within the original Preserve would cause adverse impacts to the natural soundscape; however, the impact on natural soundscapes would be negligible because approximately the same number of ORVs would be using the original Preserve and in roughly the same areas as the current condition. Consequently, impacts to the natural soundscape resulting from the ORV plan would be long-term but negligible.

Implementation of future oil and gas proposals could have adverse impacts on the natural soundscape. If such proposals included using off-road equipment and constructing roads and pads, this would create disturbances to the natural soundscape. NPS approval of the operations plan would require mitigation to eliminate or reduce the impact of activities on natural resources, including the Preserve soundscape. Short-term impacts on the natural soundscape would be moderate, adverse, and localized; residual long-term impacts would be minor, adverse, and localized.

Regional growth and development is expected to continue and result in an increase in the conversion of natural lands to development in the general area. This growth and development would cause impacts to the natural soundscape in areas on the borders of the Preserve as well as areas along roadways. The impact of these activities on the natural soundscape is expected to be long-term, moderate, and adverse.

¹⁷ The Addition GMP is the document which guides the number of miles of trails that would be developed in the Addition as well as the number of ORV permits that would be issued for use of those trails. Any future changes to the Addition GMP would supersede the information in this document regarding trails and ORV permits in the Addition.

Collectively, adverse impacts associated with ORV use would be expected from implementation of the preferred alternative in the Addition GMP and implementation 2000 *Recreational Off-road Vehicle Management Plan*. Other adverse impacts would be expected from oil and gas operations and regional growth and development. Overall, the projects discussed above would likely be adverse to the natural soundscape in the Preserve.

When the likely effects of implementing alternative 1 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, adverse cumulative impact on the soundscape in the Preserve. Alternative 1 would contribute a minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to the Preserve soundscape from alternative 1 would be long-term, minor, and adverse.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, current hunting management would continue within the original Preserve boundaries and no hunting would be permitted in the Addition.

Impacts would be similar to those described under alternative 1 since firearm noise could be heard throughout much of the Preserve (including the Addition) even if hunting is only permitted within the original Preserve. However, nonhunting visitors may be able to participate in other approved activities in certain areas of the Addition that are located a farther distance from the original Preserve boundaries unhindered by hunting-related noise impacts.

Impacts to the soundscape from other noted sources of noise in the Preserve and the Addition such as aircraft and highway traffic are unaffected by this alternative.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, adverse cumulative impact on the natural soundscape of the Preserve. Alternative 2 would contribute a negligible to minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to the Preserve soundscape from alternative 2 would be long-term, negligible to minor, and adverse.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. This alternative is similar to alternative 1, but adds an adaptive management component that would allow review and modification of the management plan if a specific need arises. As such, the impacts of this alternative would be very similar to those of alternative 1.

No short-term effects to the soundscape of the Preserve or the Addition are expected to occur as a result of alternative 3 since the project only involves a change in the hunting status in the Addition and no construction activities would occur.

The main long-term adverse effects to the soundscape associated with alternative 3 are directly attributable to hunting-related firearm noise. However, with alternative 3, the NPS would have more flexibility to manage hunting in order to minimize any future hunting-related noise impacts to wildlife and/or nonhunting visitors if a specific need is identified. Given these factors, new disturbances from firearm noise due to alternative 3 are expected to be adverse, intermittent, and long-term, and are expected to result in minor disturbance to wildlife,

nonhunting visitors, and private residences located in proximity to the Preserve.

Other long-term adverse impacts from alternative 3 could include sporadic aircraft noise from additional monitoring flights required for deer and panther monitoring efforts. However, since similar aircraft noise currently occurs from ongoing monitoring efforts at the Preserve, the impact would be negligible.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, moderate, adverse cumulative impact on the natural soundscape of the Preserve. Alternative 3 would contribute a minor adverse increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts to the Preserve soundscape from alternative 3 would be long-term, minor, and adverse.

PUBLIC HEALTH AND SAFETY

NPS *Management Policies* (2006) discusses visitor safety in the NPS units, stating that while “visitors must assume a substantial degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments ... The saving of human life would take precedence over all other management actions as the [NPS] strives to protect human life and provide for injury-free visits” (NPS 2006). This concern is limited by the constraints of the Organic Act, which only allows discretionary management activities to be undertaken to the extent that they would not impair park resources and values (NPS 2006). While the NPS acknowledges that there are limitations on its ability to protect park employees and visitors from all hazards, the NPS would strive to

“provide a safe and healthful environment” (NPS 2006). “When practicable and consistent with congressionally designated purposes and mandates, the [NPS] would reduce or remove known hazards and apply other appropriate measures” (NPS 2006). The NPS would conduct such actions to have the least possible impact on park resources and values (NPS 2006).

The NPS would provide for public health and safety under all of the alternatives. Impacts associated with implementation of each of the alternatives to public health and safety are discussed below. The impacts of perceived public and safety risks and visitor experience are discussed in the “Visitor Use and Experience / Recreational Opportunities” section. The thresholds for evaluating impacts on public health and safety are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Within the original Preserve boundaries, hunting would continue as currently managed; within the Addition, hunting would be permitted and managed through the existing framework.

Based on the information shown in figure 3-8, participating in hunting is less likely to result in injury (two recorded injuries per 100,000 participants annually) than other recreational activities in which visitors would normally participate in the Preserve, such as fishing (180 recorded injuries per 100,000 participants annually) and bicycle riding (1,349 recorded injuries per 100,000 participants annually). These statistics show that continuing to allow hunting in the original Preserve and opening hunting in the Addition would only cause a negligible but long-term adverse impact to public health and safety for both hunters and nonhunting visitors.

This negligible risk could be further minimized for both hunters and nonhunting visitors to the Preserve. Risk of Class A injury to those visitors not participating in hunting activities could be eliminated by visiting the Preserve during times of the year out of hunting season. Risk of a Class A injury to those participating in hunting could be further minimized by hunter education and proper adherence to the hunter orange requirement. A study conducted by the Centers for Disease Control and published in the *Morbidity and Mortality Weekly Report* (1996) analyzed 343 two-party hunting firearm (Class A) injuries in reference to whether the parties involved were wearing hunter orange. The study reported that in 76% of the incidents the injured hunter was not wearing hunter orange, clearly showing an increased safety risk when hunter orange is not worn. Risk of a Class B injury to hunter could be substantially reduced by use of a fall arrest system or full body harness, as currently recommended by the FWC.

Therefore, a negligible, but long-term, adverse impact to public health and safety would result throughout the Preserve from the selection of alternative 1.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP (NPS 2010a) would provide diverse frontcountry and backcountry recreational opportunities, enhance day use and interpretive opportunities along road corridors, and enhance recreational opportunities with new facilities and services. Since these opportunities are already available within the original Preserve, the expansion of these opportunities into the Addition would not be expected to have any adverse impact on public health and safety. The implementation of ORV use in the Addition would be expected to have a long-term, minor, adverse impact on public health and safety associated with the risk of using ORVs¹⁸.

¹⁸ The U.S. Consumer Product Safety Commission (2011) attributed 903 estimated deaths to ATV use nationwide in 2006 (the last year for which complete data is available); this correlates to an estimated risk of death of 10 persons per 100,000 participants per year.

Implementation of the 2000 *Recreational ORV Management Plan* would provide up to 400 miles of designated ORV trails, 15 ORV access points, and up to 2,000 annual permits in the original Preserve. While there is a minor safety risk associated with using ORVs [approximately 10 deaths per 100,000 participants in 2006 (U.S. Consumer Product Safety Commission 2006)], this risk already exists in the original Preserve and would be mitigated by the implementation of this plan (i.e., ORVs would be limited to designated trails). Therefore, implementation of this plan provides a long-term, minor, beneficial impact on public health and safety.

Implementation of the *Commercial Services Plan* would initially only affect the original Preserve. The Addition would be addressed in an addendum to the *Commercial Services Plan* to be completed in the future. The *Commercial Services Plan* proposes to enhance the original Preserve's visitor services through the development of one or more new facilities; a new backcountry camping complex; hunting and fishing guides; buggy, van, and hiking tours; boat and bicycle rentals; and expanded opportunities for birding, wildlife viewing, and photography. This increased access and new facilities would facilitate safer use of natural areas in the region and cause a long-term, minor, beneficial impact on public health and safety in the region. Enhanced and expanded opportunities in the Preserve, before an addendum to include the Addition, would increase visitation and might result in increased congestion and user conflicts. Impacts resulting from increased visitation and congestion at access points and along the primary and secondary ORV trail network would result in long-term, minor, adverse impacts on public health and safety. When the Addition is addressed in an addendum, visitor opportunities to explore and use the Addition could be expanded. Impacts from implementing the *Commercial Services Plan* would be long-term, minor, and adverse as a result of potential congestion and use conflicts.

Implementation of future oil and gas proposals would not have any impact on public health and safety. The public would not be allowed

access to areas that these operations are occurring in the Preserve, and thus no safety risk would be posed.

Regional recreation plans and projects, such as the *CERP Master Recreation Plan*, *I-75 Recreational Access Plan*, and *State Comprehensive Outdoor Recreation Plan*, would provide a long-term, minor, beneficial effect on public health and safety in the region. These plans and projects would provide additional recreational opportunities in the region by providing additional facilities, opportunities and access points to visitors in the region. This increased access and new facilities would facilitate safer use of natural areas in the region and cause a long-term, minor, beneficial impact on public health and safety in the region. Potential increased visitation might result in increased congestion and user conflicts, which would cause a long-term, minor, adverse impact to public health and safety.

Regional growth and development is expected to continue and result in an increase in population and tourism in the general area. More visitations over time might result in increased congestion and user conflicts at access points and along the primary and secondary ORV trail network. Impacts to public health and safety from growth and development would be long-term, minor, and adverse as a result of increased congestion and user conflict.

Collectively, implementation of the preferred alternative in the Addition GMP (NPS 2010a) and the *Commercial Services Plan* would have long-term, minor, adverse impacts on public health and safety. Implementation of the 2000 *Recreational ORV Management Plan* would result in long-term, minor, beneficial impacts. Regional recreation plans and regional growth and development would have a long-term, minor, adverse impact.

The likely effects of implementing alternative 1 in combination with the effects of other past, present, and reasonably foreseeable future actions described above, would result in long-term, minor, adverse cumulative impacts on public health and safety. The actions contained

in alternative 1 would contribute a negligible increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on public health and safety from alternative 1 would be long-term, negligible, and adverse throughout the Preserve.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, the health and safety risks to visitors within the original Preserve would be the same as described under alternative 1 – long-term, negligible, and adverse. The health and safety risks to visitors within the Addition would remain unchanged since hunting would continue to be prohibited in this area.

Within the original Preserve, a negligible, but long-term, adverse impact to public health and safety would result from the selection of alternative 2.

In the Addition, no direct or indirect short- or long-term adverse impacts to public health and safety would result from the selection of alternative 2.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, adverse cumulative impact on public health and safety in the Preserve. The actions contained in alternative 2 would contribute a negligible increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on public health and safety from alternative 2 would be long-term, negligible, and adverse in the original Preserve; in the Addition, no direct or indirect short- or long-term adverse impacts to

public health and safety would result from the selection of this alternative.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. The impacts of this alternative would be very similar to those of alternative 1. However, the NPS would have the flexibility of potentially changing hunting regulations (i.e., area closures, season dates, etc.) if a specific public health and safety concern arises.

Therefore, a negligible, but long-term, adverse impact to public health and safety would result throughout the Preserve from the selection of alternative 3.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor, adverse cumulative impact on public health and safety in the Preserve. The actions contained in alternative 3 would contribute a negligible increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on public health and safety from alternative 3 would be long-term, negligible, and adverse.

SOCIOECONOMIC ENVIRONMENT

SOCIOECONOMICS

Analysis of socioeconomic impacts for all of the alternatives was based on anticipated increases in visitation to the Preserve, which in turn would affect visitor spending patterns in the Preserve and Collier County. Impacts in sales of hunting licenses, tags, permits, and stamps, statewide were also considered in the analysis. While no regional impacts are anticipated from any of the alternatives, cumulative impacts to the entire South Florida region were also taken into consideration in the analysis. The thresholds for evaluating impacts on the socioeconomic environment are defined in Table 4-1, located at the beginning of this chapter.

Alternative 1 – No Action – Apply Current Management to the Addition

Analysis. Under alternative 1, the no-action alternative, the preferred alternative from the Addition GMP (NPS 2010a) would be implemented and hunting would be permitted in the entire Preserve. Anticipated impacts to the Preserve would include a long-term, minor increase in visitor use during hunting season from hunters wishing to participate in hunting activities in the Preserve, and a long-term, negligible increase in visitor expenditures in the Preserve during hunting season.

In terms of hunting licenses, tags, permits, and stamps, statewide revenue from issuance could be anticipated to increase by a negligible to minor amount from the existing 328,000 licenses, tags, permits, and stamps issued statewide in 2011 (at a gross cost of nearly six million dollars).

In Collier County, a negligible increase in tourism might be expected during hunting season from hunters visiting the area to participate in hunting activities in the Preserve. No impacts would be expected to the population or employment in Collier County.

No regional socioeconomic impacts would be anticipated from opening hunting in the Addition.

Collectively, a long-term, minor increase in visitor use would be expected in the Preserve during hunting season. Long-term, negligible, beneficial impacts to visitor expenditures in the Preserve and Collier County could be expected. A long-term, negligible to minor increase in statewide hunting license revenue could be expected. No impacts would be expected to the population or employment in Collier County. No regional socioeconomic impacts would be anticipated.

Cumulative Impacts. Implementation of the preferred alternative in the Addition GMP (NPS 2010a), the *Commercial Services Plan*, and the 2000 *Recreational ORV Management Plan* would all increase visitor use opportunities in the Preserve and could be expected to increase visitor expenditures in the Preserve by a long-term, minor to moderate amount and tourism expenditures in Collier County by a long-term, negligible amount. No regional socioeconomic impacts would be expected to result from implementation of these plans.

