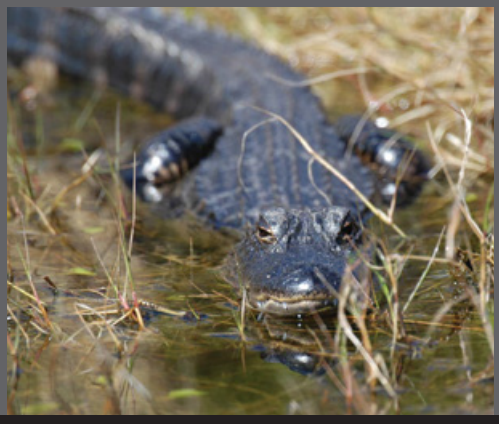
Big Cypress National Preserve
Florida

National Park Service
U.S. Department of the Interior

Big Cypress National Preserve Backcountry Access Plan / Draft Environmental Impact Statement



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Estimated Lead Agency Total Costs Associated with Developing and Producing this DEIS is $790,000.

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EXECUTIVE SUMMARY

The United States Department of the Interior, National Park Service (National Park Service or NPS) has prepared a backcountry access plan/draft environmental impact statement (Plan) to provide management guidelines for backcountry access and use in Big Cypress National Preserve, Florida (the preserve). The Plan was developed in accordance with the preserve's enabling legislation; management plans; NPS policies; and applicable federal, state, and local laws and regulations.[1] Some parts of the Plan apply solely to the original preserve (established in 1974), while others cover the entire preserve, including lands added to the preserve in 1988 (the Addition).

PLAN PURPOSE AND NEED

The purpose of this Plan is to provide management guidelines for backcountry access and use while protecting the preserve's natural and cultural resources and providing for public enjoyment.

The Plan is needed to:

- Protect the preserve's resources (e.g., habitat, wildlife, protected species) while providing for sustainable recreational backcountry use of the preserve in accordance with its enabling legislation.
- Evaluate potential alternatives for a secondary motorized trail network in the original preserve that provides access to backcountry destinations while protecting the natural and cultural resources of the preserve.
- Establish a permanent route for the Florida National Scenic Trail (FNST) and other nonmotorized recreational opportunities.
- Establish a management approach for backcountry camping as it relates to off-road vehicle (ORV) use, hunting, hiking, and other activities.
- Clarify definitions of key terms (i.e., secondary trails and backcountry destinations) within the 2000 Final Big Cypress Recreational Off-Road Vehicle Management Plan (2000 Recreational ORV Management Plan) (NPS 2000a) and the 2010 Final Big Cypress Addition General Management Plan/Off-Road Vehicle Management Plan/Wilderness Study (Addition GMP) (NPS 2010).

1. This environmental impact statement was initiated before the 2020 Council on Environmental Quality (CEQ) Implementing NEPA Regulations were in effect, and therefore it was developed in accordance with the 1978 CEQ NEPA Regulations and 2008 Department of Interior NEPA regulations. The process for this environmental impact statement and content is consistent with those regulations.

ALTERNATIVES

The plan evaluates five alternatives for motorized and nonmotorized trails, and backcountry destinations. The plan evaluates several management approaches for backcountry camping in the preserve as it relates to ORV use, hunting, hiking, and other activities, and clarifies definitions of key terms (i.e., secondary trails and backcountry destinations) in the 2000 Recreational ORV Management Plan and the Addition GMP.

This plan, when read in conjunction with the 2000 Recreational ORV Management Plan and the 2010 Addition GMP, provides comprehensive guidance on managing the evolving trail system for the preserve.

Alternative 1: The No-Action Alternative

The no-action alternative would continue current management practices related to backcountry access in the preserve; this alternative provides a baseline for comparison in evaluating the changes and impacts of the other alternatives.

Under this alternative, the current system of primary ORV trails (a total of 278 miles) would remain unchanged and no secondary ORV trails would be opened. Accordingly, ORV backcountry recreation access opportunities would be limited. ORV and non-ORV user groups would continue to share the same designated trail network. There would be no changes to the current nonmotorized trails and no reroute of the FNST would occur. The current annual 60-day ORV closure would remain in place.

Dispersed camping would continue to be permitted in most of the preserve, with backcountry camping permits required but free of charge. Designated backcountry campgrounds would continue to be limited to certain areas in the preserve (the two current backcountry campgrounds in the Bear Island Unit and camping areas along the FNST and in Zone 4 of the Stairsteps Unit). No additional designated backcountry camping areas would be proposed.

Alternative 2

Alternative 2 offers visitors slightly increased access compared to the no-action alternative. The existing primary ORV trail system, 278 miles total, would remain unchanged. Thirty-three miles of secondary ORV trails would be opened (only those trails that traverse highly resilient substrate types). The FNST would be realigned to improve the backcountry experience of hikers by separating ORV and non-ORV (e.g., hiking) users.

Forty-six new backcountry destinations would be opened to accommodate camping (in addition to 23 existing locations and the two backcountry campgrounds in the Bear Island Unit). The camping stay limit would be 14 consecutive days. Under this alternative, all dispersed camping would be discontinued; camping opportunities would be provided at designated locations. A reservation system would be established for camping, and limitations on group size would be implemented. The current annual 60-day ORV closure would remain in place.

Alternative 3

Alternative 3 offers visitors increased access compared to alternative 2. The existing primary ORV trail system, 278 miles total, would remain unchanged and 88 miles of secondary ORV trails would be opened (only those trails traversing resilient as well as highly resilient substrate types). The FNST would be realigned to improve the backcountry experience of hikers by separating ORV and non-ORV users.

Eighty-eight additional backcountry destinations would be opened to accommodate camping (in addition to 23 existing locations and the 2 backcountry campgrounds in the Bear Island Unit). As in alternative 2, the camping stay limit would be 14 consecutive days. Also as in alternative 2, dispersed camping adjacent to primary and secondary ORV trails would be discontinued, but visitors would be provided expanded camping opportunities at destinations and through the allowance of dispersed camping in more remote areas of the preserve. A reservation system would be established for camping, and limitations on group size would be implemented. The current annual 60-day ORV closure would remain in place.

Alternative 4:

Alternative 4 would increase backcountry access for visitors (compared to alternative 3) while balancing impacts to natural resources by using pre-existing routes and other previously disturbed areas. This alternative would expand the hiking trail system by 51 miles. It would also open 59 additional miles of primary ORV trails and 100 miles of secondary ORV trails. Most miles of primary and secondary ORV trail would traverse highly resilient to resilient substrate types. A total of 136 additional backcountry destinations would be opened. Dispersed camping would be allowed in all of the preserve's management zones, including Bear Island, and as in alternatives 2 and 3, the camping stay limit would be 14 consecutive days. No reservation system would be implemented for camping, and the annual 60-day ORV closure would be lifted. As in the previous alternatives, the FNST would be realigned to improve the backcountry experience of hikers by separating ORV and non-ORV users.

Alternative 5: National Park Service Preferred Alternative

Alternative 5 would provide the most backcountry access for visitors. Compared to the no-action alternative, this alternative would expand the hiking trail system by 51 miles. It would also open 66 additional miles of primary ORV trails and 154 miles of secondary ORV trails. Most miles of primary and secondary trail would traverse highly resilient to resilient substrate types. However, more miles of trail would traverse least resilient to unsuitable substrates under this alternative than under alternative 4. A total of 203 additional backcountry destinations would be opened. Dispersed camping would be allowed in all of the preserve's management zones, including Bear Island, and as in alternatives 2, 3, and 4, the camping stay limit would be 14 consecutive days. No reservation system would be implemented for camping, and the annual 60-day ORV closure would be lifted. Two additional backcountry campgrounds would be constructed. As in the other action alternatives, the FNST would be realigned to improve the backcountry experience of hikers by separating ORV and non-ORV users.

NPS Preferred Alternative: Alternative 5 is the NPS preferred alternative because it provides the greatest amount of public access to the preserve while providing for protection of cultural and natural resources.

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Chapter 1

Introduction

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CHAPTER 1: INTRODUCTION

The United States Department of the Interior, National Park Service (National Park Service or NPS) has prepared a backcountry access plan/draft environmental impact statement (Plan) to provide management guidelines for backcountry access and use in Big Cypress National Preserve, Florida (the preserve). The Plan was developed in accordance with the preserve's enabling legislation; management plans; NPS policies; and applicable federal, state, and local laws and regulations.[1] Some parts of the Plan apply solely to the original preserve (established in 1974), while others cover the entire preserve, including lands added to the preserve in 1988 (the Addition).

The Plan evaluates five alternatives for motorized and nonmotorized trails, together with backcountry destinations. The Plan also evaluates several management approaches for backcountry camping in the preserve as it relates to off-road vehicle (ORV) use, hunting, hiking, and other activities, and clarifies definitions of key terms (i.e., secondary trails and backcountry destinations) in the 2000 Final Big Cypress Recreational Off-Road Vehicle Management Plan Supplemental Environmental Impact Statement (NPS 2000a) (2000 Recreational ORV Management Plan) and the 2010 Final Big Cypress Addition General Management Plan/ Off-Road Vehicle Management Plan/Wilderness Study (NPS 2010) (Addition GMP).

This document is part of the preserve's planning portfolio. It addresses some elements of the preserve's required management plans; additional elements would be addressed in future planning documents. For example, while comments received during the public scoping period for this Plan prompted the National Park Service to initiate a wilderness study of the original preserve, the National Park Service has decided to address this study in a separate planning effort. The backcountry access plan and wilderness proposal have independent utility as contemplated by 40 CFR 1508.25 (43 FR 55978 [Nov. 29, 1978]). They are neither connected nor interdependent actions and thus can be addressed appropriately in separate planning documents. Further, each of the action alternatives analyzed herein has been developed taking into account wilderness eligibility assessments completed in 2010 and 2015, with the result that all motorized recreational opportunities would avoid wilderness-eligible areas. Accordingly, it was determined appropriate to consider the wilderness study in a future planning effort.

This Plan, when read in conjunction with the 2000 Recreational ORV Management Plan and the 2010 Addition GMP, provides comprehensive guidance on managing the evolving trail system for the preserve. The actions included in this Plan are high-priority management actions ready to be acted upon.