Implementation of future oil and gas proposals could produce a short-term, moderate amount of revenue that would have a county-wide impact. Such proposals would also be expected to have a short-term, minor impact on employment in Collier County.

Numerous regional ecosystem restoration plans and projects are in various stages of completion throughout the South Florida region. The plans and projects would improve sheet flows and hydrologic connectivity and likely restore natural conditions in the Preserve. This effort would enhance the visitor use and experience by providing increased opportunities for wildlife viewing and experiencing natural settings. This would be expected to have a long-term, minor,

beneficial impact on revenue and employment in the South Florida region.

Regional recreation plans and projects, such as the *CERP Master Recreation Plan, I-75 Recreational Access Plan*, and *State Comprehensive Outdoor Recreation Plan* would provide a long-term, moderate, beneficial effect on visitor use and experience in the region. These plans and projects would enhance the visitor use and experience for the public and provide additional recreational opportunities in the region by providing additional facilities, opportunities and access points to visitors in the region. This would be expected to have a long-term, minor, beneficial impact on revenue and employment in the South Florida region.

Regional growth and development is expected to continue in the general area. Such growth and development would be expected to have a long-term, moderate, beneficial impact (increase) on tourism, general revenue, and population in the region.

Collectively, implementation of several plans in the Preserve would increase visitor expenditures in the Preserve by a long-term, minor to moderate amount and tourism expenditures in Collier County by a long-term, negligible amount. No regional socioeconomic impacts would be expected to result from implementation of these plans. Implementation of future oil and gas proposals could produce a short-term, moderate amount of revenue that would have a county-wide impact. Such proposals would also be expected to have a short-term, minor impact on employment in Collier County. Regional restoration and recreation plans and projects would be expected to have a long-term, minor, beneficial impact on revenue and employment in the South Florida region. Regional growth and development projects would be expected to have a long-term, moderate, beneficial impact (increase) on tourism, general revenue, and population in the region.

The likely effects of implementing the preferred alternative in combination with the effects of other past, present, and reasonably foreseeable future actions described above,

would result in long-term, minor to moderate, beneficial cumulative impacts on the socioeconomic environment of the Preserve, Collier County, and the region. The actions contained in alternative 1 would contribute a negligible to minor increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on the socioeconomic environment of the Preserve, Collier County, and the South Florida region from alternative 1 would be long-term, negligible to minor, and beneficial.

Alternative 2 – Minimum Management – No Hunting in the Addition

Analysis. Under alternative 2, the environmental baseline alternative, impacts would be very similar to those described under alternative 1 since hunting would be allowed in the Preserve under both alternatives even though hunting would be restricted to a certain portion of the Preserve (the original Preserve boundaries) with alternative 2.

Collectively, a long-term, minor increase in visitor use would be expected in the Preserve during hunting season. Long-term, negligible, beneficial impacts to visitor expenditures in the Preserve and Collier County could be expected. A long-term, negligible to minor increase in statewide hunting license revenue could be expected. No impacts would be expected to the population or employment in Collier County. No regional socioeconomic impacts would be anticipated.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 2 as described under alternative 1. When the likely effects of implementing alternative 2 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor to moderate, beneficial cumulative impacts on the socioeconomic environment of the Preserve, Collier County, and the region. The actions contained in the alternative 2 would contribute a negligible to

minor increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on the socioeconomic environment of the Preserve, Collier County, and the South Florida region from alternative 2 would be long-term, negligible to minor, and beneficial.

Alternative 3 – New Adaptive Management Strategy

Analysis. Under alternative 3, hunting would be managed in the entire Preserve through a science-based adaptive management process. The impacts of this alternative would be the same those of alternative 1 since hunting would be permitted in the entire Preserve under both alternatives.

Collectively, a long-term, minor increase in visitor use would be expected in the Preserve during hunting season. Long-term, negligible, beneficial impacts to visitor expenditures in the Preserve and Collier County could be expected. A long-term, negligible to minor increase in statewide hunting license revenue could be expected. No impacts would be expected to the population or employment in Collier County. No regional socioeconomic impacts would be anticipated.

Cumulative Impacts. Cumulative impacts from projects other than this *Hunting Management Plan* would be the same under alternative 3 as described under alternative 1. When the likely effects of implementing alternative 3 are added to the effects of other past, present, and reasonably foreseeable actions as described above, there would be a long-term, minor to moderate, beneficial cumulative impacts on the socioeconomic environment of the Preserve, Collier County, and the region. The actions contained in alternative 3 would contribute a negligible to minor increment to the cumulative impact of other projects.

Conclusion. Collectively, impacts on the socioeconomic environment of the Preserve, Collier County, and the South Florida region

from alternative 3 would be long-term, negligible to minor, and beneficial.

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Alternative 2 (environmental baseline) would not result in any unavoidable adverse environmental impacts. Implementation of alternatives 1 or 3 would both lead to unavoidable long-term adverse environmental impacts. Alternative 1 (no action) would lead to unavoidable adverse impacts to native vegetative communities, protected plant species, nonnative invasive plant species (i.e., impacts to native plant communities from nonnative invasive plants), protected wildlife, major game species, nonnative wildlife species (i.e., impacts to native wildlife population from nonnative wildlife species), wilderness, and soundscapes. Alternative 3 would lead to unavoidable adverse impacts to native vegetative communities, protected plant species, nonnative invasive plant species (i.e., impacts to native plant communities from nonnative invasive plants), protected wildlife, wilderness, and soundscapes.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA regulations (40 CFR 1502.16) require an EA to address the irreversible and irretrievable commitment of resources caused by the alternatives. An “irreversible” commitment of resources is defined as the loss of future options. The term applies primarily to the effects of using nonrenewable resources (such as minerals or cultural resources) or resources that are renewable only over long periods (such as soil productivity). It could also apply to the loss of an experience as an indirect effect of a “permanent” change in the nature or character of the land. An “irretrievable” commitment of resources is defined as the loss of production, harvest, or use of natural resources; irretrievable resource commitments may or may not be irreversible. No irreversible or irretrievable commitment of resources was identified with any of the alternatives in this plan.



CHAPTER 5: CONSULTATION AND COORDINATION



SCOPING PROCESS AND PUBLIC INVOLVEMENT

INTERNAL SCOPING

The purpose of NPS internal scoping activities was to develop a framework for the planning process and the fundamental foundation (e.g., draft purpose, need, objectives, and alternatives for the project) needed to prepare the *Hunting Management Plan*. The internal scoping supports the planning process by ensuring that the requirements of NEPA and Director's Order 12 are fulfilled throughout the planning process.

Internal Scoping Meetings

Three meetings and two web seminars were held during the NPS internal scoping process (see table 5-1).

Table 5-1 – Internal Scoping Meetings

Date	Location	Attendees
Jan 24, 2011	Big Cypress Swamp Welcome Center	NPS (Big Cypress and contractor), USFWS, FWC
Jul 13, 2011	Big Cypress National Preserve Headquarters	NPS (Big Cypress, Denver Service Center, and contractor), USFWS
Jul 14, 2011	Big Cypress Swamp Welcome Center	NPS (Big Cypress, Denver Service Center, and contractor), USFWS, FWC
Jul 28, 2011	Web Seminar	NPS (Big Cypress, Denver Service Center, and contractor), USFWS, FWC
Aug 1, 2011	Web Seminar	NPS (Big Cypress, Denver Service Center, and contractor), USFWS, FWC

The overall goals of these internal scoping meetings were to review the project background with all of the agencies involved in

the internal scoping process (NPS, USFWS, and FWC); review the NPS NEPA planning process; develop a draft purpose, need, and objectives for the public scoping process; develop draft alternatives for the public scoping process; and prepare for the public scoping portion of the project.

PUBLIC SCOPING

Public scoping is an early and open process to determine public concerns in relation to a proposed action. Public involvement is an important requirement of NEPA, especially in determining the appropriate scope of the analysis. In accordance with Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* and NPS *Management Policies* (2006), the NPS conducted public scoping for the *Hunting Management Plan* to ensure input from all interested parties.

The public scoping period for the *Hunting Management Plan* was scheduled from August 8 through September 16, 2011 (40 days). The public scoping period was initiated by the NPS by publishing a news release on the NPS Big Cypress National Preserve website and by issuing the release to local media.

A public scoping newsletter was posted on the NPS Planning, Environment, and Public Comment website. The public scoping newsletter provided background information on the project, information on how to comment on the project, and the preliminary draft purpose, need, objectives, and alternatives. The public scoping newsletter also posed four questions about the *Hunting Management Plan*:

- *Question 1: Do you feel that the draft purpose, need, and objectives adequately express the goals of the Hunting Management Plan / EA?*
- *Question 2: Do you have any additional alternatives in mind that would better*

address the draft purpose, need, and objectives of the Hunting Management Plan / EA?

- *Question 3: Describe any issues or concerns you feel should be addressed in the Hunting Management Plan / EA.*
- *Question 4: Do you have any other comments related to the Hunting Management Plan / EA?*

Additionally, in order to solicit agency input on the project, scoping letters were sent to the Florida State Clearinghouse, USFWS, the Florida State Historic Preservation Officer, the Miccosukee Tribe of Indians of Florida, Seminole Tribe of Florida, and the Seminole Nation of Oklahoma.

Public Scoping Meetings

Two public scoping meetings were held for the *Hunting Management Plan* in proximity to the areas surrounding the Preserve to initiate public involvement early in the planning stage and to obtain community feedback regarding the preliminary draft project purpose, need, objectives, and alternatives.

The first public scoping meeting was held at Edison State College in Naples, Collier County, Florida, on August 30, 2011. A total of 26 public participants and 19 agency / tribal / contractor personnel attended.

The second public meeting was held at the Hyatt Regency Bonaventure in Weston, Broward County, Florida, on August 31, 2011. A total of 60 public participants and 17 agency/tribal/contractor personnel attended.

Each meeting was structured into the following sessions. Participants were asked to sign in to the meeting and were provided with the project scoping newsletter. From 5:00 p.m. to 6:00 p.m., an open house session was held with a series of exhibits illustrating the preliminary draft project purpose, need, objectives, and alternatives. National Park Service and contractor staff were available to discuss the project, answer questions, and record comments on flip charts. From 6:00

p.m. to 6:30 p.m., there was a brief presentation about the project, outlining the project background, EA process, public involvement opportunities, and preliminary draft purpose, need, objectives, and alternatives. From approximately 6:30 p.m. to 7:30 p.m., the public was provided with an opportunity to provide official statements on the project while NPS and contractor staff recorded comments on flip charts.

Public Comment Opportunities

The public was invited to participate in the scoping portion of this project in the following ways:

- Participation in the two public meetings. Comments could be provided via the following methods at the public meetings:
 - spoken comments recorded by NPS and contractor staff on flip charts during the open house portion of the meetings
 - spoken comments recorded by NPS and contractor staff on flip charts during the formal comment session
 - written comments via the project comment form provided in the public scoping newsletter
- Submission of comments at any time during the scoping period. Comments could be provided via the following methods:
 - the NPS Planning, Environment, and Public Comment website
 - e-mail to NPS Preserve staff
 - Hard copy letter to the Preserve superintendent
 - the project comment form provided in the public scoping newsletter

Public Scoping Comments

During the comment period 272¹⁹ pieces of correspondence were received with 1,113 comments. Correspondence was received by

¹⁹ The flip chart comments recorded at each of the public meetings were compiled and entered as one piece of correspondence for each public meeting.

one of the following methods: web form (NPS Planning, Environment, and Public Comment website), public comment form (attached to the public scoping newsletter), hard copy letter, e-mail, fax, and public meeting flip charts. Letters received by hard copy, e-mail, or fax, as well as comments from the public meeting flip charts, were entered into the NPS Planning, Environment, and Public Comment system for analysis. Each of these letters or submissions is referred to as correspondence.

Correspondence from respondents regarding the *Hunting Management Plan* ranged from strong support to strong opposition to the project. The remaining correspondence did not express an opinion clearly supporting or opposing a hunting management plan, but only provided comments, questions, recommendations, or concerns.

Regarding Question 1 (“*Do you feel that the draft purpose, need, and objectives adequately express the goals of the Hunting Management Plan / EA?*”), a similar number of commenters responded affirmatively and negatively. A little more than half of respondents either did not answer Question 1 or did not clearly state their opinion in the affirmative or negative.

Regarding Question 2 (“*Do you have any additional alternatives in mind that would better address the draft purpose, need, and objectives of the Hunting Management Plan / EA?*”), slightly more commenters responded by stating ‘yes’ than those respondents that stated ‘no.’ A little more than half of respondents either did not answer Question 2 or did not clearly state their opinion either way.

Regarding the open-ended Questions 3 (“*Describe any issues or concerns you feel should be addressed in the Hunting Management Plan / EA*”) and 4 (“*Do you have any other comments related to the Hunting Management Plan / EA?*”), varied responses were received from commenters. The responses to these questions have been summarized by topic below and included in the concern statements in the following section.

Comments received that were in favor of the *Hunting Management Plan* included reasons such as the enjoyment of the recreational opportunity to hunt, appreciation of the natural resources while hunting, and the desire to pass on the hunting opportunity to future generations. A few of the correspondents in favor of the *Hunting Management Plan* also expressed a concern that it has taken a long time to open the Addition for hunting opportunities.

Those respondents that expressed opposition to the *Hunting Management Plan* discussed reasons such as protecting the natural resources, wildlife, and threatened and endangered species present in the preserve; protecting the Preserve for future generations to enjoy; and the ample availability of other hunting lands both in the state of Florida and in other parts of the Preserve. A few of the respondents opposed to the *Hunting Management Plan* also expressed opposition to the allowance of hunting in other parts of the Preserve.

Several correspondents requested that hunting regulations be reviewed, clarified, and/or revised. A few of the requested changes included: reinstating turkey hunting during regular gun season; instituting an alligator hunt; abolishing the 10:00 p.m. to 5:00 a.m. daily closure to ORV operators; abolishing the requirement that stipulates that hunters must check-in and check-out at the same check station; prohibition of the trapping of small game; and review of the closure of the Stairsteps Unit. There was also a request to provide general hunting information and education as part of the *Hunting Management Plan*.

Many correspondences received included requests to revise the wording in portions of the preliminary draft purpose, need, and objectives presented to the public during the scoping period. A few comments were received which stated that the preliminary draft purpose, need, and objectives only expressed the needs of hunters and did not express the needs of nonhunting visitors. Comments were also received which requested that some of the preliminary draft need and objectives

statements be removed from the *Hunting Management Plan*.

Many respondents stated their support for one of the preliminary draft alternatives, including support for alternatives 1, 2, and 3, as they were currently proposed during the public scoping period. Many of those commenting on the alternatives also requested changes to the existing preliminary draft alternatives or proposed new alternatives for the *Hunting Management Plan*. A few pieces of correspondence mentioned that the no-action alternative should be no hunting in the Addition. A few respondents also requested that alternative 2 not be included in the *Hunting Management Plan*. A large number of correspondents requested that the USFWS be removed from the decision-making process for alternative 3. Comments were also received which expressed the need for an additional alternative that allows the FWC to independently manage hunting in the Preserve.

Many pieces of correspondence received referenced the enabling legislation for the Preserve. Some commenters stated that the NPS must allow hunting in the Addition in order to comply with the enabling legislation, while other commenters stated that the NPS does not have to allow hunting in the Addition to comply with the enabling legislation. A few pieces of correspondence also referenced NPS regulations, such as the need to implement the "Precautionary Principle" for the *Hunting Management Plan*. Other respondents included requests to comply with NEPA, the Endangered Species Act, the National Historic Preservation Act, and the Americans with Disabilities Act. A few commenters also expressed that it would be undesirable to have to comply with NEPA in the future for changes in hunting protocol within the Preserve.

Correspondence received that referenced public involvement included the following: a request that project information be better disseminated to the public; concern that too much weight is given to local concerns during the public involvement process; concern that too much weight is given to out-of-town concerns during the public involvement

process; and a request to start a volunteer program to assist with project-related issues. A few comments referred to Preserve management issues. Some commenters expressed a concern about enforcement of hunting regulations and the availability of NPS resources for enforcement. A couple of respondents also stated their belief that the NPS and FWC have done a good job of managing hunting in the Preserve.

Wildlife and habitat comments received during the scoping period included the need for additional studies as part of the *Hunting Management Plan* and general concern for impacts associated with implementation of a hunting management plan. Comments were received which expressed a concern that the deer population in the Preserve has been declining in recent years. Other commenters stated that wildlife poaching is a problem in the Addition and the Preserve. Correspondence was also received that mentioned hunting as a wildlife management tool. A few respondents also expressed concern about nonnative species and the need for nonnative species impacts to be analyzed in the *Hunting Management Plan*.

A large number of those commenting on the project expressed a concern for direct and indirect impact to endangered species in the Addition and the Preserve in general, especially the federally and state listed endangered Florida panther. Commenters requested that studies be conducted to determine the abundance and distribution of threatened and endangered species in the Preserve as well as the impacts of hunting on the Florida panther and its prey.

Socioeconomic impacts were mentioned by a number of correspondents. A few commenters requested that the socioeconomic impacts of allowing hunting in the Addition be analyzed in the *Hunting Management Plan*, while other comments were received which state that socioeconomic considerations should not be a part of the decision-making process for the *Hunting Management Plan*. Other socioeconomic concerns expressed by respondents included the need to complete the *Hunting Management Plan* in the most

economical manner possible and the potential for a fee to be charged to visitors of the Preserve.

Visitor use and experience was discussed by many of the respondents. Those opposed to hunting in the Addition expressed concern about a safety conflict between hunters and nonhunting visitors, as well as negative impacts on the visitor experience for nonhunters. Many comments were received which expressed an opposition to ORV use in the Addition. A number of correspondences also mentioned the need for better access options in the Addition.

A concern for cultural and ethnographic resources in the Addition was mentioned by some of the respondents. Commenters requested that cultural resources impacts be fully analyzed in the *Hunting Management Plan*. Other respondents expressed opposition to allowing hunting in the Addition due to concerns about cultural resources impacts. Comments were also received which requested that the Gladesmen culture be recognized in the *Hunting Management Plan*.

Other questions, concerns, and issues that were raised by respondents included: a request to designate the Addition as wilderness lands; the need to analyze indirect, secondary, and cumulative impacts in the *Hunting Management Plan*; the need to define certain terms (i.e., hunting management, science-based, adaptive management) in the *Hunting Management Plan*; and the need for prescribed burning in the Addition.

Agency / Tribal / Organization Comments

Correspondence from agencies, organizations, and businesses included letters and comments from the following entities (see table 5-2). The remaining 232 pieces of correspondence were received from unaffiliated individuals.

Table 5-2 – Agencies / Organizations / Business Providing Correspondence during the Public Scoping Process

Agency / Organization / Business	Number of Corr. Received
Airboat Association of Florida	3
American Indian Movement / Florida Chapter	1
Ancient Trees	1
Animal Welfare Institute	1
Antelope Club / Largo, Florida	1
Audubon Society	6
Big Cypress Sportsmen's Alliance	3
Broward Chapter of the Native Plant Society	1
Broward County Master Gardener	1
Center for Biological Diversity	1
Christian Outdoorsmen of Southwest Florida	1
Citizens Allied for Safe Energy, Inc.	1
City of Cooper City	1
Coastal Conservation	1
Council of Civic Associations, Inc.	1
Council of the Original Miccosukee Simanolee Nation Aboriginal People	1
Defenders of Wildlife	1
Ducks Unlimited	2
Eagle Watch	1
Ecology Party of Florida	1
Everglades Conservation and Sportsman Club	2
Everglades Coordinating Council	1
Federal Bureau of Prisons	1
Florida Biodiversity Project	1
Florida Department of State, Division of Historical Resources	1
Florida State Clearinghouse	1
Florida Trail Association	7
Fulltrack Conservation Club of Dade County	2
GatorGuides.com	2
Green Party	1
Jetport Conservation and Recreation Club	1
Kosher Caregivers	1
National Parks Conservation Association	1
National Rifle Association	6
National Wild Turkey Federation	5
National Wildlife Federation	3
New York Bowhunters	1
Palm Beach County Environmental Coalition	1

Table 5-2 – Agencies / Organizations / Business Providing Correspondence during the Public Scoping Process

Agency / Organization / Business	Number of Corr. Received
Pops Hunt Club / Southwest Ranches, Florida	1
Public Employees for Environmental Responsibility	2
Reading Environmental Advisory Council	1
Rocky Mountain Elk Foundation	1
Safari Club International	16
Save our Sovereign Lands, LLC	1
Sea Turtle Oversight Protection	1
Seminole Tribe of Florida	1
Sierra Club	11
South Florida Wildlands Association	2
Southwest Florida Boy Scout Council	1
Tropical Theatre	1
Unified Sportsmen	1
United Waterfowlers of Florida	3
UWF	1

Agency / Tribal Correspondence Summary

On August 5, 2011, letters were sent to the following agencies, which provided information about the development of a hunting management plan for the Preserve and the opportunity to comment on the project.

- Florida State Clearinghouse
- USFWS
- Florida SHPO
- Miccosukee Tribe of Indians of Florida
- Seminole Tribe of Florida
- Seminole Nation of Oklahoma.

Florida Department of State, Division of Historical Resources. The State Historic Preservation Officer reviewed the scoping notice for the project for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places. The review was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended and 36

CFR Part 800: Protection of Historic Properties. The September 14, 2011, SHPO letter stated the following regarding the *Hunting Management Plan*:

“Based on the information provided, it is the opinion of this office that the above-referenced undertaking will have no effect on historic properties.”

Florida State Clearinghouse. The Florida State Clearinghouse coordinated a review of the scoping notice for the project under the following authorities: Presidential Executive Order 12372; § 403.061(42), Florida Statutes; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and NEPA, 42 U.S.C. §§ 4321-4347, as amended.

The Florida State Clearinghouse letter contained the following comment from the FWC:

“The [FWC] is pleased to see the opportunity for public input into a Hunting Management Plan for [the Preserve]. FWC has been a full partner with the Preserve staff in drafting the alternatives and looks forward to continued participation at that level throughout the remainder of the plan development process.”

The Florida State Clearinghouse letter concluded the following regarding the *Hunting Management Plan*:

“Based on the information contained in the scoping notice and state agency comments, at this stage, the state has no objections to the proposed federal action. To ensure the project’s consistency with the Florida Coastal Management Program (FCMP), any concerns identified by our reviewing agencies during future reviews must be addressed prior to project implementation. The state’s continued concurrence will be based on the activity’s compliance with FCMP authorities, including federal and state monitoring of the activity to ensure its continued conformance, and the adequate resolution of any issues identified during subsequent reviews.”

Seminole Tribe of Florida. A member of the Seminole Tribe of Florida commented on the proposed *Hunting Management Plan*, but no official correspondence was received.

**Council of the Original Miccosukee
Simanolee Nation Aboriginal People.**

- Allowing hunting in the Addition violates the traditional, customary, and cultural rights of the Original Miccosukee Simanolee Nation Aboriginal People, including hunting, fishing, harvesting materials for homes, and practicing traditional customs.
- The area that comprises the Addition is a monument to the Aboriginal Indigenous Miccosukee Simanolee People.
- The Council of the Original Miccosukee Simanolee Nation Aboriginal People strongly objects to recreational hunting and recreational ORV use in the Addition.
- The Council of the Original Miccosukee Simanolee Nation Aboriginal People objects to destruction of natural systems, damage to the wildlife habitat, damage to the land, destruction of vegetation, disruption of the natural water flow and water quality, and disruption of the wildlife balance in the Addition.
- Allowing hunting in the Addition will reduce the prey base for the endangered Florida panther.
- Allowing for trails and roads, ORVs, and hunting in the Addition will force wildlife (including the Florida panther) in developed areas, which will increase mortality.
- The remaining habitat for the Florida panther is limited.
- The Addition needs to be preserved for future generations.

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The following NPS staff, agency personnel, and contractors contributed to the preparation or review of this *Hunting Management Plan*.

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ACRONYMS

Addition GMP	<i>Big Cypress National Preserve – Addition Final General Management Plan / Wilderness Study / Off-Road Vehicle Management Plan / Environmental Impact Statement</i>
CBA	Choosing By Advantages
CERP	Comprehensive Everglades Restoration Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB(A)	A-Weighted Decibels
EA	Environmental Assessment
EO	Executive Order
FWC	Florida Fish and Wildlife Conservation Commission
GMP	General Management Plan
NEPA	National Environmental Policy Act
NPS	National Park Service
ORV	Off-Road Vehicle
PL	Public Law
Preserve	Big Cypress National Preserve
ROD	Record of Decision
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Officer
SR	State Road
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area



APPENDIXES

Appendix A

**Big Cypress National Preserve Enabling Legislation
(PL 93-440, as amended by PL 100-301)**

Big Cypress

National Park Service
U.S. Department of the Interior

Big Cypress
National Preserve



Enabling Legislation

P.L. 93-440, AN ACT TO ESTABLISH BIG CYPRESS NATIONAL PRESERVE, AS AMENDED BY P.L. 100-301, THE BIG CYPRESS NATIONAL PRESERVE ADDITION ACT

(ALL UNDERLINED SECTIONS ARE FROM THE 1988 ADDITION LEGISLATION)

An Act to establish the Big Cypress National Preserve in the State of Florida, and for other purposes. (88 Stat. 1255)
(P.L. 93-440)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,
That (a) in order to assure the preservation, conservation, and protection of the natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress Watershed in the State of Florida and to provide for the enhancement and public enjoyment thereof, the Big Cypress National Preserve is hereby established.

(b) The Big Cypress National Preserve (hereafter referred to as the “preserve”) shall comprise the area generally depicted on the map entitled “Big Cypress National Preserve”, dated November 1971 and numbered 60-91,001, which shall be on file and available for public inspection in the Offices of the National Park Service, Department of the Interior, Washington, District of Columbia, and shall be filed with appropriate offices of Collier, Monroe, and Dade Counties in the State of Florida. The Secretary of the Interior (hereafter referred to as the “Secretary”) shall, as soon as practicable, publish a detailed description of the boundaries of the preserve in the Federal Register which shall include not more than five hundred and seventy thousand acres of land and water.

(c) The Secretary is authorized to acquire by donation, purchase with donated or appropriated funds, transfer from any other Federal agency, or exchange, any lands, waters, or interests therein which are located within the boundaries of the preserve or the Addition: *Provided*, That any lands owned or acquired by the State of Florida, or any of its subdivisions *in the preserve* may be acquired by donation only and any land acquired by the State of Florida. or any of its subdivisions, in the Addition shall be acquired in accordance with subsection (d): *Provided further*, That no Federal

funds shall be appropriated until the Governor of Florida executes an agreement on behalf of the State which (i) provides for the transfer to the United States of all lands within the preserve *previously owned* or acquired by the State and (ii) provides for the donation to the United States of all lands acquired by the State within the preserve pursuant to the provision of “the Big Cypress Conservation Act of 1973 (Chapter 73-131 of the Florida Statutes) or provides for the donation to the United States of any remaining moneys appropriated pursuant to such Act for the purchase of lands within the preserve. No improved property, as defined by this Act, nor oil and gas rights, shall be acquired without the consent of the owner unless the Secretary, in his judgment, determines that such property is subject to, or threatened with, uses which are, or would be, detrimental to the purposes of the preserve. The Secretary may, if he determines that the acquisition of any other subsurface estate is not needed for the purposes of the preserve and the Addition, exclude such interest in acquiring any lands within the preserve and the Addition. Notwithstanding the provisions of section 301 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (84 Stat. 1894, 1904) the Secretary (i) may evaluate any offer to sell land within the preserve and the Addition by any landowner and may, in his discretion, accept any offer not in excess of \$10,000 without an appraisal and (ii) may direct an appraisal to be made of any unimproved property within the preserve and the Addition without notice to the owner or owners thereof. Notwithstanding any other provision of law, and federally owned lands within the preserve or the Addition shall, with the concurrence of the head of the administering agency, be transferred to the administrative jurisdiction of the Secretary for the purposes of this Act, without transfer of funds. Nothing in this Act shall be construed to interfere with the right of the State of Florida to acquire such property rights as may be necessary for Interstate 75.