1.1 BRIEF DESCRIPTION OF THE PRESERVE

Big Cypress National Preserve is centrally located between Miami and Naples in southern Florida (figure 1-1). It encompasses 729,000 acres of a largely freshwater wetland ecosystem offering refuge

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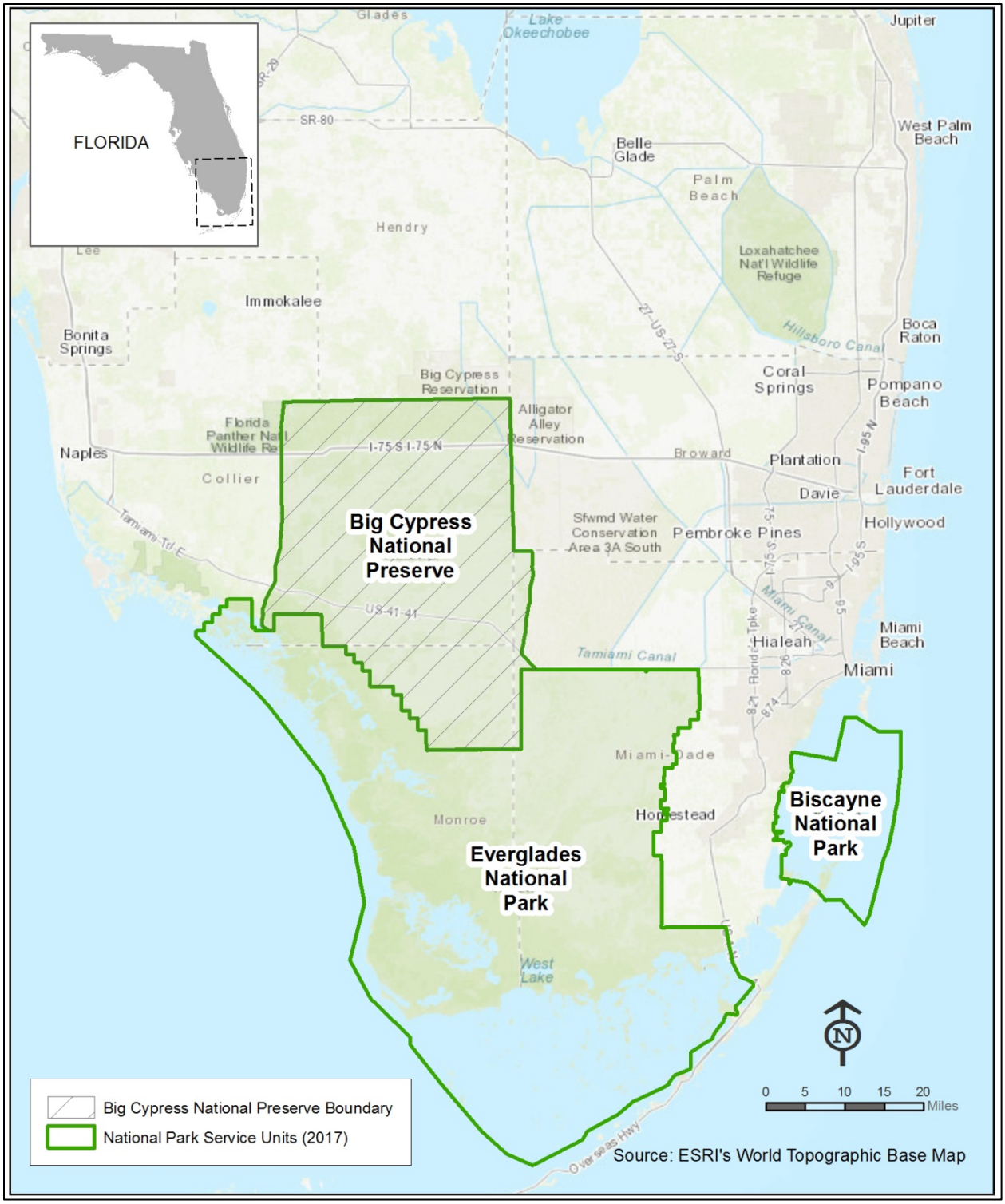

FIGURE 1-1. BIG CYPRESS NATIONAL PRESERVE LOCATION

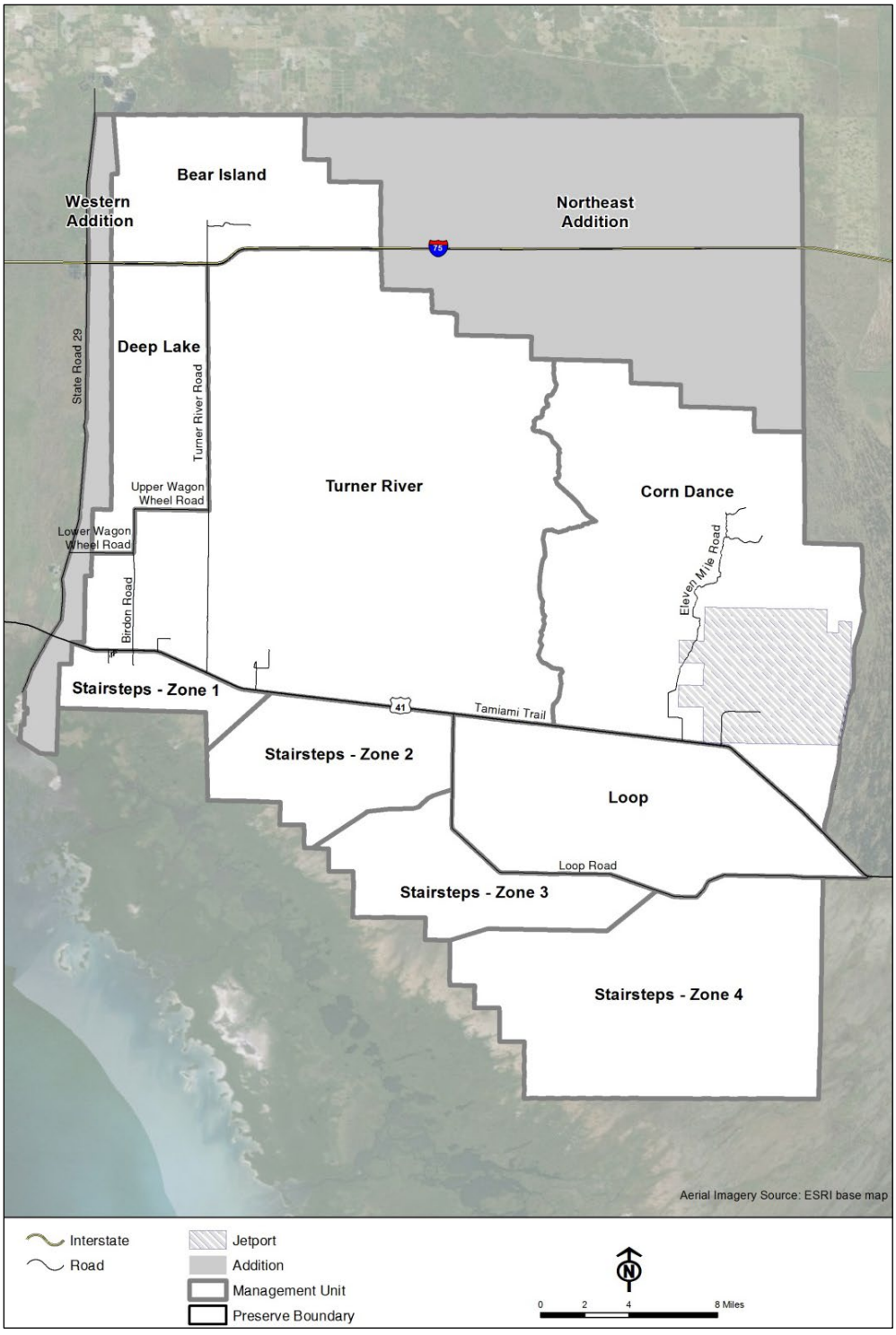

FIGURE 1-2. MANAGEMENT UNITS WITHIN THE PRESERVE

to a wide variety of plants and animals. Established in 1974 as one of the first national preserves, the preserve represents a unique management concept where resource protection, public recreation, and specific uses stipulated in its enabling legislation are managed concurrently (figure 1-2).

Water is the unifying force of the preserve, connecting its five habitats: hardwood hammocks, pinelands, prairies, cypress swamps, and estuaries. These diverse ecosystems encompass a dynamic mixture of tropical and temperate plant communities and wildlife. The preserve protects 9 federally listed and 31 state listed threatened and endangered or species of special concern animal species and 120 state listed threatened and endangered plant species.

In the late 1960s, the area that was to become the preserve was threatened by multiple forms of development, including a proposal to construct the "jetport," which would have been the largest airport in the world at that time. Alarmed by the potential for environmental harm and the threatened loss of a traditional way of life, a coalition of hunters, conservationists, and citizen activists, including Marjory Stoneman Douglas and the newly formed Friends of the Everglades, pressured the then Dade County Port Authority to find another location for the jetport. Everyone saw the importance of protecting the Big Cypress, but many did not want this region merely added to nearby Everglades National Park. Many felt that traditional forms of access to the Big Cypress area would be lost if the area was managed as a national park. The resulting compromise created a new land management concept—a national preserve. Under this concept, the area would be protected but specific activities identified in the preserve's enabling legislation would be allowed to continue.

The preserve is divided into eight management units: Turner River, Bear Island, Corn Dance, Deep Lake, Loop, Stairsteps (further divided into zones 1 through 4), Western Addition, and Northeast Addition (figure 1-2). This Plan addresses alternatives throughout the original preserve (excluding the Northeast and Western Additions), as well as through each individual management unit, as specified.

1.2 PURPOSE AND SIGNIFICANCE OF THE PRESERVE

The purpose statement identifies the specific reason(s) for establishment of a particular park unit. The purpose statement for the preserve was drafted through a careful analysis of its enabling legislation and the legislative history that influenced its development. The preserve was authorized by Congress on October 11, 1974 (Public Law [PL] 93-440), to include not more than 570,000 acres of land and water. That law was amended on April 29, 1988, when Congress passed PL 100-301, the Big Cypress National Preserve Addition Act (Addition Act), to expand the preserve by 147,000 acres. This expansion area is referred to as the Addition. With the Addition, the preserve now encompasses 729,000 acres. The purpose statement lays the foundation for understanding what is most important about the preserve.

The purpose of the preserve 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 express why a park unit's resources and values are important enough to merit designation as a unit of the national park system. These statements are linked to the purpose of the preserve and are supported by data, research, and consensus. Statements of significance describe the distinctive nature of the park unit and why an area is important within a global, national, regional, and systemwide context. They focus on the most important resources and values that would assist in park unit planning and management.

The following significance statements have been identified for the preserve. (Please note that the sequence of the statements does not reflect the level of significance.)

- The preserve protects the Big Cypress Watershed – an area critical to the survival of the greater Everglades ecosystem.
- The preserve contains the largest dwarf cypress forests in North America and the largest old-growth south Florida slash pine forest.
- The preserve protects vital habitat for state and federally listed threatened and endangered plant and animal species, including the Florida panther, red-cockaded woodpecker, and ghost orchid.
- The preserve provides opportunities for the public to enjoy outdoor recreation activities in a vast natural area spanning 729,000 acres of south Florida. These opportunities are increasingly rare in a region containing rapidly growing cities with more than 6 million people.
- The preserve contains evidence of approximately 15,000 years of human use and sustains resources that continue to hold importance to traditionally associated cultures, including the Miccosukee and Seminole peoples.

1.3 PROJECT BACKGROUND

1.3.1 Backcountry Access Plan Scope

The National Park Service prepared a general management plan (GMP) for the preserve in 1991. One of the key recommendations of the GMP was to prepare a plan allowing ORV use in the preserve while ensuring the natural and ecological integrity of preserve resources. Thereafter, the 2000 Recreational ORV Management Plan was prepared in accordance with a 1995 settlement agreement between the Florida Biodiversity Project and several federal agencies and bureaus. The 2000 Recreational ORV Management Plan established a framework for a primary and secondary trail system, as well as 15 primary access points. The incorporation of the 2000 Recreational ORV Management Plan into preserve policy effectively eliminated dispersed ORV use throughout the preserve. In addition to a designated system of trails, the ORV Management Plan established a framework for instituting temporary closures of the preserve backcountry when conditions were not compatible with recreational use, as during times of severe high or low water, hurricanes, and fires.

In 2007, the NPS reopened 35 miles of primary ORV trails and 9.4 miles of secondary trails within the Bear Island Unit of the preserve. In that same year, several non-governmental organizations and individuals brought suit challenging this management decision as a violation of the National Environmental Policy Act (NEPA), the Endangered Species Act, several executive orders, and the 2000 Recreational ORV Management Plan. A July 2012 judicial opinion stated that the NPS's decision violated NEPA requirements because the NPS had failed to undertake a supplemental environmental analysis prior to reopening the trails. The judge ordered these trails in the Bear Island Unit closed, and the NPS complied pending completion of further NEPA review. See Defenders of Wildlife v. Salazar, 877 F. Supp.2d 1271 (M.D. Fla. 2012).

In 2010, the NPS decided to reopen 83 miles of secondary ORV trails within the Turner River Unit. The following year, it decided to open an additional 64 miles of secondary ORV trails within the Corn Dance Unit. ORV users were limited to primary and secondary trails, thereby eliminating dispersed use in these areas. The NPS was then sued in 2013 by several environmental organizations and individuals claiming that the opening of this network of trails was in violation of NEPA and the ORV Management Plan. See Center for Biological Diversity v. Jewell, No. 2:13-cv-00364-SPC-DNF

(M.D. Fla. 2013). When the NPS issued its annual 60-day ORV trail closure notice in 2013, these secondary trails were also closed until additional NEPA planning efforts could be performed. A settlement agreement, which incorporated the closure notice, was finalized in September 2014.

Controversy surrounding implementation of the 2000 Recreational ORV Management Plan has highlighted a need to clarify the meaning of various provisions, including the definitions of "secondary trail" and "destination." Likewise, the Bear Island and secondary trails litigation has created a need for NPS to determine which of the preserve's closed trails should be reopened. The present Plan has been prepared, in part, to re-evaluate the preserve's trail network, establish a system of secondary ORV trails, and define a set of destinations for the original preserve. It also addresses the management of other backcountry activities in the preserve as a whole, including hiking and camping. This Plan does not specifically address the management of fishing, frogging, hunting, trapping, or tribal customary use and occupancy.

1.4 PURPOSE, NEED, AND OBJECTIVES

1.4.1 Purpose

The purpose of this project is to develop a backcountry access plan/environmental impact statement for the preserve that provides management guidelines for backcountry access and use while protecting the preserve's natural and cultural resources and providing for public enjoyment. The Plan was developed in accordance with the preserve's enabling legislation; management plans; NPS policy; and applicable federal, state, and local laws and regulations.

1.4.2 Need

The backcountry access plan is needed to:

- Protect the preserve's resources (e.g., habitat, wildlife, protected species) while providing for sustainable recreational backcountry use of the preserve in accordance with its enabling legislation.
- Evaluate potential alternatives for a secondary motorized trail network in the original preserve that provides access to backcountry destinations while protecting the natural and cultural resources of the preserve.
- Establish a permanent route for the Florida National Scenic Trail (FNST) and other nonmotorized recreational opportunities.
- Establish a management approach for backcountry camping as it relates to ORV use, hunting, hiking, and other activities.
- Clarify definitions of key terms (e.g., primary trails, secondary trails, backcountry destinations) within the 2000 Recreational ORV Management Plan and the 2010 Addition GMP.

1.4.3 Objectives

Objectives are specific statements of purpose that describe what must be accomplished for the proposal to be considered a success. The following primary objectives were developed for the Plan:

- Evaluate the suitability of secondary trails and nonmotorized trails in the original preserve.
- Evaluate the potential for additional primary trails in the original preserve, in accordance with the total maximum allowable primary trail mileage set forth in previous planning efforts.

- Evaluate the potential for a primary trail connection between the original preserve and the Addition.
- Establish a permanent route for the FNST in collaboration with the US Forest Service.
- Evaluate and establish guidance to manage backcountry camping, specifically as it relates to motorized use, hiking, and other recreational uses.
- Clarify definitions of key terms related to backcountry use to create more certainty in planning and management efforts.
- With respect to backcountry uses, evaluate and refine indicators and thresholds from previous plans to ensure that monitoring and other commitments are informative, feasible to manage, and financially sustainable.
- Complete NEPA analysis on a range of alternatives for secondary trails, nonmotorized trails, and backcountry recreational uses, including camping.

1.5 RELATIONSHIP TO OTHER PLANS, POLICIES, AND ACTIONS

1.5.1 National Park Service Plans, Policies, and Actions

1.5.1.1 General Management Plan / Environmental Impact Statement (1991).

The General Management Plan completed in 1991 for the original preserve was mandated by the National Parks and Recreation Act of 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 articulates the need to manage ORV use within the preserve. The Plan updates portions of the General Management Plan, modifies guidance for visitor use, and changes management of ORV use within the original preserve.

1.5.1.2 Recreational Off-Road Vehicle Management Plan / Environmental Impact Statement (2000).

ORV use is allowed in the original preserve by the enabling legislation in a manner that is compatible with resource preservation. The ORV Management Plan was called for and directed by the 1991 GMP. It was also prepared to comply with a 1995 settlement agreement negotiated to resolve a lawsuit between a number of individuals and conservation organizations and several agencies and bureaus (Florida Biodiversity Project v. Kennedy, No. 95-50-CIV-FTM-24D (M.D. Fla. Oct. 25, 1995). The ORV plan outlines the management of recreational ORV use in the original preserve. It requires that ORV travel be facilitated by a system of designated access points and trails, that sensitive areas be closed, temporal and seasonal closures be instituted, and that permits and education be required to operate ORVs in the original preserve. Significantly, the ORV plan required the elimination of dispersed ORV use in most units and placed an upper limit of 400 miles on the number of miles of primary trails in the original preserve. The ORV plan also instituted an annual 60-day closure (implemented in June and July) to allow resources a time free from any pressures related to ORV use. The present Plan is rooted in part in the ORV plan, but it also addresses the need to further clarify the preserve's management approach as related to secondary trails, camping, and other backcountry opportunities.

1.5.1.3 Resource Management Plan (2001).

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 approximately 147,000 acres of adjacent tracts. The Resource Management Plan, completed in 2001, directs initial planning and resource inventorying for the preserve. Resource conditions in the preserve vary from nearly pristine to areas where natural function no longer exists. The Resource Management 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. This Plan expands upon the goals for preserving natural resources and those management objectives used to obtain the goals identified in the Resource Management Plan. This Plan also expands on and outlines the various issues within the preserve, including natural resources, cultural resources, nonnative plants and wildlife, and the hydrologic environment.

1.5.1.4 Addition Final General Management Plan / Wilderness Study / Off-Road Vehicle Management Plan / Environmental Impact Statement (2010)(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 2010). 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. ORV access and riding opportunities are authorized in the Addition GMP and 47,067 acres of wilderness is proposed. While this Plan is rooted in the Addition GMP, it also addresses the need to clarify the preserve's management approach as related to secondary trails, camping, and other backcountry opportunities.

1.6 ISSUES TO BE ADRESSED AND IMPACT TOPICS RETAINED FOR ANALYSIS

Implementation of the Plan may result in a number of environmental issues. The differences in the impacts associated with the various issues are analyzed in this document. NPS guidance states that analysis in an environmental impact statement should focus on significant issues (meaning pivotal issues, or issues of critical importance) and only discuss insignificant issues briefly (40 *Code of Federal Regulations* [CFR] 1502.2(b)).

The following issues were identified by the National Park Service interdisciplinary team (IDT), during public scoping for the Plan:

- The opening of motorized trails could degrade animal habitat.
- Changes in use patterns could adversely affect threatened and endangered species.
- Motorized use in habitats with unsuitable soils could lead to erosion, rutting, and other harmful impacts on the landscape.
- Cultural resources could be impacted by an expansion in visitor use.
- Factors such as visitor convenience and high-quality visitor experiences should be a key consideration in any management strategies considered for the preserve backcountry.

Based on the environmental issues described above, impact topics were identified. Appendix B outlines impact topics both retained for and dismissed from detailed analysis.

Chapter 2

Alternatives

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CHAPTER 2: ALTERNATIVES

2.1 INTRODUCTION

This section describes the range of alternatives, consisting of a no-action alternative and four action alternatives, including a preferred alternative. The preferred alternative is the National Park Service management preference. For brevity in this chapter, the phrases "expansion of the trail system" and "additions to the trail system" are used frequently. The words "expansion" and "addition" do not refer to new trail or new trailhead construction. All of the trails proposed in these alternatives (for ORV and hiking trails) follow previously used trails on already disturbed ground. Opening and maintaining these trails is not an activity expected to involve significant ground disturbance, but generally would entail: (1) clearing the route of hazards such as fallen trees, (2) clearly marking the route and destination, and (3) trimming vegetation.

Appendix C presents a comparison of the alternatives. Key terms relevant to all alternatives are defined below.

Primary ORV trail: Primary ORV trails are those trails emanating from the designated access points and providing recreational access within the preserve. These trails are the principal ORV routes.

Secondary ORV trail: A secondary ORV trail branches off a primary trail and leads to one or more backcountry destinations. Conditions on secondary trails are monitored and use levels are managed to minimize impacts to resources.