(d)(i) The aggregate cost to the United States of acquiring lands within the Addition may not exceed 80 percent of the total cost of such lands.

(2) Except as provided in paragraph (3), if the State of Florida transfers to the Secretary lands within the Addition, the Secretary shall pay to or reimburse the State of Florida (out of funds appropriated for such purpose) an amount equal to 80 percent of the total costs to the State of Florida of acquiring such lands.

(3) The amount described in paragraph (1) shall be reduced by an amount equal to 20 percent of the amount of the total cost incurred by the Secretary in acquiring lands in the Addition other than from the State of Florida.

(4) For purposes of this subsection, the term ‘total cost’ means that amount of the total acquisition costs (including the value of exchanged or donated lands’ less the amount of the costs incurred by the Federal Highway Administration and the Florida Department of Transportation, including severance damages paid to private property owners as a result of the construction of Interstate 75.

Sec. 2. (a) In recognition of the efforts of the State of Florida in the preservation of the area, through the enactment of chapter 73-131 of the Florida statutes, ‘The Big Cypress Conservation Act of 1973’, the Secretary

is directed to proceed as expeditiously as possible to acquire the lands and interests in lands necessary to achieve the purposes of this Act.

(b) Within one year after the date of the enactment of this Act, the Secretary shall submit, in writing, to the Committee on Interior and Insular Affairs and to the Committees on Appropriations of the United States Congress a detailed plan which shall indicate:

- (i) the lands and areas which he deems essential to the protection and public enjoyment of this preserve.
- (ii) the lands which he has previously acquired by purchase, donation, exchange or transfer for administration for the purpose of this preserve, and
- (iii) the annual acquisition program (including the level of funding) which he recommends for the ensuing five fiscal years.

(c) It is the express intent of the Congress that the Secretary should substantially complete the land acquisition program contemplated by this Act within six years after the date of its enactment.

SEC 3. (a) The owner of an improved property on the date of its acquisition by the Secretary may, as a condition of such acquisition, retain for himself and his heirs and assigns a right of use and occupancy of the improved property for a definite term of not more than twenty-five years or, in lieu thereof, for a term ending at the death of the owner or the death of his spouse, whichever is later. The owner shall elect the term to be reserved. Unless this property is wholly or partially donated to the United States, the Secretary shall pay the owner the fair market value of the property on the date of acquisition less the fair market value, on that date, of the right retained by the owner. A right retained pursuant to this section shall be subject to termination by the Secretary upon his determination that it is being exercised in a manner inconsistent with the purposes of this Act, which shall include the exercise of such right in violation of any applicable State or local laws and ordinances, and it shall terminate by operation of law upon the Secretary's notifying the holder of the right of such determination and tendering to him an amount equal to the fair market value of that portion of the right which remains unexpired.

(b) As used in this Act, the term "improved property" means:

- (i) a detached, one family dwelling, construction of which was begun before November 23, 1971, with respect to the preserve and January 1, 1986 with respect to the Addition which is used for noncommercial residential purposes, together with not to exceed three acres of land on which the dwelling is situated and such additional lands as the Secretary deems reasonably necessary for access thereto, such land being in the same ownership as the dwelling, and together with any structures accessory to the dwelling which are situated on such lands and

(ii) any other building, construction of which was begun before November 23, 1971, with respect to the preserve and January 1, 1986 with respect to the Addition which was constructed and is used in accordance with all applicable State and local laws and ordinances, together with as much of the land on which the building is situated, such land being in the same ownership as the building, as the Secretary shall designate to be reasonably necessary for the continued enjoyment and use of the building in the same manner and to the same extent as existed in November 23, 1971, or January 1, 1986, as the case may be, together with any structures accessory to the building which are situated on the lands so designated. In making such designation the Secretary shall take into account the manner of use in which the building, accessory structures, and lands were customarily enjoyed prior to November 23, 1971 or January 1, 1986 as the case may be.

(c) Whenever an owner of property elects to retain a right of use and occupancy as provided in this section, such owner shall be deemed to have waived any benefits or rights accruing under sections 203, 204, 205, and 206 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (84 Stat. 1894), and for the purposes of such sections such owner shall not be considered a displaced person as defined in section 101(6) of such Act.

SEC 4. (a) The area within the boundaries depicted on the map referred to in section 1 shall be known as the Big Cypress National Preserve. Such lands shall be administered by the Secretary as a unit of the National Park System in a manner which will assure their natural and ecological integrity' in perpetuity' in accordance with the provisions of this Act and with the provisions of the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1-4), as amended and supplemented.

(b) In administering the preserve, the Secretary shall develop and publish in the Federal Register such rules and regulations as he deems necessary and appropriate to limit or control the use of Federal lands and waters with respect to:

- (1) motorized vehicles,
- (2) exploration for and extraction of oil, gas, and other minerals,
- (3) grazing,
- (4) draining or constructing of works or structures which alter the natural water courses,
- (5) agriculture,
- (6) hunting, fishing, and trapping,
- (7) new construction of any kind, and
- (8) such other uses as the Secretary determines must be limited or controlled in order to carry out the purposes of this Act: *Provided*, That the Secretary shall consult and cooperate with the Secretary of

Transportation to assure that necessary transportation facilities shall be located within existing or reasonably expanded rights-of-way and constructed within the reserve in a manner consistent with the purposes of this Act.

SEC. 5. The Secretary shall permit hunting, fishing, and trapping on lands and water under his jurisdiction within the preserve and the Addition in accordance with the applicable laws of the United States and the State of Florida, except that he may designate zones where and periods when no hunting, fishing, trapping, or entry may be permitted for reasons of public safety, administration, floral and faunal protection and management, or public use and enjoyment. Except in emergencies, any regulations prescribing such restrictions relating to hunting, fishing, or trapping shall be put into effect only after consultation with the appropriate State agency having jurisdiction over hunting, fishing, and trapping activities. Notwithstanding this section or any other provision of this Act, members of the Miccosukee Tribe of Indians of Florida and members of the Seminole Tribe of Florida shall be permitted, subject to reasonable regulations established by the Secretary, to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the preserve and the Addition, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonials.

SEC. 6. Notwithstanding any other provision of law, before entering into any contract for the provision of revenue producing visitor services,

(i) the Secretary shall offer those members of the Miccosukee and Seminole Indian Tribes who, on January 1, 1972, (January 1, 1985 in the case of the Addition) were engaged in the provision of similar services, a right of first refusal to continue providing such services within the preserve and the Addition subject to such terms and conditions as he may deem appropriate, and

(ii) before entering into any contract or agreement to provide new revenue-producing visitor services within the preserve or within the Addition the Secretary' shall offer to the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida the right of first refusal to provide such services, the right to be open for a period of ninety days. Should both tribes respond with proposals that satisfy the terms and conditions established by the Secretary, the Secretary may allow the Tribes an additional period of ninety days in which to enter into an inter-Tribal cooperative agreement to provide such visitor services, but if neither tribe responds with proposals that satisfy the terms and conditions established by the Secretary', then the Secretary shall provide such visitor services in accordance with the Act of October 9, 1965 (79 Stat. 969, 16 U.S.C. 20). No such agreement may be assigned or otherwise transferred without the consent of the Secretary.

SEC. 7. Within five years from the date of the enactment of this Act, with respect to the preserve and five years from the date of the enactment of the Bid Cypress National Preserve Addition Act. with respect to the Addition the Secretary shall review the area within the preserve or the area within the Addition (as the case

may be) and shall report to the President, in accordance with section 3 (c) and (d) of the Wilderness Act (78 Stat. 891; 16 U.S.C. 1132 (c) and (d)), his recommendations as to the suitability or unsuitability of any area within the preserve or the area within the Addition (as the case may be) for preservation as wilderness, and any designation of any such areas as a wilderness shall be accomplished in accordance with said subsections of the Wilderness Act.

SEC. 8. (a) Except as provided in subsection (b), there are authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act, but not to exceed \$116,000,000 for the acquisition of lands and interests in lands and not to exceed \$900,000 for development. Any funds donated to the United States by the State of Florida pursuant to chapter 73-131 of the Florida statutes shall be used solely for the acquisition of lands and interests in land within the preserve.

(b) There is hereby authorized to be appropriated from the Land and Water Conservation Fund not to exceed \$49,500,000 for the acquisition of lands within the Addition. There is hereby authorized to be appropriated such sums as may be necessary for development in the Addition.

Approved October 11, 1974.

(The following are completely new sections added from Addition Legislation)

Sec. 9. (a) In order to -

- (1) achieve the purposes of the first section of this Act:
- (2) complete the preserve in conjunction with the planned construction of Interstate Highway 75: and
- (3) insure appropriately managed use and access to the Big Cypress Watershed in the State of Florida.

the Big Cypress National Preserve Addition is established.

(b) The Big Cypress National Preserve Addition (referred to in this Act as the 'Addition') shall comprise approximately 146,000 acres as generally depicted on the map entitled Big Cypress National Preserve Addition, dated April 1987, and numbered 176-910000, which shall be on file and available for public inspection in the Office of the National Park Service, Department of the Interior, Washington, D.C., and shall be filed with appropriate offices of Collier County in the State of Florida. The Secretary shall, as soon as practicable publish a detailed description of the boundaries of the Addition in the Federal Register.

(c) The area within the boundaries depicted on the map referred to in subsection (b) shall be known as the 'Big Cypress National Preserve Addition' and shall be managed in accordance with section 4.

(d) For purposes of administering the Addition and notwithstanding section 2(c), it is the express intent of the Congress that the Secretary should substantially complete the land acquisition program contemplated with

respect to the Addition in not more than five years after the date of the enactment of this paragraph.

Sec. 10. The Secretary and other involved Federal agencies shall cooperate with the State of Florida to establish recreational access points and roads, rest and recreation areas, wildlife protection, hunting, fishing, frogging and other traditional opportunities in conjunction with the creation of the Addition and in the construction of Interstate Highway 74. Three of such access points shall be located within the Preserve (including the Addition).

Sec. 11. Not later than two years after the date of the enactment of this section, the Secretary shall submit to the Congress a detailed report on, and further plan for, the preserve and Addition including -

- (1) the status of the existing preserve, the effectiveness of past regulation and management of the preserve, and recommendations for future management of the preserve and the Addition:
- (2) a summary of the public's use of the preserve and the status of the access points developed pursuant to section 10:
- (3) the need for involvement of other State and Federal agencies in the management and expansion of the preserve and Addition:
- (4) the status of land acquisition; and
- (5) a determination, made in conjunction with the State of Florida, of the adequacy of the number, location, and design of the recreational access points on 1-75/Alligator Alley for access to the Big Cypress National Preserve, including the Addition.

The determination required by paragraph (5) shall incorporate the results of any related studies of the State of Florida Department of Transportation and other Florida State agencies. Any recommendation for significant changes in the approved recreational access points, including any proposed additions, shall be accompanied by an assessment of the environmental impact of such changes.

Sec. 12. (a) Within nine months from the date of the enactment of the Big Cypress National Preserve Addition Act the Secretary shall promulgate, subject to the requirements of subsections (b)-(e) of the section, such rules and regulations governing the exploration for and development and production of non-Federal interests in oil and gas located within the boundaries of the Big Cypress National Preserve and the Addition, including but not limited to access on, across, or through all lands within the boundaries of the Big Cypress National Preserve and the Addition for the purpose of conducting such exploration or development and production, as are necessary and appropriate to provide reasonable use and enjoyment of privately owned oil and gas interests, and consistent with the purposes for which the Big Cypress National Preserve and the Addition were established. Rules and regulations promulgated pursuant to the authority of this section may be made by appropriate amendment to or in substitution of the rules and regulations respecting non-Federal oil and gas rights (currently codified at 36 CFR 9.30, et seq.. (1986)).

- (b) Any rule or regulation promulgated by the Secretary under subsection (a) of this section shall

provide that -

(1) exploration or development and production activities may not be undertaken, except pursuant to a permit issued by the National Park Service authorizing such activities or access; and

(2) final action by the National Park Service with respect to any application for a permit authorizing such activities shall occur within 90 days from the date such an application is submitted unless -

(A) the National Park Service and the applicant agree that such final action shall occur within a shorter or longer period of time; or

(B) the National Park Service determines that an additional period of time is required to ensure that the National Park Service has, in reviewing the application, complied with other applicable law, Executive orders and regulations; or

(C) the National Park Service, within 30 days from the date of submission of such application, notifies the applicant that such application does not contain all information reasonably necessary to allow the National Park Service to consider such application and requests that such additional information be provided. After receipt of such notification to the applicant, the applicant shall supply any reasonably necessary additional information and shall advise the National Park Service that the applicant believes that the application contains all reasonably necessary information and is therefore complete, whereupon the National Park Service may -

(i) within 30 days of receipt of such notice from the applicant to the National Park Service determine that the application does not contain all reasonably necessary additional information and, on that basis, deny the application; or

(ii) review the application and take final action within 60 days from the date that the applicant provides notification to the National Park Service that its application is complete.

(c) Such activities shall be permitted to occur if such activities conform to requirements established by the National Park Service under authority of law.

(d) In establishing standards governing the conduct of exploration or development and production activities within the boundaries of the Big Cypress National Preserve or the Addition, the Secretary shall take into consideration oil and gas exploration and development and production practices used in similar habitats or ecosystems within the Big Cypress National Preserve or the Addition at the time of promulgation of the rules and regulations under subsection (a) or at the time of the submission of the application seeking authorization for such activities, as appropriate.