Backcountry destination: A backcountry destination is a specific campsite or geographic point of interest in the backcountry of the preserve. ***A campsite*** is a specific point that provides features desirable for camping such as shade and high, dry ground. ***A geographic point of interest*** is a location that attracts—or could be anticipated to attract—a broad spectrum of visitors, such as a scenic vista, a viewing area for wildlife, a place with distinctive flora, a lake, or a feature of cultural or historic interest. Some destinations may feature both campsites and geographic points of interest.

2.2 HOW THE ALTERNATIVES WERE DEVELOPED

In accordance with the National Environmental Policy Act (NEPA), the National Park Service is required to examine a range of alternatives when preparing an environmental impact statement. Alternatives developed for analysis are those alternatives that meet the purpose and need for action and are technically and economically feasible (43 CFR 46.420(b)).

2.2.1 Alternatives Considered But Dismissed From Detailed Analysis

While developing alternatives, it became evident that certain alternative concepts or strategies were not appropriate to analyze fully. The NPS Director's Order 12 Handbook gives the following reasons for eliminating alternatives:

- Technical or economic infeasibility
- Inability to meet project objectives or resolve need
- Duplication with other, less environmentally damaging or less expensive alternatives

- Conflict with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would need to be implemented
- Too great an environmental impact

Table 2-1 provides a brief description of alternative strategies that were considered but dismissed from detailed analysis, along with the applicable Director's Order 12 criteria and rationale.

Table 2-1. Alternatives and Concepts Considered but Dismissed

Description of Alternative or Action	Applicable Director's Order 12 Criteria	Rationale for Dismissal
Dispersed ORV use in certain areas	Conflicts with an up-to-date and valid plan (1991 GMP, 2000 Recreational ORV Management Plan, 2010 Addition GMP)	Dispersed ORV use, even in small areas, conflicts with the preserve's purpose and significance, existing management plans, and recent court rulings.
Looping Secondary Trails	Inability to meet project objectives or resolve need	Looping secondary trails do not meet the definition of secondary trails, and therefore do not fit with the project purpose and need.
Connecting trails from private camp to private camp	Too great an environmental impact	Trails designated for the sole purpose of connecting one private camp to another would require a larger footprint of disturbance and would serve specific landowners rather than the public as a whole.
Reduction of existing trail system to eliminate all trail segments on unsuitable substrates	Inability to meet project objectives or resolve need	As part of this planning process, all current, closed, and proposed primary and secondary ORV trails were re-evaluated to identify workable alternatives for a trail system that would meet the project purpose and need. The planning team considered a reduction in trail mileage, but ultimately determined that an alternative incorporating reduced trail mileage would not support the project purpose and need. To the contrary, to achieve desired levels of safety, especially during high-use periods (e.g., the beginning of hunting season), additions to the current trails system are necessary. Furthermore, a reduction in size of the trail system would not meet the preserve's administrative needs and recreational objectives.

2.3 ACTIONS COMMON TO ALL ALTERNATIVES

While the action alternatives represent unique approaches to management of the preserve, there are many strategies that do not vary among the action alternatives. These strategies are considered "common to all" of the action alternatives and ultimately serve to protect the resources and values of the preserve. They are considered practical approaches to preserve management and are grounded in NPS policy, mandates, and previously approved management plans. These strategies include:

- Segments of the FNST would be re-routed to a previously used trail and would separate motorized and nonmotorized users and thereby improve the hiking experience in the preserve. The new alignment for the trail would have little overlap with motorized trails. The total mileage of the realigned trail is 44 miles.
- All ORVs would be required to abide by rules governing vehicle specifications and operation, designated trails, and permitting and licensing requirements.

- ORV users violating regulations would be subject to punishment, including fines and/or imprisonment.
- All backcountry overnight campers (including ORV users, hikers, campers, and boaters) would be required to obtain a backcountry permit for each trip, which is free and available online, from preserve staff, or at designated locations throughout the preserve.
- Temporal and spatial closures would be implemented as deemed necessary for visitor safety and protection of preserve resources. If a trail is closed for any reason, the preserve would not open a new trail of similar character in order to bring the system mileage back to levels described in this Environmental Impact Statement. Any new trails would be evaluated on a case-by-case basis through separate compliance efforts.
- Education of and communication to all visitors, including ORV operators and hikers, would be ongoing and adaptable to changing management strategies.
- Leave No Trace and Tread Lightly educational materials would be provided to visitors as they obtain backcountry or camping permits.
- As local conditions and public health requirements permit, pitcher pumps would be installed in disturbed sites at Frog Hammock, 13-Mile Camp, and 7-Mile Camp along the FNST to improve hiker convenience and prevent resource impacts. These pumps would allow access to non-potable water and would be clearly marked as such. Pitcher pumps would be installed in accordance with the preserve's established protocols for public health and safety.
- The preserve would develop a signage plan to improve trail markings and way finding.
- No changes to the existing canoe trails in the Western Addition and Stairsteps Unit Zone 1 are proposed. As a result, canoe trail mileage (15 miles) is common to all alternatives and is not included in the nonmotorized trail mileage.
- No changes to the existing conceptual primary trail network in the Northeast and Western Additions are proposed in any of the alternatives.

2.4 ALTERNATIVE 1: NO ACTION

The no-action alternative (figure 2-1) represents the continuation of current management practices related to backcountry recreational access in the preserve. In the original preserve, the primary guiding management policies for backcountry recreational access were established in the General Management Plan / Final Environmental Impact Statement (1991) and the Final Recreational ORV Management Plan / Supplemental Environmental Impact Statement (2000). The policies in these documents, accompanying NPS policy documents (such as NPS *Management Policies 2006*), and any superseding policies enacted since approval of these documents, would continue to serve as management guidance.

Under this alternative, ORV trails would continue along existing primary trails and no new primary or secondary ORV trails would be opened. Accordingly, existing ORV backcountry recreation access opportunities would continue. ORV and non-ORV user groups would share the same trail network. Dispersed camping would continue to be permitted in most of the preserve, with free backcountry camping permits required. Designated backcountry campgrounds would be limited to the two

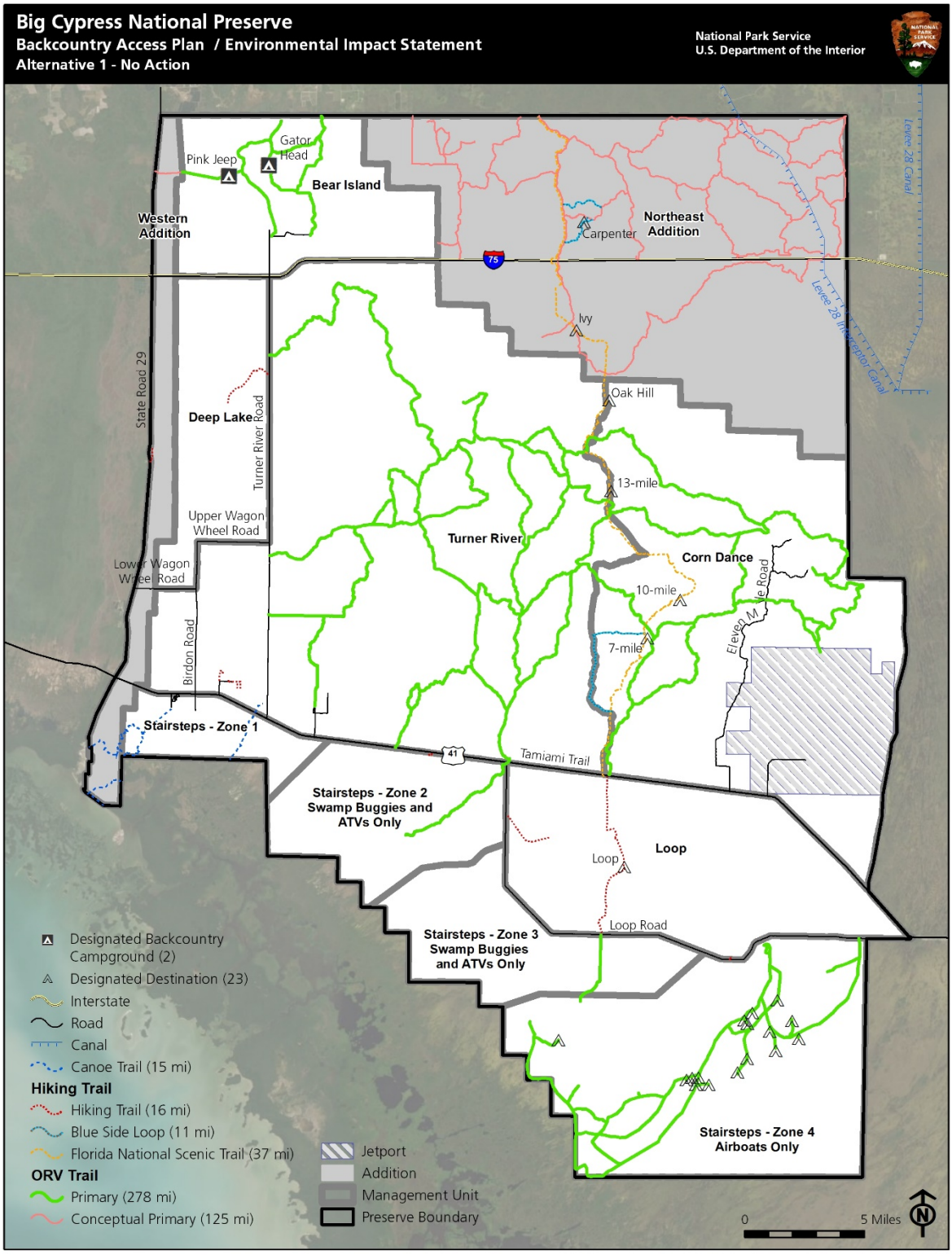

FIGURE 2-1. NO-ACTION ALTERNATIVE

current backcountry campgrounds in the Bear Island Unit and camping areas along the FNST and in Zone 4 of the Stairsteps Unit. No additional designated backcountry camping areas would be provided (table 2-2).

2.4.1 ORV Trails

Of the 278 currently existing miles of primary ORV trails, 125 miles are in the Turner River Unit, 22 miles in the Bear Island Unit, 65 miles in the Corn Dance Unit, 6 miles in Stairsteps Unit Zone 2, 3 miles in Stairsteps Unit Zone 3, and 57 miles in Stairsteps Unit Zone 4 (table 2-2). This primary ORV trail system would remain unchanged and no secondary ORV trails would be opened.

Approximately 200 miles of the primary ORV trails traverse highly resilient substrate; approximately 78 miles transverse least resilient to unsuitable substrates (table 3-1). These primary trails would continue to serve as multiuse trails, allowing a variety of user groups (ORV and non-ORV) to share trail use.

Table 2-2. Alternative 1 Summary

Unit	Primary ORV Trail (miles)	Secondary ORV Trail (miles)	Backcountry Campgrounds (number of)	Backcountry Campsites/ Destinations (number of)
Turner River	125			
Bear Island	22		2	
Deep Lake				
Loop				1
Corn Dance	65			4
Stairsteps Zone 1				
Stairsteps Zone 2	6			
Stairsteps Zone 3	3			
Stairsteps Zone 4	57			16
Original Preserve Subtotal	278		2	21
Northeast Addition				2
Western Addition				
Addition Subtotal				2
TOTAL	278	0	2	23

2.4.2 Nonmotorized Trails

There would be no changes to the current system of nonmotorized trails in the preserve, which includes 27 miles of hiking trails and 15 miles of canoe trails (excluding the FNST). The 37-mile FNST would remain in its current alignment. No reroute of the FNST would occur; therefore, sections of the FNST would continue to be closely aligned with the primary ORV trail network.

2.4.3 Camping

Dispersed camping would continue to be allowed in all areas of the preserve except the Bear Island Unit. Additionally, there would continue to be no group size limits for dispersed camping. The 2 backcountry campgrounds in the Bear Island Unit, the 7 hike-in campsites along the FNST, and the 16 airboat campsites in the Stairsteps Unit would continue to be open. All backcountry camping would continue to require a permit.

2.4.4 Stay Limits

This alternative would retain the current backcountry stay limits of 10 consecutive days (January 1 through April 30) and 14 consecutive days (May 1 through December 31). The backcountry camping annual limit would remain at the maximum number of days per year specified in the superintendent's compendium. Camping equipment could be left at backcountry campsites for the duration of the hunting season.

2.4.5 Closures and Adaptive Strategies

The current annual 60-day ORV closure would remain in place. The annual 60-day closure is intended to allow resources time to recover from any pressures related to recreational ORV use (this does not apply to landowners who hold special use permits to access their private properties via a designated route through the preserve).

The preserve is closed to ORV use between the hours of 10:00 p.m. and 5:00 a.m. to ensure visitor safety.

The foregoing seasonal and nightly closures were a part of the 2000 Recreational ORV Management Plan and have been used by the National Park Service in the original preserve since that time. These temporal and spatial closures minimize impacts on wildlife by reducing the potential for direct mortality, increased legal harvest, disturbance, and habitat loss. These conservation and safety measures are supported by scientific literature and the professional judgment of agency staff.

Contractors for the Florida Fish and Wildlife Conservation Commission (FWC) and the South Florida Water Management District (SFWMD), together with NPS-authorized agents (volunteers), would continue to remove nonnative pythons from the preserve.

2.5 ALTERNATIVE 2

Alternative 2 offers visitors slightly increased access compared to the no-action alternative (figure 2-2).

2.5.1 ORV Trails

The primary ORV trail system would be the same as that in the no-action alternative. A 33-mile designated ORV secondary trail system would be established and would include only those trails that traverse highly resilient substrate types (table 3-1). Allowing trails in these highly resilient substrate types would limit the number of habitat types visitors could experience by ORV but would generally ensure a more sustainable trail system and thus better conditions for ORV travel (table 2-3).

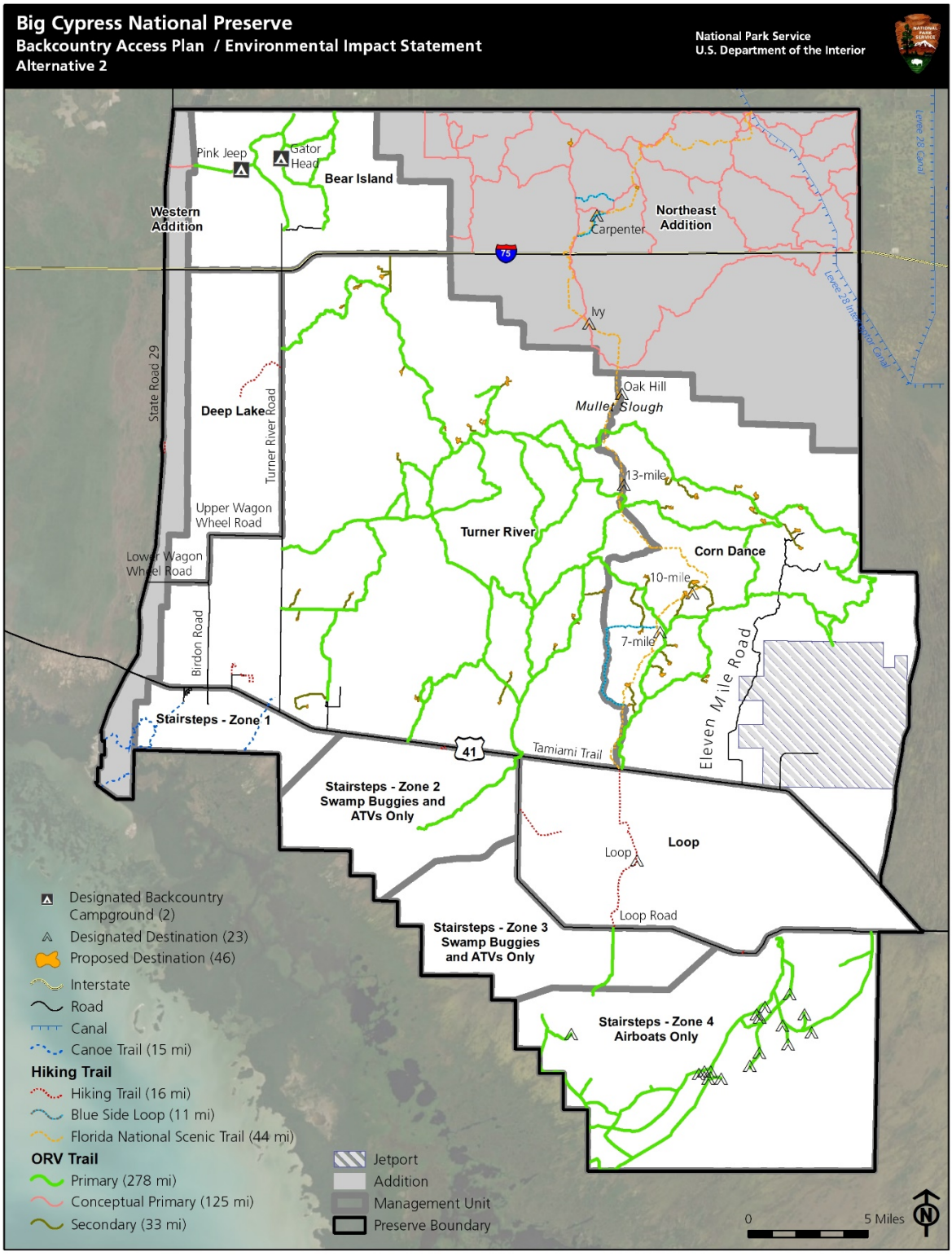

FIGURE 2-2. ALTERNATIVE 2

TABLE 2-3. ALTERNATIVE 2 SUMMARY

Unit	Primary ORV Trail (miles)		Secondary ORV Trail (miles)		Backcountry Campgrounds (number of)		Backcountry Campgrounds (number of)		Backcountry Campsites / Destinations (number of)		Backcountry Campsites / Destinations (number of)	
—	Designated		Proposed		Designated		Proposed		Designated		Proposed	
Turner River	125		15								23	
Bear Island	22				2							
Deep Lake												
Loop									1			
Corn Dance	65		18						4		21	
Stairsteps Zone 1												
Stairsteps Zone 2	6											
Stairsteps Zone 3	3											
Stairsteps Zone 4	57								16			
Original Preserve Subtotal	278		33		2		0		21		44	
Northeast Addition									2		2	
Western Addition												
Addition Subtotal									2		2	
TOTAL	278		33		2		0		23		46	

2.5.2 Nonmotorized Trails

The FNST would be realigned to a previously used trail and thus would improve the backcountry experience of hikers by separating ORV and hiking use, as well as increasing the total number of miles of the FNST to 44. All other hiking/canoeing opportunities would be the same as in the no-action alternative.

2.5.3 Camping

Under this alternative all dispersed camping would be discontinued. Camping opportunities would be provided at 46 newly designated destinations at the ends of secondary trails, as well as at existing backcountry campsites in the Stairsteps Unit and along the FNST, and in the two backcountry campgrounds in the Bear Island Unit.

Visitors would be required to reserve a campsite at destinations, designated backcountry campsites, and backcountry campgrounds through a new online or in-person reservation system. The details of

the reservation system would be developed separately from this planning effort, with input from the public.

Limitations on group size would be established.

2.5.4 Stay Limits

Stay limits would be established to help increase the campsite turnover rate and provide opportunities for enjoyment by a greater number of visitors. Camping or occupancy of a designated backcountry campsite or backcountry campground would be limited to 14 consecutive days. This stay limit would also apply to camping and hunting equipment. Backcountry camping in the preserve by the same person, party, or organization would be limited to no more than 14 days in a 30-day period, and no more than 120 days in a calendar year. (Bear Island Campground is not considered a backcountry campground.)

2.5.5 60-Day Closure

The current annual 60-day closure would remain in place.

2.6 ALTERNATIVE 3

Alternative 3 offers visitors increased access compared to alternative 2 (figure 2-3).

2.6.1 ORV Trails

ORV users would have the option to access a broader range of areas compared to both the no-action alternative and alternative 2 via trails traversing resilient as well as highly resilient substrate types (table 3-1). In alternative 3, a designated ORV secondary trail system would encompass 88 total miles and would also include those trails that traverse both resilient and highly resilient substrate types (table 2-4).

2.6.2 Nonmotorized Trails

Same as alternative 2.

2.6.3 Camping

Camping opportunities would be provided at 88 newly designated destinations at the ends of secondary trails, as well as at existing backcountry campsites in the Stairsteps Unit and along the FNST, and in the two backcountry campgrounds in the Bear Island Unit.

The visitor reservation system would be the same as in alternative 2.

To provide camping opportunities beyond designated destinations, campsites, and campgrounds, walk-in dispersed camping would be permitted, but only in areas at least 0.25 mile from any designated campsite or ORV trail and 0.5 mile from any developed area or road. Dispersed camping would still be prohibited in the Bear Island Unit. Dispersed camping would not require a reservation.

2.6.4 Stay Limits

See alternative 2.

2.6.5 60-Day Closure

See alternative 2.