(e) Prior to the promulgation of rules or regulations under this section, the Secretary is authorized, consistent with the purposes of which the Big Cypress National Preserve Addition was established, to enter into interim agreements with owners of non-Federal oil and gas interests governing the conduct of oil and gas exploration, development or production activities within the boundaries of the Addition, which agreements shall be superseded by the rules and regulations promulgated by the Secretary when applicable: Provided. That such

agreement shall be consistent with the requirements of subsections (b) -(d) of this section and may be altered by the terms of rules and regulations subsequently promulgated by the Secretary: Provided further, That this provision shall not be construed to enlarge or diminish the authority of the Secretary to establish rules and regulations applicable to the conduct of exploration or development and production activities within the Big Cypress National Preserve or the Addition.

(f) There is hereby authorized to be established a Minerals Management Office within the Office of the Superintendent of the Big Cypress National Preserve, for the purpose of ensuring, consistent with the purposes for which the Big Cypress National Preserve was established, timely consideration of and final action on applications for the exploration or development and production of non-Federal oil and gas rights located beneath the surface of lands within the boundaries of the Big Cypress National Preserve and the Addition.

(g) There are hereby authorized to be appropriated such sums as may be necessary to carry out the activities set forth in this section.

Legislative History.

House Report No. 93-502 (Comm. on Interior and Insular Affairs).

Senate Report No. 93-1128 (Comm. on Interior and Insular Affairs).

Congressional Record:

Vol. 119 (1973): Oct. 3, considered and passed House.

Vol. 120 (1974); Sept 9, considered and passed Senate, amended.

Sept. 24, House concurred in Senate amendments with amendments.

Oct. 1 Senate concurred in House amendments to Senate amendments.



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Appendix B

National Park Service /
Florida Fish and Wildlife Conservation Commission
Cooperative Partnership Agreement

COOPERATIVE PARTNERSHIP AGREEMENT

BETWEEN

THE NATIONAL PARK SERVICE AND

THE FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

This Cooperative Partnership Agreement ("Agreement") is made and entered on this 1st day of December, 2010 by and between the National Park Service, represented by the Superintendent of the Big Cypress National Preserve ("NPS," "Preserve") and the Executive Director of the Florida Fish and Wildlife Conservation Commission ("FWC").

WHEREAS, the Preserve was established as a unit of the National Park System by Public Law 93-440, effective October 11, 1974. As established, the Preserve consisted of 580,000 acres for purposes of assuring the preservation, conservation and protection of natural, scenic, hydrologic, floral and fauna, and recreation values of the Big Cypress Watershed and providing for the enhancement and public enjoyment thereof; and

WHEREAS, Public Law 100-301, effective April 29, 1988, added 147,000 acres ("the Addition") to the Preserve and further stated that NPS shall cooperate with the State of Florida to establish recreational access points, roads, rest and recreation areas, wildlife protection, hunting, fishing, frogging and other traditional recreational opportunities in conjunction with the creation of the Addition; and

WHEREAS, NPS's special regulations for the Preserve at 36 CFR § 7.86 (a)(2)(iii) state with respect to Motorized Vehicle travel: "...Prior to making a temporary or permanent closure the Superintendent shall consult with the executive director of the Florida Game and Freshwater Fish Commission..."; and

WHEREAS, 36 CFR § 7.86 (e) states that hunting, fishing and trapping are permitted in the Preserve in accordance with the NPS general regulations and applicable Florida law governing Cooperative Wildlife Management Areas; and

WHEREAS the NPS is fulfilling its mission to assure the preservation, conservation and protection of natural, scenic, hydrologic, floral and fauna, and recreation values of the Big Cypress Watershed and to provide for the enhancement and public enjoyment thereof in accordance with all applicable Federal regulations and NPS policies and in a manner consistent with State of Florida regulations; and

WHEREAS, the federal and state statutes establishing the Preserve and the Addition distinguish these public lands from typical national parks and thereby recognize the importance of local traditional values, and integrate those values in a unique and cooperative partnership between the Federal government and the State of Florida; and

WHEREAS, the State of Florida has been a major financial contributor and partner in creating the Preserve by spending \$40 million on land acquisition and by donating 140,000 acres to the creation of the Preserve; and

WHEREAS, the State of Florida has designated the Big Cypress Area as an "area of critical state concern" by Section 380.055, Florida Statutes in order to protect the Preserve and the Addition as an environmental natural resource of regional and statewide significance for the state; and

WHEREAS, FWC is the state agency empowered by Article IV, Section 9, Florida Constitution to execute the executive and regulatory powers of the state over wild animal life, freshwater aquatic life and marine life and is also empowered by sections 375.311-314, Florida Statutes to regulate motor vehicle access and traffic control on Florida's public lands to prevent damage to environmentally sensitive lands; and

WHEREAS, FWC has developed partnership relationships with the federal government for the regulation of fishing, hunting and other outdoor recreational activities in national forests, US Department of Defense lands, US Army Corps of Engineers lands, and for the enforcement of federal marine fishery regulations in state and federal waters and has capably and effectively carried out its partnership responsibilities with other federal agencies; and

WHEREAS, FWC is fulfilling its mission to conserve the fish and wildlife resources of the Preserve by effectively regulating and managing hunting, fishing, and imperiled fish and wildlife in cooperation and as authorized by the NPS, through Rule 68A-15.064(5), Florida Administrative Code and other regulations, and through FWC law enforcement; and

WHEREAS, NPS and FWC [and its predecessor agency the Florida Game and Fresh Water Fish Commission ("GFC")] executed a Memorandum of Understanding in 1974 to promote collaboration, consultation, and cooperation in the regulation and management of the fish and wildlife resources on the Preserve; and

WHEREAS, said Memorandum of Understanding expired in 1990; and

WHEREAS, based upon the aforesaid expressed intent of the above-described state and federal authorities both parties desire to continue to collaborate, consult, and cooperate on Preserve management issues related to recreational access points and roads, rest and recreation areas, wildlife protection, hunting, fishing, frogging and other traditional opportunities to ensure the good and stability of the greater Everglades ecosystem; and

WHEREAS, this Agreement is desirable in order to fulfill the mandate and intent of the Acts of Congress and Florida Statutes for the management of the Preserve and the Addition.

THEREFORE, NPS and FWC agree as follows:

1. NPS and FWC will implement this Agreement through joint and cooperative endeavors which will focus the resources, expertise, skills, and abilities of the FWC and the NPS toward achieving the proper management of the lands and waters involved, the proper management of fish and wildlife resources, and the maximum public benefit from these endeavors.

2. NPS and FWC will offer reasonable public access as provided for in Public Law 93-440 and Public Law 100-301, allowing the public to engage in authorized traditional uses in the Preserve and the Addition such as hunting, fishing, camping and other wildlife-oriented recreational activities, which can be compatible with fish and wildlife conservation and are integral to fulfilling the mandate and intent of said public laws, without compromising the integrity of Preserve natural and cultural resources.
3. NPS and FWC shall collaborate, consult, and cooperate with one another to ensure that their actions do not adversely affect the ability of the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Indians of Florida to continue their usual and customary use and occupancy of Federal or federally acquired lands and waters within the Preserve and Addition.
4. FWC and NPS shall collaborate, consult and cooperate with one another when developing management plans, environmental assessments or environmental impact statements or other management instruments that affect fish and wildlife resources of the Preserve and the Addition and the public's ability or access to enjoy such resources.
5. FWC and NPS shall collaborate, consult and cooperate with one another regarding management of imperiled species of fish and wildlife on the Preserve and/or the Addition.
6. FWC and NPS shall collaborate, consult and cooperate with one another on courses of action to control or eradicate exotic or nonnative fish and wildlife or plants in the Preserve and the Addition. Nothing herein shall restrict or constrain the ability of NPS to implement management measures necessary to control or eradicate exotic fish, wildlife or plants.
7. When practicable, the NPS and FWC shall collaborate, consult, and cooperate on ecological research and resource monitoring to address questions of mutual interest to NPS and FWC. Authorship rights to publications resulting from such collaboration, consultation, and cooperation shall follow the guidelines in Dickson, J. G., R. C. Conner,

and K. T. Adair. 1978. Guidelines for Authorship of Scientific Articles. Wildlife Society Bulletin 6:260-261

8. NPS and FWC shall have the opportunity to review and comment upon each other's research and monitoring proposals when related to fish and wildlife in the Preserve and the Addition prior to commencement of the research and monitoring.
9. FWC and NPS shall freely exchange with each other, upon request and in consideration of the Freedom of information Act and Florida's public records law, their biological data about flora and fauna of the Preserve and the Addition and shall acknowledge use of the other's data in any publication of such data.
10. The NPS shall facilitate reasonable access to the Preserve and the Addition by the FWC for ecological research and natural resource monitoring of mutual interest to NPS and FWC.
11. NPS and FWC shall permit the harvest of fish and wildlife by the public in such areas of the Preserve and the Addition as provided for in the aforementioned Acts of Congress.
12. Areas within the Preserve and the Addition where public hunting, fishing, and other activities associated with taking or possession of fish and wildlife are allowed shall be open for said activities as provided by and in accordance with all applicable federal and state statutes, rules or regulations.
13. This Agreement recognizes the authority of the Preserve Superintendent to promulgate regulations and implement management limits and controls as they relate to public access, including but not limited to actions in response to changing resource conditions during emergencies as described in paragraph 19 below, but in any case where such actions relate to fish and wildlife management or the taking of fish and wildlife or associated activities, these actions shall be promulgated in collaboration, consultation, and cooperation with FWC.

14. All state licenses and permits required under State law shall be required for public hunting, fishing and activities associated with the taking or possession of game fish and wildlife species in the Preserve and the Addition.
15. FWC shall consult with and secure the concurrence of NPS before establishing any regulation of fishing, hunting, and other activities associated with the taking or possession of game fish and wildlife on the Preserve and the Addition.
16. FWC shall provide law enforcement support for sufficient enforcement of FWC regulations effective in the Preserve and the Addition. Furthermore the FWC and NPS will develop and adopt a specific Memorandum of Understanding that sets forth the procedures for mutual aid and law enforcement in the Preserve and the Addition.
17. FWC and NPS shall act in good faith and as true partners to resolve disagreements that may arise in the implementation of this Agreement. In the event of a disagreement, the parties agree to contact each other in a timely manner and make a reasonable effort resolve the conflict at the lowest level. Should elevation of the dispute become necessary, the Superintendent and Executive Director will serve as final decision makers on behalf of their respective agencies in resolving points of disagreement within a mutually agreed upon time frame and as expeditiously as possible.
18. NPS and FWC will collaborate, consult, and cooperate on the development of news releases and/or public comments to the media concerning fish and wildlife, access, recreation, law enforcement, and emergencies that may affect the Preserve and Addition. Additionally NPS and FWC will collaborate, consult, and cooperate on outreach that may pertain to other related areas of mutual interest.
19. When necessary to address emergencies, NPS may issue regulations or orders to restrict or prohibit public use and access in the Preserve and the Addition or portions thereof. With the concurrence of NPS, FWC may issue regulations or orders to restrict or prohibit hunting or fishing or other activities associated with the taking of fish and wildlife in the Preserve and the Addition or portions thereof. When practicable,

regulations and orders of the nature referenced in this provision should be jointly or cooperatively issued.

20. FWC and NPS shall enter into a separate agreement to render mutual assistance as practicable in times of emergency or natural disaster affecting the Preserve or its employees.
21. FWC and NPS may enter into separate working arrangements as occasion demands for the use of lands, buildings, equipment and other facilities owned and operated by either party.
22. FWC and NPS shall assist each other in supporting and defending mutually agreed rules, regulations and policies relating to the Preserve and the Addition.
23. The Superintendent and the Executive Director or their designees will meet at least annually to insure that the provisions of the cooperative partnership established under this Agreement are being fully implemented and to identify any measures necessary to improve this cooperative partnership.
24. Modifications to this Agreement may be made through mutual consent of the NPS and FWC as approved by the Superintendent and the Executive Director
25. Termination of this agreement shall be by mutual consent of the NPS and FWC as executed by the Superintendent and the Executive Director.

WHEREFORE, the Parties hereto, through their designated Representatives, have executed this Agreement on the last date listed and signed below.



Pedro Ramos
Superintendent
Big Cypress National Preserve



Nick Wiley
Executive Director
Florida Fish & Wildlife Conservation Commission

Appendix C

Big Cypress Wildlife Management Area Regulations Summary and Area Map (July 1, 2011 - June 30, 2012)

2011-
2012
Hunting
Season

Big Cypress

Wildlife Management Area

Regulations Summary and Area Map
July 1, 2011 - June 30, 2012



A cooperative public wildlife and recreational area

National Park Service



Florida Fish and Wildlife
Conservation Commission

MyFWC.com

This brochure is designed to provide the public with information and a summary of regulations pertaining to hunting and other recreational use on the Big Cypress Wildlife Management Area. **Regulations that are new or differ substantially from last year are shown in bold print.** Area users should familiarize themselves with all regulations. For exact wording of the wildlife laws and regulations, see the Florida Fish and Wildlife Conservation Commission's wildlife code, on file with the Secretary of State and state libraries. This brochure, the Florida Hunting Regulations handbook and quota permit worksheets should provide the information necessary for you to plan your hunting activities. These publications are available from any Commission office, county tax collector and at MyFWC.com.

Persons using wildlife management areas are required to have appropriate licenses, permits and stamps. The following persons are exempt from all license and permit requirements (except for quota permits when listed as "no exemptions," recreational use permits, antlerless deer permits and the Migratory Bird Hunting and Conservation Stamp [federal duck stamp]): Florida residents who are 65 years of age or older; residents who possess a Florida Resident Disabled Person Hunting and Fishing Certificate; residents in the U.S. Armed Forces, not stationed in Florida, while home on leave for 30 days or less, upon submission of orders; and children under 16 years of age. Children under 16 years of age are exempt from the federal duck stamp. Anyone born on or after June 1, 1975 and 16 years of age or older must have passed a Commission-approved hunter-safety course prior to being issued a hunting license, except the Hunter Safety Mentoring exemption allows anyone to purchase a hunting license and hunt under the supervision of a licensed hunter, 21 years of age or older, for one year.