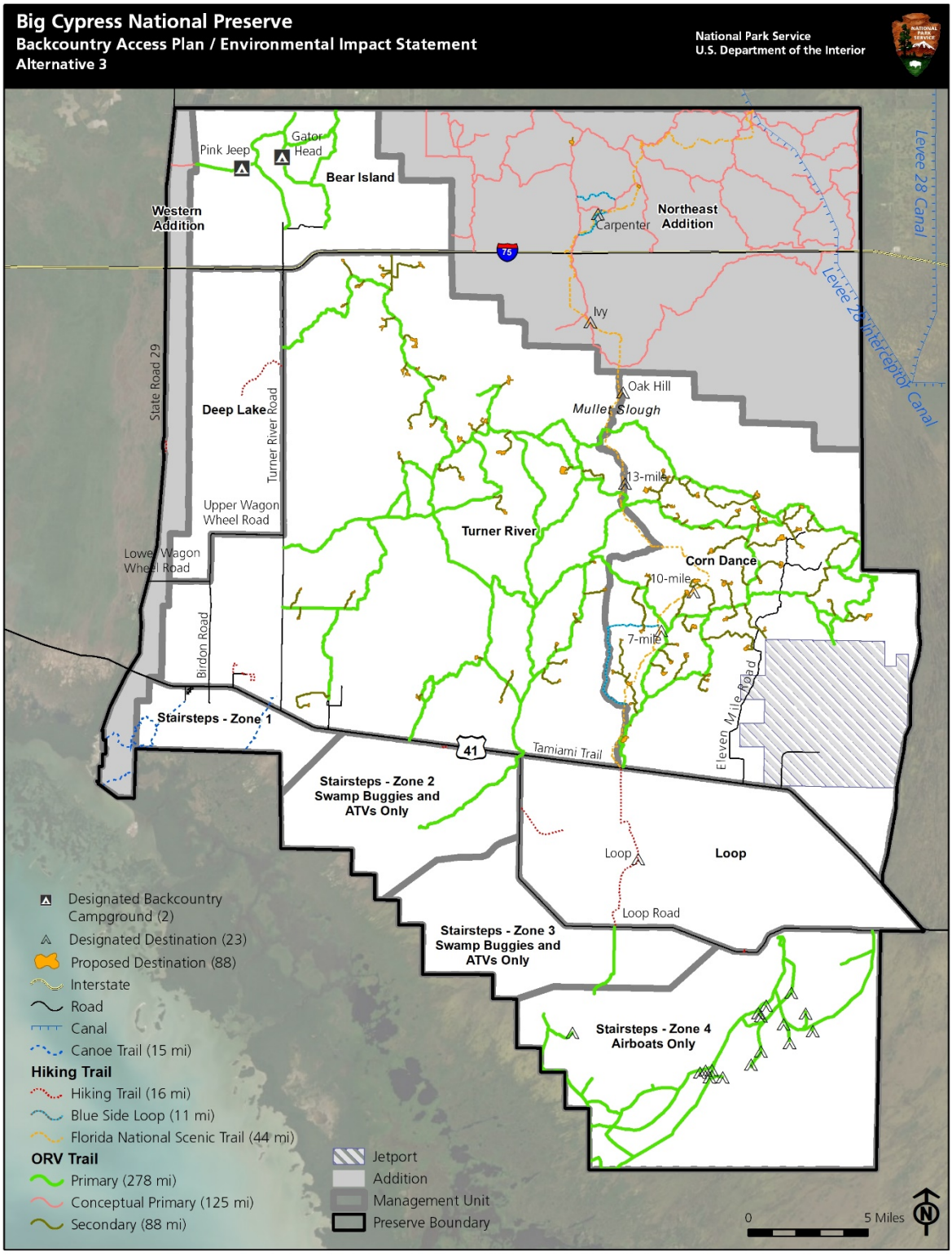

FIGURE 2-3. ALTERNATIVE 3

Table 2-4. Alternative 3 Summary

Unit	Primary ORV Trail (miles)		Secondary ORV Trail (miles)		Backcountry Campgrounds (number of)		Backcountry Campgrounds (number of)		Backcountry Campsites/ Destinations (number of)		Backcountry Campsites/ Destinations (number of)	
—	Designated		Proposed		Designated		Proposed		Designated		Proposed	
Turner River	125		31								41	
Bear Island	22				2							
Deep Lake												
Loop									1			
Corn Dance	65		57						4		47	
Stairsteps Zone 1												
Stairsteps Zone 2	6											
Stairsteps Zone 3	3											
Stairsteps Zone 4	57								16			
Original Preserve Subtotal	278		88		2		0		21		88	
Northeast Addition									2			
Western Addition												
Addition Subtotal									2			
TOTAL	278		88		2		0		23		88	

2.7 ALTERNATIVE 4

Alternative 4 would increase backcountry access for visitors, compared to alternative 3 (figure 2-4).

2.7.1 ORV Trails

The primary ORV trail system would grow by 59 miles compared to the no-action alternative, part of which would consist of reopened airboat trail on pre-existing routes. This expansion would bring the total mileage of primary trail to 337 miles (table 2-5). A secondary ORV trail system would be established, comprising 100 total miles of reopened secondary trail.

The proposed increase in primary trail mileage is part of continued implementation of the 2000 Recreational ORV Management Plan, which calls for up to 400 miles of primary trails. The additional 59 miles of primary trail would be located in the Bear Island Unit (12 miles) and in the Stairsteps Unit, Zones 2, 3, and 4 (47 miles).

This alternative modifies the 2010 Addition GMP by relocating the ORV connecting route between Bear Island Grade (original preserve) and Bundschu Grade (Northeast Addition). The Addition GMP connected the original preserve to the Addition at a point near the north end of Bundschu Grade. Alternative 4 moves the connecting point farther south to a point near the southern end of Bundschu Grade (see map of alternative 4). The southern route crosses pineland habitat and avoids prairies.

Primary and secondary ORV trails would be located primarily on highly resilient to resilient substrate types. See tables 3-1 (Substrate Suitability in the Preserve) and 4-1 (Summary of Soil Substrate Suitability of Trails and Destinations). Of the 59 miles of new primary trail, 30 miles would be located in highly resilient to resilient substrate and 29 miles in least resilient to unsuitable substrate. Of the 100 miles in the secondary trail system, 88 miles would be located in areas of highly resilient to resilient substrate and 12 miles in least resilient to unsuitable substrate. Through monitoring and targeted trail closures, impacts to least resilient to unsuitable substrates would be minimized to the greatest extent possible.

This alternative calls for public ORV access to the northwestern part of the preserve from State Road 29. Note, however, that access will only be made available after the National Park Service has secured legal access to the ORV trail system from the highway. Note also that safety issues (entering, leaving the highway) must be addressed before ORV access can be established at State Road 29.

2.7.2 Nonmotorized Trails

The hiking trail system would be expanded by 51 miles compared to the no-action alternative, for a total of 78 miles (excluding the FNST). Additional trails would include:

- The Cross Preserve Trail – 41 miles
- R57 also known as the Gator Hook Extension – 2.59 miles
- R59 also known as the R-T Day Hike to Charlie Cypress Camp – 2.70 miles
- R60 – 0.82 miles
- R61 – 0.92 miles
- R64 – also known as Airplane Prairie – 2.89 miles

2.7.3 Camping

An additional 136 backcountry destinations would be opened to camping. To provide expanded camping options, walk-in dispersed camping would be permitted throughout the preserve (including Bear Island and Stairsteps Unit Zone 4) at least 0.25 mile from any backcountry campsite or campground or 0.5 mile from any developed area or road. Camping would also be permitted anywhere along primary ORV trails as long as ORVs parked next to the designated trail and did not block travel. To minimize impacts on preserve resources, backcountry users would be encouraged to camp in backcountry campgrounds, at destinations, and at previously disturbed campsites. Campers would be required to fill out permit forms prior to entering the backcountry and to identify the areas where they plan to camp, with campsites being available on a first-come, first-served basis. There would be no reservations required for any type of camping.

Camping opportunities would still be provided at the existing backcountry campsites in the Stairsteps Unit, along the FNST, and in the two backcountry campgrounds in the Bear Island Unit.