Licenses and permits may be purchased from county tax collectors, license agents, at MyFWC.com/license or by telephone at 1-888-486-8356. A no-cost Migratory Bird Permit is available when purchasing a hunting license. Any waterfowl hunter 16 years of age or older must possess a federal duck stamp; available where hunting licenses are sold, at most post offices or at duckstamp.com.

QUOTA PERMIT INFORMATION:

Muzzleloading Gun (first 9 days) – 200 (Bear Island Unit), no-cost, quota permits.
General Gun (first 9 days) - 200 (Bear Island Unit), 500 (Turner River Unit), no-cost, quota permits.

Permit applications: Hunters must submit electronic applications for quota and special-opportunity permits through the Commission's Total Licensing System (TLS). Worksheets listing hunts, application periods, deadlines and instructions are available at county tax collector's offices, FWC offices or MyFWC.com. Quota application periods occur throughout the year beginning April 1; please refer to the hunting handbook or MyFWC.com for specific dates. Worksheets will be available about 2 weeks prior to each application period.

Guest hunters: For each non-transferable archery, muzzleloading gun, general gun, wild hog, spring turkey and mobility-impaired quota permit issued through the Commission's TLS, only one guest permit may be obtained. The following persons may be a guest hunter, but are not required to obtain a guest permit: a youth under 16 years of age, a youth supervisor, a mentor license holder or a mentor license supervisor. A quota permit holder (host) may only bring 1 guest hunter at a time. The following persons are not considered to be guest hunters: other quota permit holders, non-hunters and exempt hunters (on areas and during seasons that allow exemptions). The host must share the bag limit with the guest and the host is responsible for violations that exceed the bag limit. The guest and host must enter and exit the area together and must share a street-legal vehicle while hunting on the area; ATVs may be ridden independently, if allowed on the area. The guest may only hunt while the host is on the area. A person is only eligible for one guest permit per hunt. Guest permits may only be obtained from license agents or county tax collector's offices. Guest permits may be obtained up to and during the last day of the hunt. Refer to the quota hunt worksheets for additional information.

Youth and mentor license holders: A youth hunter (less than 16 years of age) must be supervised by a person at least 18 years of age. A mentor license holder must be supervised by a licensed hunter at least 21 years of age. Unless exempt, only those supervisors with proper licenses and permits may hunt. If the supervisor is hunting during any hunt (not including special-opportunity) for which quota permits are issued, at least one person in the party must be in possession of a quota permit. During a hunt that allows exemptions, a non-exempt supervisor of a youth must have a quota permit to hunt. A non-hunting supervisor is allowed to accompany a youth or mentor license holder during any hunt (including special-opportunity).

Transfer of permits: Quota and guest permits are not transferable. Except for youth under 16 years of age, a positive form of identification is required when using a non-transferable permit. The sale or purchase of any quota permit or guest permit is prohibited.

NATIONAL PARK SERVICE OFF-ROAD VEHICLE (ORV) PERMIT:

Vehicle operators must be state licensed (regular or learner's permit) and obtain an ORV operator's permit from the NPS for all vehicles, including airboats, used off-road on the Big Cypress Wildlife Management Area. All ORVs and their operators must be permitted and the vehicles inspected prior to operation in the preserve. The ORV permit is issued for the vehicle, but NPS maintains record of applicant and ownership information for each permitted ORV. Vehicle operators are responsible for knowing National Park Service regulations that apply to ORV use in the preserve. Please contact the Big Cypress National Preserve ORV Office, 33100 Tamiami Trail East, Ochopee, FL 34141, 239-695-1205, regarding vehicle use regulations or at nps.gov/bicy/planyourvisit/orv-use.htm. The National Park Service ORV permit is available at the Oasis Visitor Center.

GENERAL AREA REGULATIONS:

All general laws and regulations relating to wildlife and fish shall apply unless specifically exempted for this area. Hunting or the taking of wildlife or fish on this area shall be allowed only during the open seasons and in accordance with the following regulations:

1. Any person hunting deer or accompanying another person hunting deer shall wear at least 500 square inches of daylight fluorescent-orange material as an outer garment, above the waistline. These provisions are not required when hunting with a bow and arrow during archery season.
2. Taking of spotted fawn, swimming deer or roasted turkey is prohibited. Species legal to hunt are listed under each season.
3. It is illegal to hunt over bait or place any bait or other food for wildlife on this area.
4. Driving a metal object into any tree, or hunting from a tree into which a metal object has been driven, is prohibited.
5. No person shall cut, damage or remove any natural, man-made or cultural resource without written authorization of the landowner or primary land manager.
6. Taking or attempting to take any game with the aid of live decoys, recorded game calls or sounds, set guns, artificial light, net, trap, snare, drug or poison is prohibited. Recorded calls and sounds can be used to hunt furbearers, wild hog and crows.
7. The wanton and willful waste of wildlife is prohibited.
8. Hunting, fishing or trapping is prohibited on any portion of the area posted as closed to those activities.
9. People, dogs, vehicles and other recreational equipment are prohibited in areas posted as "Closed to Public Access" by FWC administrative action.
10. Taking or herding wildlife from any motorized vehicle, aircraft or boat which is under power is prohibited, until power and movement from that power, has ceased.

11. Most game may be hunted from ½ hour before sunrise until ½ hour after sunset (see exceptions under each season).
12. The release of any animal is prohibited, without written authorization of the landowner or primary land manager.
13. The head and evidence of sex may not be removed from the carcass of any deer or turkey on the area.
14. The planting or introduction of any non-native plant is prohibited, without written authorization of the landowner or primary land manager.
15. Wild hog may not be transported alive.
16. Littering is prohibited.
17. It is unlawful to set fire to any forest, grass or woodlands.
18. A Fish and Wildlife Conservation Commission Law Enforcement Officer may search any camp, vehicle or boat, in accordance with law.
19. Falconers may hunt during the statewide falconry season anytime a management area is open for public access. Falconers are not exempt from quota permits during hunts requiring them.
20. Construction of buildings or other structures is prohibited, unless permitted by the National Park Service.
21. Cutting or damaging fences used to contain animals (including cattle fences) is a felony of the third degree.
22. The collection of plants, rocks, minerals, animal life or other natural objects is allowed only in accordance with written permits obtained in advance from the National Park Service.

PUBLIC ACCESS AND VEHICLES:

1. Open to public access year round.
2. All vehicles and airboats used off-road on the Big Cypress Wildlife Management Area shall have a National Park Service ORV permit. See NATIONAL PARK SERVICE OFF-ROAD VEHICLE (ORV) PERMIT section, page 1.
3. To access the Bear Island Unit, all persons shall enter and exit the area at the Bear Island check station on the north end of Turner River Road or at the I-75 walk-in only access check station, located north of I-75 in the southeast portion of the Bear Island Unit.
4. Vehicle use on Eleven-mile Road or the Florida Trail is prohibited; however, vehicles may cross Eleven-mile Road at marked designated crossing points. Maps are available at the Visitor Center.
5. On Jetport Road, only vehicles with pneumatic tires may be operated and parked vehicles are prohibited.
6. Parked vehicles may not obstruct a road, gate or firelane.
7. No motor vehicle shall be operated on any part of any wildlife management area that has been designated as closed to vehicular traffic.
8. All airboats must be equipped with an orange flag at least 10 inches wide and 12 inches long and displayed at a minimum height of 10 feet above the bottom of the vessel.
9. Public access inside any fenced portion of the Jetport property is prohibited.

HUNTERS AND CHECK STATIONS:

1. **Hunting deer in Zone 4 of the Stairsteps Unit is prohibited.**
2. **In Zone 3 of the Stairsteps Unit harvested deer must have at least one antler having 2 or more points (each point 1-inch or more in length) and at least one antler 5 inches or more in length. Bag limit for deer in Zone 3 is 1 annually.**
3. All hunters shall check in at a designated check station when entering the area, retain in their possession a check station pass while hunting and check out at the same check station when exiting the area and shall check all game taken.
4. Hunters using the Bear Island Unit shall enter and exit only at the designated entrance at the north end of Turner River Road or designated entrances along I-75. The I-75 entrances are walk-in only and equipped with self-service check stations.
5. Deer, wild hog and turkey may be divided or consumed in the field, but each portion shall be identified with the license number of the person who took the game and be readily traceable to the portion of the animal bearing sex identification.
6. It is important that game stay intact as much as possible and be brought to the check station as soon as possible. Important biological data are obtained from the following animals and parts: deer (head, heart, kidney, and liver), hog (head) and turkey (wings and tail). If game is processed in the field, the above items should be brought to the check station along with the meat.
7. Deer jawbones shall be saved and brought to the check station.
8. Hunting equipment and dogs may be taken onto the WMA after 8 a.m. the day before the opening of a season and shall be removed by 6 p.m. one day after the end of the season, but see #6 under the DOGS section and #s 4 and 16 under the NATIONAL PARK SERVICE RULES AND INFORMATION section.
9. Licensed hunters are allowed to take Reptiles of Concern incidental to lawful hunting activities during established hunting seasons.
10. Reptiles of Concern shall not be transported alive from the area. Please report all take of Reptiles of Concern at 866-392-4286 or at MyFWC.com.

GUNS:

1. All firearms shall be securely encased and in a vehicle, vessel, camper or tent, during periods when they are not a legal method of take. Persons in possession of a valid Concealed Weapon or Firearm License may carry concealed handguns.
2. Target practice is prohibited.
3. Hunting or the display or use of a gun in a manner capable of taking wildlife on or from the rights-of-way of Burns Road; County Roads 839, 841, 837; State Roads 84 (I-75) or 94; or U.S. 41 is prohibited.

4. In the Deep Lake Unit, only muzzleloading guns, bows or raptors may be used. Muzzleloading guns may only be used in the Deep Lake Unit during the small game season.
5. Hunting with a gun and light is prohibited, except see #10 under the NATIONAL PARK SERVICE RULES AND INFORMATION section.
6. Muzzleloading guns used for taking deer must be .40 caliber or larger, if firing a single bullet, or be 20 gauge or larger if firing two or more balls.
7. Children under the age of 16 may not be in possession of a firearm unless in the presence of a supervising adult.
8. No person shall have a gun under control while under the influence of alcohol or drugs.
9. For hunting non-migratory game, only shotguns, rifles, pistols, bows, crossbows or falconry may be used. **Hunting during the spring turkey season with firearms other than shotguns or using a shot size larger than #2 is prohibited.**
10. For hunting migratory game, only shotguns, bows or falconry may be used. Shotguns shall not be larger than 10 gauge and shall be incapable of holding more than three shells in the magazine and chamber combined.
11. Firearms using rimfire or non-expanding, full metal jacket (military ball) ammunition are prohibited for taking deer.
12. Fully automatic or silencer-equipped firearms, centerfire semi-automatic rifles having a magazine capable of holding more than five rounds, explosive or drug-injecting devices and set guns are prohibited.

DOGS:

1. Hunting deer or wild hog with dogs is prohibited.
2. The possession of dogs is prohibited, except bird dogs or retrievers are allowed for hunting purposes only.
3. Dogs are prohibited in the Loop Unit.
4. No person shall allow any dog to pursue or molest any wildlife during any period in which the taking of wildlife by the use of dogs is prohibited.
5. Leashed dogs may not be used for trailing wounded game.

CAMPING:

1. Camping is allowed in accordance with the regulations of the National Park Service. See the NATIONAL PARK SERVICE RULES AND INFORMATION section for additional camping rules.
2. Primitive camping is not limited to designated campsites except in Bear Island Unit and in Zone 4 when the campsite is accessed by airboat.
3. Camping on Bear Island Unit is allowed at designated campsites only; only tents, trailers and self-propelled camping vehicles may be used in the Bear Island Campground. Only tents may be used in the Gator Pit and Pink Jeep Trail designated campsites.
4. Draining or dumping refuse or waste from any trailer or other vehicle is prohibited.
5. Fires are allowed only on designated camping areas or in backcountry campsites and must be completely extinguished prior to the user leaving the campsite.

BAG AND POSSESSION LIMITS: During quota hunts, host hunter and guest must share all bag and possession limits.

1. **Deer - Daily limit 1, annual limit 2 (all seasons combined), except in Zone 3 of the Stairsteps Unit where the bag limit for deer is 1 annually. Hunting deer in Zone 4 is prohibited.**
2. Wild hog - Daily limit 1, annual limit 2 (all seasons combined).
3. Turkey - Daily limit 1, season limit 2, possession limit 2.
4. Gray squirrel, quail and rabbit - Daily limit 12, possession limit 24 for each.
5. Raccoon, opossum, armadillo, beaver, coyote, skunk and nutria - No bag limits.
6. Bobcat and otter - Prohibited.
7. Migratory birds - See Migratory Bird Hunting Regulations pamphlet.

ARCHERY SEASON:

September 3 through October 2 (all Units).

November 12 through January 1 (Deep Lake Unit only).

Permit, Stamp and License Requirements - Check station pass, hunting license, management area permit, archery permit, deer permit (if hunting deer), migratory bird permit (if hunting migratory birds) and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - **Deer with at least one antler 5 inches or more in length, except in Zone 3 of the Stairsteps Unit deer must also have at least one antler having 2 or more points (each point 1-inch or more in length),** wild hog with shoulder height of 15 inches or more, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.

Regulations Unique to Archery Season - In addition to these regulations, all General Area Regulations shall apply.

1. Hunting with firearms or crossbows (except by disabled crossbow) is prohibited, except that centerfire shotguns are allowed for taking migratory birds when one or more species are legal to hunt in all units except Deep Lake Unit (see Migratory Bird section and the current Migratory Bird Hunting Regulations pamphlet).
2. Duck hunting is prohibited in the Bear Island and Deep Lake Units during the special September season.
3. **Hunting deer in Zone 4 of the Stairsteps Unit is prohibited.**

MUZZLELOADING GUN SEASON:

October 8-23 (except Deep Lake Unit).