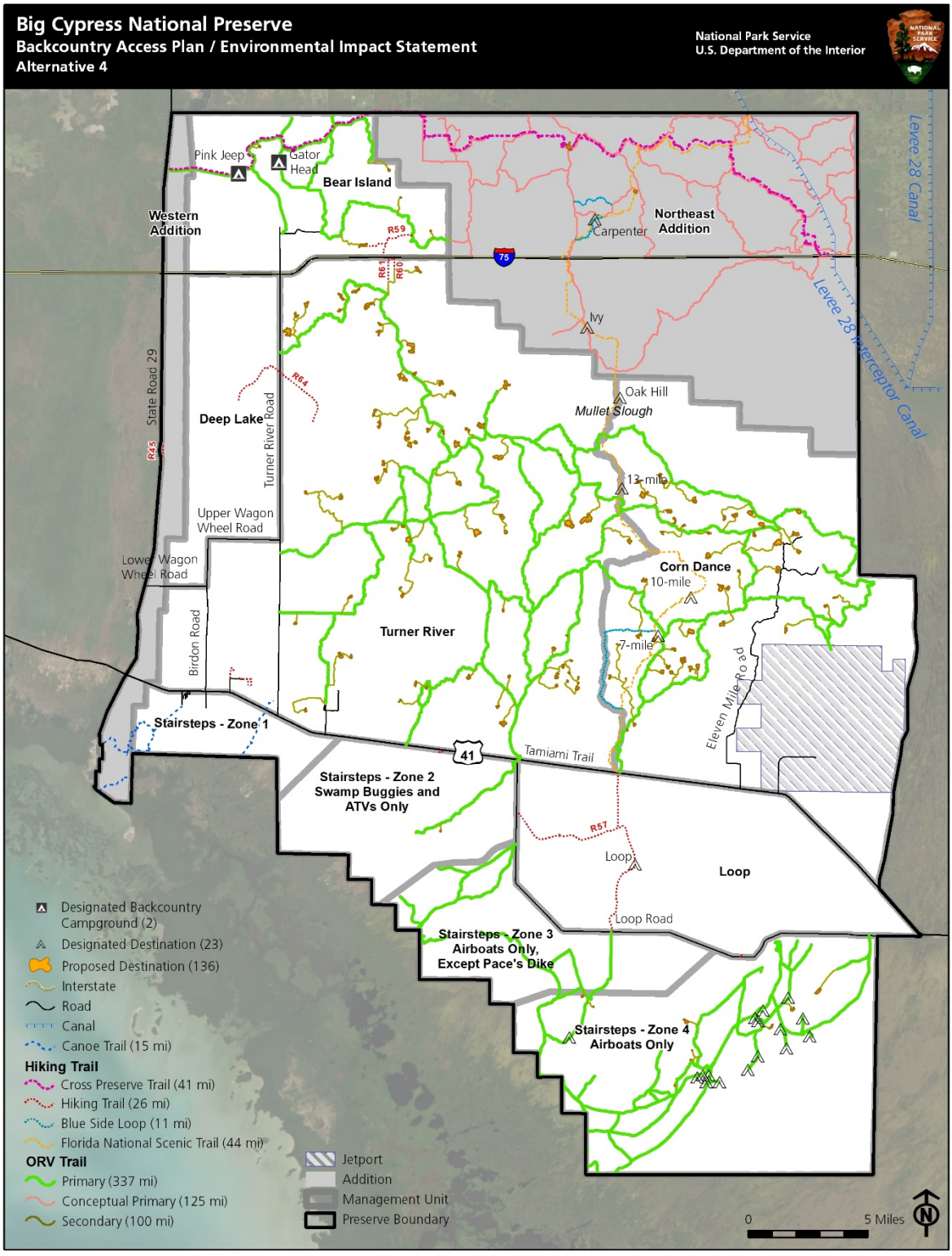

FIGURE 2-4. ALTERNATIVE 4

Table 2.5. Alternative 4 Summary

Unit	Primary ORV Trail (miles)	Primary ORV Trail (miles)	Secondary ORV Trail (miles)	Backcountry Campgrounds (number of)	Backcountry Campgrounds (number of)	Backcountry Campsites/ Destinations (number of)	Backcountry Campsites/ Destinations (number of)
—	Designated	Proposed	Proposed	Designated	Proposed	Designated	Proposed
Turner River	125		56				77
Bear Island	22	12	4	2			5
Deep Lake							
Loop						1	
Corn Dance	65		37			4	45
Stairsteps Zone 1							
Stairsteps Zone 2	6	6	0.4				
Stairsteps Zone 3	3	22					
Stairsteps Zone 4	57	19	3			16	9
Original Preserve Subtotal	278	59	100	2	0	21	136
Northeast Addition						2	
Western Addition							
Addition Subtotal						2	
TOTAL	278	59	100	2	0	23	136

2.7.4 Stay Limits

Same as alternative 2.

2.7.5 60-Day Closure

The existing annual 60-day closure would be removed throughout the preserve in favor of targeted closures aimed at specific problem areas identified by preserve staff, such as high or low water levels, extensive trail braiding, etc. The use of targeted closures would increase access while still giving resources the opportunity to recover, as needed, from pressures related to ORV use. Closures would not be made on a defined schedule or limited to a set time, but would instead be implemented where resource and trail conditions were observed to be at or near impact thresholds as described in section 2.10 and table 2-8. Removal of the annual 60-day closure for ORVs is not expected to adversely affect resources because visits during the summer are typically low anyway due to summer heat, and because ORVs would remain on designated trails. The annual closure would not be reinstated unless observation of adverse impacts demonstrated that resumption of the closure would have a beneficial impact to preserve resources.

2.8 ALTERNATIVE 5: PREFERRED ALTERNATIVE

Alternative 5 would provide the most backcountry access for visitors (figure 2-5).

2.8.1 ORV Trails

The primary ORV trail system would grow by 66 miles compared to the no-action alternative, part of which would consist of reopened airboat trail on pre-existing routes. This expansion would bring the total mileage of primary trail to 344 miles (table 2-6). The secondary ORV trail system would comprise 154 total miles of reopened secondary trail.

The proposed increase in primary trail mileage is part of continued implementation of the 2000 Recreational ORV Management Plan, which calls for up to 400 miles of primary trails. The additional 66 miles of primary trail would be located in the Bear Island Unit (12 miles), the Corn Dance Unit (2 miles), and in the Stairsteps Unit, Zones 2, 3, and 4 (52 miles).

This alternative modifies the 2010 Addition GMP by relocating the ORV connecting route between Bear Island Grade (original preserve) and Bundschu Grade (Northeast Addition). The Addition GMP connected the original preserve to the Addition at a point near the north end of Bundschu Grade. Alternative 5 moves the connecting point farther south, to a point near the southern end of Bundschu Grade (see map of alternative 5). The southern route crosses pineland habitat and avoids prairies.

Most miles of primary and secondary ORV trail would traverse highly resilient to resilient substrate types. See tables 3-1 (Substrate Suitability in the Preserve) and 4-1 (Summary of Soil Substrate Suitability of Trails and Destinations). Of the 66 miles of new primary trail, 34 miles would be located in highly resilient to resilient substrate and 32 miles in least resilient to unsuitable substrate. Of the 154 miles in the secondary trail system, 135 miles would be located in areas of highly resilient to resilient substrate and 19 miles in least resilient to unsuitable substrate.

This alternative calls for public ORV access to the northwestern part of the preserve from State Road 29. Note, however, that access will only be made available after the National Park Service has secured legal access to the ORV trail system from the highway. Note also that safety issues (entering, leaving the highway) must be addressed before ORV access can be established at State Road 29.

More miles of trail would traverse least resilient to unsuitable substrates under this alternative than under alternative 4. Segments of trails within this alternative may traverse small portions of prairie habitat, but through monitoring and targeted trail closures, impacts to prairie vegetation would be minimized to the greatest extent possible.

2.8.2 Nonmotorized Trails

Same as alternative 4.

2.8.3 Camping

Same as alternative 4, except for additional backcountry campgrounds. Specifically, two additional backcountry campgrounds would be established at Panther and Nobles (Jones) Grades, bringing the total number of backcountry campgrounds to four.

2.8.4 Stay Limits

Same as alternative 2.

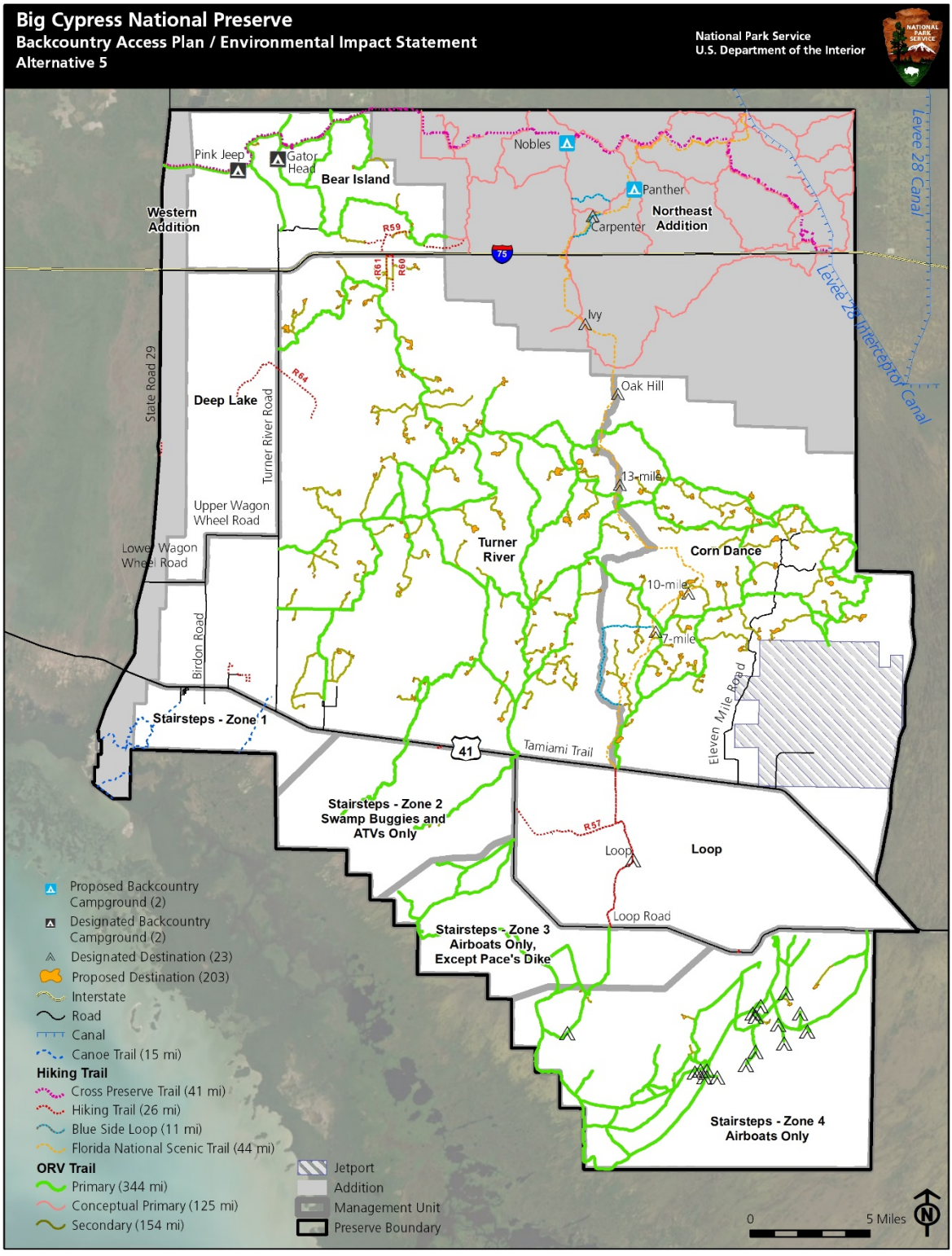

FIGURE 2-5. ALTERNATIVE 5

Table 2-6. Alternative 5 Summary

Unit	Primary ORV Trail (miles)	Primary ORV Trail (miles)	Secondary ORV Trail (miles)	Backcountry Campgrounds (number of)	Backcountry Campgrounds (number of)	Backcountry Campsites/ Destinations (number of)	Backcountry Campsites/ Destinations (number of)
—	Designated	Proposed	Proposed	Designated	Proposed	Designated	Proposed
Turner River	125		86				120
Bear Island	22	12	5	2			7
Deep Lake							
Loop						1	
Corn Dance	65	2	58			4	65
Stairsteps Zone 1							
Stairsteps Zone 2	6	11	.5				2
Stairsteps Zone 3	3	22	0				
Stairsteps Zone 4	57	19	4			16	9
Original Preserve Subtotal	278	66	154	2	0	21	203
Northeast Addition					2	2	
Western Addition							
Addition Subtotal					2	2	
TOTAL	278	66	154	2	2	23	203

2.8.5 60-Day Closure

Same as alternative 4.

2.9 ACTIVITIES REQUIRED TO IMPLEMENT THE ACTION ALTERNATIVES

Implementation of the Actions Common to All Action Alternatives described in section 2.3 and the specific actions identified for the action alternatives in sections 2.4 through 2.8 would be conducted in a similar manner for all of the alternatives.