Permit, Stamp and License Requirements - Quota permit (if hunting Bear Island Unit Oct. 8-16), check station pass, hunting license, management area permit, muzzleloading gun permit, deer permit (if hunting deer), and migratory bird permit (if hunting migratory birds).

Legal to Hunt - **Deer with at least one antler 5 inches or more in length, except in Zone 3 of the Stairsteps Unit deer must also have at least one antler having 2 or more points (each point 1-inch or more in length), wild hog with shoulder height of 15 inches or more, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.**

Regulations Unique to Muzzleloading Gun Season - In addition to these regulations, all General Area Regulations shall apply.

1. Hunting with archery equipment or firearms, other than muzzleloading guns, is prohibited, except that centerfire shotguns are allowed for taking migratory birds when one or more species are legal to hunt in all units except Deep Lake Unit (see Migratory Bird section and the current Migratory Bird Hunting Regulations pamphlet).
2. **Hunting deer in Zone 4 of the Stairsteps Unit is prohibited.**

GENERAL GUN SEASON:

November 12 through January 1 (except Deep Lake Unit).

Permit, Stamp and License Requirements - Quota permit (if hunting Nov. 12-20 in the Bear Island or Turner River Units), check station pass, hunting license, management area permit, deer permit (if hunting deer) migratory bird permit (if hunting migratory birds) and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - **Deer with at least one antler 5 inches or more in length, except in Zone 3 of the Stairsteps Unit deer must also have at least one antler having 2 or more points (each point 1-inch or more in length), wild hog with a shoulder height of 15 inches or more, gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.**

1. Regulations Unique to General Gun Season - In addition to these regulations, all General Area Regulations shall apply. **Hunting deer in Zone 4 of the Stairsteps Unit is prohibited.**

SMALL GAME SEASON:

January 2 through February 1.

Permit, Stamp and License Requirements - Check station pass, hunting license, management area permit, migratory bird permit (if hunting migratory birds), and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - Gray squirrel, quail, rabbit, raccoon, opossum, armadillo, beaver, coyote, skunk, nutria and migratory birds in season.

Regulations Unique to Small Game Season - In addition to these regulations, all General Area Regulations shall apply.

1. In the Deep Lake Unit, only muzzleloading guns, bows or raptors may be used.
2. Hunting with centerfire rifles is prohibited.

TRAPPING: Prohibited.

SPRING TURKEY SEASON:

March 3 through April 8.

Permit, Stamp and License Requirements - Check station pass, hunting license, management area permit and wild turkey permit.

Legal to Hunt - Bearded turkey or gobbler.

Regulations Unique to Spring Turkey Season - In addition to these regulations, all General Area Regulations shall apply.

1. In the Deep Lake Unit, only muzzleloading guns, bows or raptors may be used.
2. Legal shooting hours are ½ hour before sunrise until 1 p.m.
3. Hunting other animals is prohibited.
4. **Hunting with firearms other than shotguns or using a shot size larger than #2 is prohibited.**

MIGRATORY BIRD SEASONS:

Duck may be hunted during the special September season in all units except Bear Island and Deep Lake units. Rail, common moorhen, mourning dove, white-winged dove, snipe, duck, geese, coot, woodcock and crow may be hunted during seasons established by the Commission for these species that coincide with the archery, muzzleloading gun, general gun or small game seasons.

Permit, Stamp and License Requirements - Quota permit (if hunting during any quota period), check station pass, hunting license, management area permit, migratory bird permit, and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - See Migratory Bird Hunting Regulations pamphlet.

Regulations Unique to Migratory Bird Seasons - In addition to these regulations, all General Area Regulations and Migratory Bird Regulations shall apply.

1. Hunting with bird dogs or waterfowl retrievers is allowed except in the Loop Unit.
2. Hunting duck, geese and coot with lead shot is prohibited.
3. Centerfire shotguns are allowed for hunting during established area seasons when one or more migratory birds are legal to hunt, except in the Deep Lake Unit.

FISHING AND FROGGING:

Allowed year round.

Permit, Stamp and License Requirements - Fishing license (not required when frogging).

Legal to Take - See Florida Freshwater Fishing Regulations Summary.

Regulations Unique to Fishing and Frogging - All General Area Regulations and General Freshwater Fishing Regulations shall apply. Frogs may be taken by gig only. See #s 13, 14 and 15 in the NATIONAL PARK SERVICE RULES AND INFORMATION section.

GENERAL INFORMATION:

1. Information for persons with disabilities can be found at MyFWC.com/ADA
2. If you have any questions about this material, please call the Fish and Wildlife Conservation Commission South Region Office at 561-625-5122 (TDD 800-955-8771).
3. Small tracts of private property are located within the boundary of the wildlife management area. These lands may be posted against trespass and should not be considered to be part of the wildlife management area.

NATIONAL PARK SERVICE RULES AND INFORMATION:

This area is a national preserve and Big Cypress National Preserve regulations shall apply. For further information, contact the Big Cypress National Preserve, 33100 Tamiami Trail East, Ochopee, Florida 34141, 239-695-1205 or nps.gov/bicy/.

1. Time limits apply to camping. Please contact Big Cypress NP for current camping regulations and limitations on the maximum number of days an individual may camp.
2. Backcountry camping in the Bear Island Unit is allowed only at designated campsites: Gator Pit and Pink Jeep Trail sites.
3. Backcountry camping in Zone 4 is allowed as follows: Airboat users must camp in designated campsites only. Those gaining access by foot or non-motorized vessels may camp anywhere as long as the campsite is at least ½ mile from Loop Road and ¼ mile from any designated campsite or airboat trail.
4. Except for Zone 4, during archery, muzzleloading gun, general gun and spring turkey hunting seasons, an individual may camp or leave camping gear unattended for the length of the season in backcountry areas and the designated campsites in Bear Island, Gator Pit and Pink Jeep Trail, provided such equipment / camps are marked with the owner's name, address and telephone number. Sites / equipment may be occupied after 8 a.m. one day before the opening of the season and must be removed by 6 p.m. one day after the close of that season.
5. Dead wood lying on the ground may be collected as fuel for campfires within the preserve. This wood cannot be removed from the Preserve.
6. Primitive campsites must be located at least ½ mile from and out of sight of designated state or county roads.
7. All backcountry users are required to have a backcountry use permit (free).
8. Consumption of alcohol or possession of an open container of alcohol in or on a motor vehicle, including off-road vehicles and airboats, is prohibited.
9. All private property owners in the preserve are required to obtain a burn permit in advance from the Florida Division of Forestry by calling 239-690-3502 between 9 a.m. and 4:30 p.m. Call Big Cypress Dispatch at 800-788-0511 on the day of the burn to avoid false reports of fire caused by others reporting your smoke.
10. The preserve is closed to the viewing of wildlife with an artificial light, except that artificial lights may be used during frogging activities.
11. It is prohibited to destroy, injure, deface, remove, dig or disturb from their natural state living or dead wildlife, fish, plants, non-fossilized and fossilized paleontological specimens, cultural or archaeological resources or the parts of each thereof.
12. The taking, feeding or intentional disturbance of wildlife (including snakes and other reptiles) is prohibited except as authorized by specific hunting regulations.
13. Frogging regulations: 1) Commercial frogging is prohibited; 2) frogs may be taken by gig only; 3) the daily bag limit is one five-gallon bucket per vessel or individual; and 4) the possession limit is 18 lbs of dressed frog legs. Recreational frogging for personal use is allowed.
14. Fishing in freshwater must be by hook and line.
15. Fishing is prohibited in the canal on the north side of U.S. Highway 41 in front of the Oasis Visitor Center for a distance of 200 yards east and west from a midpoint located directly opposite of the front door of the building and the Turner River Canal from the bridge on U.S. Highway 41 to 1/10 of a mile North.
16. During archery, muzzleloading, general gun and spring turkey seasons an individual may leave treestands or similar devices unattended for the length of the specific season provided such equipment is marked with the owner's name, address and telephone number. Individuals may bring this equipment into the preserve after 8 a.m. one day before the opening of the specific season and must be removed by 6 p.m. one day after the close of that season.
17. Off-road vehicle use is prohibited between 10 p.m. and 5 a.m.
18. Target practice or random discharge of firearms is prohibited.

COOPERATION REQUESTED:

If you see law violators or suspicious activities, contact your nearest Commission regional office or call 1-888-404-FWCC. You may qualify for a cash reward from the Wildlife Alert Reward Association.

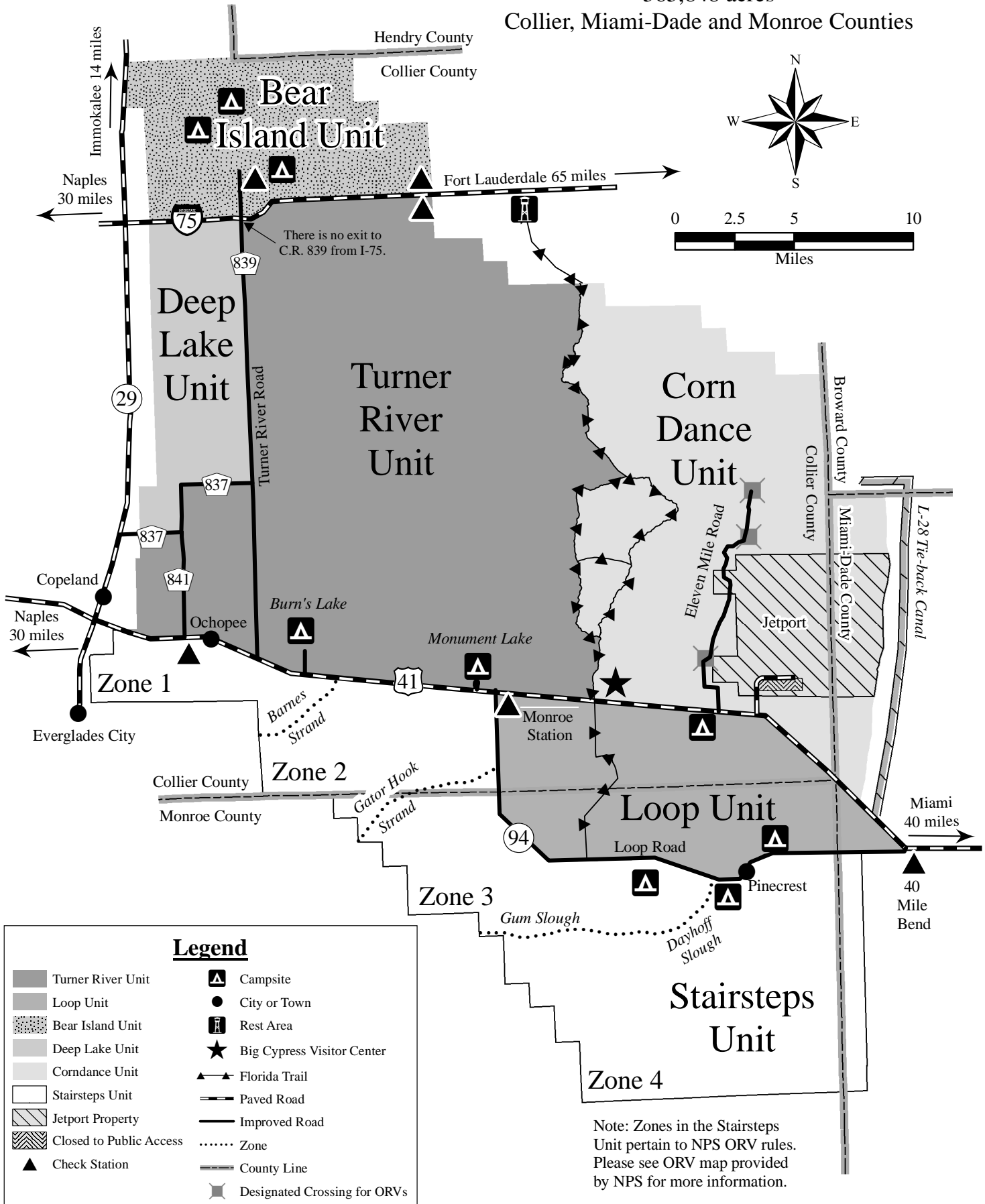
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BIG CYPRESS

WILDLIFE MANAGEMENT AREA

565,848 acres

Collier, Miami-Dade and Monroe Counties



Appendix D

Adaptive Management

ADAPTIVE MANAGEMENT

Adaptive management could be an effective approach to managing hunting in the Preserve because:

- Adaptive management allows stakeholders to confront unresolved issues that can influence management performance. An adaptive approach provides a framework for making good decisions in the face of uncertainties and a formal process for reducing uncertainties so that management performance can be improved over time.
- The adaptive management strategy requires a commitment to developing a collaborative decision framework that includes stakeholders with different perspectives. Developing a collaborative group focused on recreational harvest in the Preserve is dependent upon stakeholder groups committing to a decision process because they agree that it is participatory and fair.
- Agencies whose actions may affect federally listed endangered species (under the *Endangered Species Act*) should design monitoring programs with input from USFWS and/or National Oceanic and Atmospheric Administration-National Marine Fisheries Service. Learning by doing – the critical centerpiece of adaptive management – is particularly important in *Endangered Species Act* situations, where cause and effect can be particularly difficult to ascertain.
- The amount of uncertainty about the effects of water withdrawals, altered fire regime, the rate of game harvest, and exotic plants and animals on game populations is relatively high, and the amount of potential agency control options over these issues is also high.

ADAPTIVE MANAGEMENT OF DEER HARVEST

Both the NPS and the FWC recognize that there is an opportunity to develop a better understanding of how the annual deer population interacts with other environmental influences to determine deer population densities in subsequent years. The adaptive management process builds upon the cooperative relationship for monitoring and managing the Preserve deer hunt that has functioned consistently since at least 1982 (NPS 1983). Over time this relationship has grown from cooperative staffing of deer hunt check stations (Ann. Report 1983), to include cooperative management of all wildlife populations (Adams and Bozzo 2002) and the development of a process for monitoring deer populations from aircraft (Garrison et al. 2009). Three decades of monitoring has revealed a large amount of variability in deer harvest success rates (number of deer harvested per man day of effort) among compartments in a single year and within units across years. These observations have been used to adjust the harvest of deer in different management units.

The Preserve has consistently sustained a deer population since its establishment in 1974, with shifts in abundance of deer potentially affected by droughts, floods, tropical storm events, predation, and disease. The Preserve is an integral part of an expanding group of state and federal preserves which are supporting the recovering population of Florida panthers, as discussed in chapter 3 (“Existing Conditions”). Deer are the main food source for panthers, and are critical forage for reproductive female panthers (Land, 1994; USFWS, 2008). Environmental conditions in and around the Preserve continue to change. Human development continues and is accompanied by increased alteration of the regional watershed. Expansion of protected areas has also occurred. The Southwest Florida Feasibility Study recommends a large number of infrastructure alterations focused on addressing flood protection, water supply, and the ecological health of the Big Cypress

Watershed, and both the scale of human development and the scale of proposed infrastructure alterations are likely to be large enough to impact deer populations in/around the Preserve. This EA outlines the primary management strategy that will be used to support the deer population in the Preserve for the next 15 to 20 years. The elements of the adaptive management strategy in alternative 3 are intended to reduce conflicts among agencies and stakeholders, ensure compliance with the *Endangered Species Act*, and systematically enhance the level of certainty about how regulated deer harvests affect deer populations in the context of a dynamic regional condition.

Double Loop Learning Process

The adaptive management framework is focused on the “double loop” learning process (described in Williams et al. 2009) (figure 1). The first loop occurs annually and is focused on the use of monitoring information to determine whether deer harvest should be increased or decreased in the different management compartments. This learning loop has been a feature of the traditional consultation between the NPS and the FWC. The second learning loop occurs on longer time increments (5 to 10 year basis, or when viewed as necessary by stakeholders) and is focused on clearly describing the existing challenges to managing the deer population (i.e. problem formulation), identification of objectives, and working with stakeholders to develop a participatory decision-making process. This adaptive management strategy identifies how existing cooperative efforts can be enhanced over time to fulfill the goals of increasing stakeholder participation, documenting the decision-making process, ensuring that *Endangered Species Act* requirements are met, and increasing the precision of the management of hunting in the Preserve.

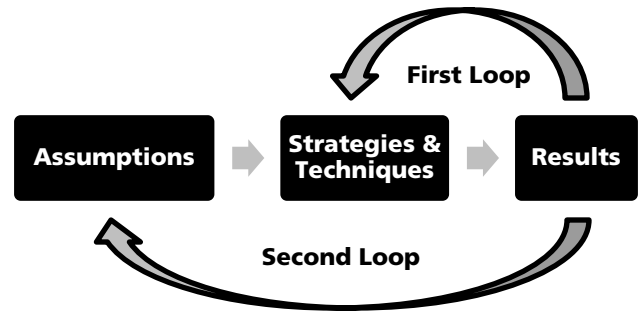


Figure 1 – Double Loop Learning Process

ADAPTIVE MANAGEMENT – DEFINITION, VOCABULARY, AND UTILITY

The operational definition of Adaptive Management is:

Adaptive management [is a decision process that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a ‘trial and error’ process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders. (Williams et al. 2009)

This definition is important because it sets the expectations for the adaptive management process for all parties who participate. There should be no expectation that management decisions will be perfect, that monitoring processes will be ideal, or that the effects of management decisions will be fully comprehensible. Instead adaptive management is based on the recognition that the best way to reduce risk is to learn, that learning in groups is essential, and that a documented process of sharing information is an effective strategy to facilitate learning while simultaneously reducing conflict. Participating in an adaptive management process is useful for agencies that operate under different regulatory authorities because it offers agencies the opportunity to document the perspective of their agency, stakeholders the opportunity to document their concerns, and management decisions to be made in the context of these deliberations. The requirement for clear communication and documentation of methods and decisions in an adaptive management enterprise is higher than traditional decision-making processes, but this requirement is thought to be essential for diffusing conflicts that might arise in the future.

“The premise of an adaptive management approach is that the behavior of resource systems is uncertain but management is required anyway, and the reduction of uncertainty over time can lead to better management.” (Williams et al. 2009)

Recognizing uncertainty is essential for adaptive management processes to function. In fact, the recognition of different types of uncertainty is the essential aspect of implementing an adaptive management strategy. The challenge is often getting groups with divergent perspectives/authorities to adopt a common perspective and vocabulary for discussing uncertainty. Four types of uncertainty affect hunting management policies in the Preserve: partial control, partial observability, environmental variation, and structural uncertainty (figure 2). Partial control limits the influence of management actions. Environmental variation affects resource system status and dynamics. Partial observability limits the recognition of system

status. Structural uncertainty limits the ability to characterize system change. Regular discussions with key stakeholder groups appear to be the most effective strategy for developing this common perspective and vocabulary.

NPS and FWC scientists and managers who work in the Preserve have long recognized that they have only partial control of the Preserve resource system. While hunting management policies can be clearly designed and communicated, the enforceability of no-hunt policies or harvest limits is subject to budget constraints, chance, and the acceptance of these policies by private individuals who wish to harvest deer. If policies were universally accepted, there would be no need for enforcement. Adaptive management processes are predicated on the idea that private individuals are more likely to accept policies that they understand and that stakeholder discussions are an effective, legal method for systematically enhancing public understanding of management decisions over time. The common theme throughout adaptive management is that focusing on causal drivers is the most effective long-term strategy for improving outcomes of a complex system that is unlikely to be completely understood by all participants. Open communication and facilitated learning are the most direct way to address the challenge of public acceptance of policy changes.

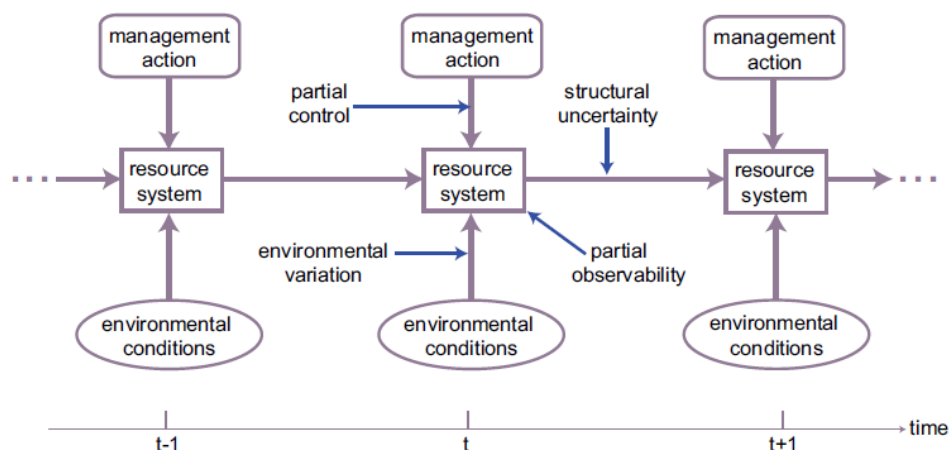


Figure 2 – Uncertainty Sources in Natural Resource Management

Source: Adapted from Williams et al. 2009, figure 5.2.

There is clear documentation of the effect of environmental variation on deer populations. Verme et al. (1969) identified both floods and droughts as affecting deer negatively. MacDonald-Beyers and Labisky (2005) identified tropical storm events in the Preserve as directly killing adult deer (50% of a radio-collared population), and driving flood events that reduced levels of reproduction 10-fold in the following breeding season. McCown et al. (1991) recognized that forage quality reduced deer health, identified the southwestern Preserve as poorer habitat than the northwestern Preserve, and recommended prescribed fire be used to increase the amount, availability, and mineral content of forage. Indicators of reduced habitat quality in the southwestern Preserve included higher parasite loads (indicated by Abomasal Parasite Counts), fewer twin fawns birthed, and a lower mean live weight of 2.5 year old deer than in the northwestern Preserve. The challenge for the adaptive management strategy seems to be helping both agencies and stakeholders recognize the value of environmental variation in supporting the resilience of natural systems, the need for a conservative approach to deer harvest management when the background levels of environmental variation are shifting, and situations when environmental variation is negative for deer but may be necessary for supporting other management goals. Ongoing stakeholder discussions and the second loop

of learning (redefining problem statements, objectives, updating conceptual models) is the appropriate part of the adaptive management process for focusing stakeholder discussions on the variety of factors that can influence deer population health and documenting the different perspectives that stakeholders may have about which factors are more important for determining optimal harvest rates in different areas.

Partial observability will likely be an ongoing challenge to the adaptive management strategy. National Park Service and FWC scientists and managers are quite familiar with this aspect of monitoring deer populations in the Preserve. Continuing to nurture the process of developing better methods for estimating deer population densities (as described by Garrison et al. 2009) seems appropriate, and consistent support for investigations that are focused on issues occurring at different spatial and temporal scales is the recommended path forward for the adaptive management process. Since all forms of monitoring and research are inherently limited, the most efficient strategy is conducting complementary investigations. The highest level of confidence in management actions occurs when different approaches discover similar patterns or provide support for one or more hypothesized causal mechanisms. The discussion presented by McCown et al. (1991) is the most direct

example of how scientists use different types of information to form management recommendations. Often the solutions available for uncertainties caused by partial observability are closely related to the solutions that are implemented for structural uncertainties (i.e. lack of understanding of precisely how the ecological system works to determine deer population levels).

CONCEPTUAL ECOLOGICAL MODEL

The first step in addressing the uncertainties that could affect management decisions is summarizing what is known about a system as a conceptual ecological model. Duever (2005) developed a conceptual ecological model for

Big Cypress, and the symbology developed by Duever has been used to create a conceptual ecological model focused on the deer harvest in the Preserve (figure 3). Ideally, a conceptual ecological model contains all of the possible drivers, stressors, ecological effects and attributes that are considered in a management decision. Attributes are aspects of the deer harvest that are monitored and are likely to change as a consequence of a management decision. Ecological effects are specific non-human events that affect attributes. Stressors are aspects of the system that may alter its properties through their influence on ecological effects, and drivers are large-scale processes that are known to influence system-level properties.

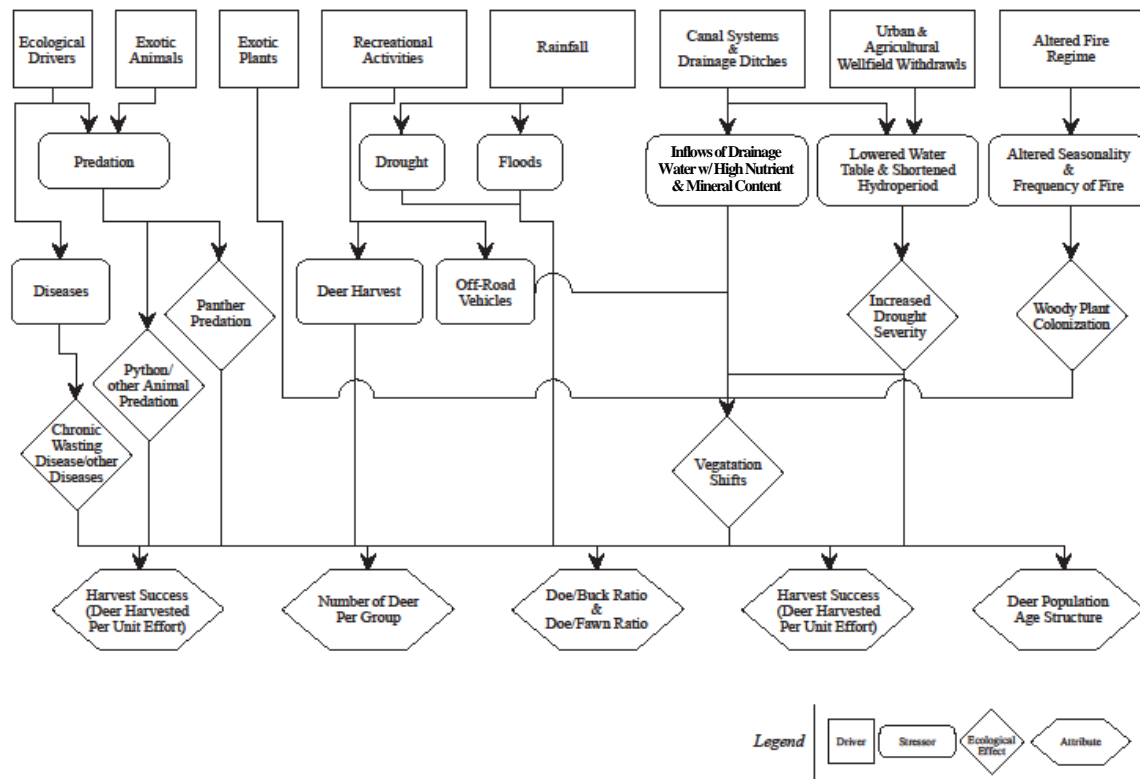


Figure 3 – Big Cypress National Preserve Deer Population Conceptual Ecological Model

CONCLUSION

The bottom line is that choosing to implement an adaptive management process does not mean that all of the challenges associated with complex system management are solved. Instead it means cultivating a group of focused stakeholders, developing a shared vocabulary for identifying and discussing the different types of uncertainty that present challenges to forming management recommendations, and committing to document the resolution of different perspectives over time. Using both the first and second loops of the double loop learning process enable making management decisions in a timely manner and retaining the flexibility to shift decision processes over time as evidence of causal mechanisms becomes clear. Williams et al. (2009) perhaps said it best:

“An adaptive management project is recognized as successful if (1) stakeholders are involved and committed to the process; (2) progress is made toward achieving management objectives; (3) results from monitoring and assessment are used to adjust management decisions; and (4) implementation is consistent with applicable laws.”



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.