2.9.1 Reopening of Primary or Secondary ORV Trails, Nonmotorized Trails (including the FNST), and Destinations

Impacts to natural resources would be minimized by siting all primary and secondary ORV trails in the original preserve on pre-existing routes that were closed under the 2000 Recreational ORV Management Plan and are proposed to be reopened under this Plan. All trails and destinations in this Plan would be sited on previously disturbed areas. Trails and destinations would be re-established by work crews using ORVs. Access would initially be from the existing primary trail network. Work

would commence where access to the proposed reopened trail diverges from the existing primary trail network. Work crews would be required to clear the route of hazards (such as fallen trees), mark the route and destination, and trim vegetation to allow for safe user passage.

Hazard removal and vegetation trimming would occur within the footprint of the previous trail network. The degree of hazard removal or vegetation trimming necessary to re-establish the trail would vary on a case-by-case basis, where some trails/destinations could be re-established with relatively little removal or trimming, and others would require extensive removal/trimming. To protect the endangered Florida bonneted bat (*Eumops floridanus*), no trees would be removed that have a visible cavity. Hazard removal would be conducted by hand or, for vegetation trimming, with the assistance of hand tools, such as tree or shrub loppers, scythes, etc., and mechanized equipment such as chain saws, weed eaters, and pole saws. In some cases, encroaching vegetation, downed trees, and hazardous trees would be removed using an excavator with a mulching head and/or a skid steer with flail mower. Vegetation would be trimmed from the ground surface to avoid disruption of soils and root systems and up to 10 feet high to provide vertical clearance. For primary and secondary ORV trails, vegetation would be trimmed within a 12-foot-wide corridor. For nonmotorized trails, vegetation would be trimmed within a 10-foot or less wide corridor. At destinations, NPS personnel and authorized volunteers would endeavor to trim vegetation around likely tent pads, each pad estimated to be 10 feet by 20 feet (0.005 acre). No removal of large trees (4-6 inches in diameter at breast height, or greater) is anticipated unless they pose a hazard. Any clearing of vegetation in wetland areas would constitute loss of wetland function and must be compensated for via mitigation (e.g., revegetation or restoration of disturbed areas) to result in no net loss of wetland function. That is, the destruction or degradation of wetland function in one place must be offset by restoration or enhancement of wetland function in another.

In some instances, fill material may need to be imported for trail maintenance, to provide for safe visitor use of the trail, and to minimize potential environmental consequences. Fill material may include soil, lime rock, or gravel; would be free of chemicals in hazardous amounts; and would be from a source deemed free of invasive nonnative vegetation. Fill would be transported to the site by dump truck. Stabilization would typically be done by a crew of two to four equipment operators using graders, tractors, and other assorted heavy equipment. An archeological survey would be conducted prior to any ground disturbance by heavy equipment and work would be adjusted to avoid or mitigate impacts to any identified sensitive resources. If post-survey construction work were to reveal previously unidentified archeological resources, work would be stopped immediately, and state and tribal authorities would be contacted in order to develop a coordinated response. See section 2.11.7 below. Generally, fill material would be placed only to raise ground elevation of a trail to match the elevation of the area immediately adjacent to the trail and would minimize the potential for trail braiding or expansion. Fill in wetlands would be authorized by permit prior to construction, as would (to the extent required) anticipated future rutting associated with recreational and administrative use of the secondary trail system. As with clearing of vegetation, the filling of wetland areas would constitute loss of wetland function and must be compensated for via mitigation within the preserve to result in no net loss of wetland function.

2.9.2 Trail Markers, Signs, and Pitcher Pumps

Trails and destinations would be clearly marked with signs. Signs would be installed at trail junctions and destinations as necessary. Work crews would install signs by attaching them to existing vegetation (posting on trees) or by installing a sign and sign post into the ground using post hole diggers or hand augers (if necessary). Holes created for signs placed into the ground would be backfilled with excavated material. The extent of area that would be disturbed by sign posts would be less than 1 square yard, or 9 square feet, for each sign.

If local conditions and health requirements permit, pitcher pumps would be installed in disturbed sites at Frog Hammock, 13-Mile Camp, and 7-Mile Camp along the FNST. Well depths would be no more than 25 feet. The pitcher pump well would typically be drilled with a hand auger or handheld motorized auger. Pitcher pumps would be installed in accordance with the preserve's established protocols for public health and safety. To comply with section 106 of the National Historic Preservation Act, ground disturbance would be monitored when installing markers, signs, and pitcher pumps.

2.9.3 Routine Maintenance and Adaptive Management

Trail conditions would be monitored and maintenance activities would routinely be conducted on all trails and destinations, including repair and replacement of trail markers and any pitcher pumps. Some areas may require annual or semi-annual maintenance, while other areas may not require maintenance for five or more years. Routine maintenance would largely consist of the same activities required to establish the trail. In addition to the activities described for reopening of trails and destinations and the installation of trail markers and signs, adaptive management actions would be employed as described in table 2-8. These are largely administrative actions but could also include placement of additional signs or closures of trails through use of materials to construct a barrier or installation of rope or chain fences to bar users. Similar vegetation management may be conducted for spot trail repairs (typically completed by hand tools or electric or gas chain saws), minor rerouting to more sustainable substrate, and placement of additional signs. In some instances, re-contouring of the trail may involve the placement of gravel or other soil material to stabilize the trail. Stabilization would typically be done by a crew of two to four equipment operators using graders, tractors, and other assorted heavy equipment. As noted above, an archeological survey would be conducted prior to any ground disturbance by heavy equipment and work would be adjusted to avoid or mitigate impacts to any identified sensitive resources. If post-survey construction work were to reveal previously unidentified archeological resources, work would be stopped immediately, and state and tribal authorities would be contacted in order to develop a coordinated response. See section 2.11.7 below.

2.9.4 Invasive Species Management

Adaptive management may require the use of herbicides to control the spread and infestations of nonnative vegetation. The actions would include the use of hand tools or mechanized equipment to remove the vegetation and may include the use of herbicide to control a population and prevent the establishment and spread of the species. Herbicide would only be applied under appropriate environmental conditions by a Florida certified pesticide applicator. The herbicide used would vary depending on the target species and would be appropriate for the environmental conditions (i.e., certified aquatic safe when working in wetlands).

2.10 MANAGEMENT OBJECTIVES, DESIRED CONDITIONS, INDICATORS, AND THRESHOLDS

Desired conditions are defined as a description of natural or cultural resource conditions, or social, economic, or ecological characteristics that the preserve aspires to maintain or achieve over time. Desired conditions are aspirational statements that describe specifically what conditions or outcomes are to be maintained or achieved in the future, not what necessarily exists today. Management objectives and desired future conditions for the preserve's backcountry can be found in table 2.7.

Descriptions of desired conditions are translated into measurable variables in order to monitor progress toward achieving desired conditions and to evaluate acceptable levels of visitor impact. Indicators are defined as a specific resource or social variable that can be measured to track change in conditions caused by public use so that progress toward attaining desired conditions can be assessed.

Thresholds are defined as the minimally acceptable condition associated with each indicator.

Alternative terms, notably "standard" or "standard of quality," have been used in many plans, visitor use frameworks, and scientific publications.

User capacity decision-making is a continuous process. Decisions are adjusted based on monitoring the indicators and thresholds (appendix D contains the visitor capacity determination rationale). Management actions are taken to minimize impacts when needed. As monitoring of the preserve's conditions continues, managers might decide to modify, add, or eliminate indicators if better ways are found to measure important changes in resource conditions. Also, if new use-related resource or visitor experience concerns arise in the future, additional indicators and thresholds would be identified as needed to address these concerns. The indicators and thresholds included in table 2-8 would encourage the use of adaptive management to help reduce influences from visitor use on natural resources.

2.11 MITIGATION MEASURES

The following mitigation measures and best management practices would be applied to avoid or minimize potential impacts from implementation of the action alternatives in this Plan.

2.11.1 General

Signs or other means would be used to protect sensitive resources on or adjacent to trails and destinations.

The trail alignments shown on the maps in this Plan are based on a geographic information system analysis and limited field observations. Final alignments are subject to groundtruthing. Trails and destinations would be established in previously disturbed areas to the maximum extent possible. In some areas, reroutes or slightly different trail alignments or destinations may be needed based on local conditions, such as the presence of sensitive resources. Final trail alignments and destinations would be reviewed by the preserve's natural and cultural resources experts in the field to ensure impacts to sensitive resources are avoided or minimized before trails and destinations are opened for public use. If sensitive resources are discovered during trail or destination opening or maintenance events, closure would occur and the area surveyed in more detail so that impacts can be avoided or minimized and/or an alternate route can be established. See sections 2.9.1 and 2.9.3 above and 2.11.7 below.

Visitors would be informed of the importance of protecting the preserve's natural resources and leaving these undisturbed for the enjoyment of future generations. Leave No Trace and Tread Lightly materials would be posted at the visitor centers and online, and distributed as appropriate.

Impervious surfaces would not be used on trails or at destinations.

2.11.2 Vegetation and Habitat

Areas used by visitors (e.g., trails, destinations) would be monitored for signs of native vegetation disturbance. Public education through development and distribution of pamphlets and signs, erosion control measures, and barriers would be used to control potential impacts on vegetation from erosion.

2.11.3 Nonnative and Invasive Species

Special attention would be devoted to preventing the spread of exotic and invasive species along trails. For exotic invasive plants, standard measures could include identifying and treating areas of nonnative plants before trail and camping improvements are made, treatment as part of regular trail and destination maintenance, and revegetation with native species as appropriate.

2.11.4 Wetlands

To prevent disruption of natural surface water flows, all trails that would receive ORV, hiking, biking, or riding use (for NPS operations or public use) would be maintained so the trail surface is generally kept at the natural grade of the surrounding landscape. Techniques to help mitigate trail rutting could include "at-grade" maintenance, "spot" trail stabilization with aggregate material, the use of culverts, and low-water crossings. These measures would help preserve the natural sheet flow through the preserve at a local and regional level. In addition, if trail conditions eventually became degraded in areas and surface flow became altered, the indicator thresholds and adaptive management actions would be applied, as described in section 2.10 and table 2-8, to remedy the situation and restore surface water flows.

Best management practices for water quality protection would be followed to ensure that effects from trail and camping improvements are minimal and to prevent long-term impacts on water quality, wetlands, and aquatic species.

All clearing or deposition of fill in wetlands resulting in loss of wetland function would be compensated for via mitigation to result in no net loss of wetland function.

2.11.5 Special Status Animal Species

Trails and destinations have been sited to avoid sensitive wildlife habitats. The proposed action and the associated activities required to reopen trails and complete maintenance (as described in section 2.9), would be timed to avoid sensitive periods, such as nesting or breeding seasons.

Measures would be taken to reduce the potential for wildlife to obtain food from humans. Wildlife-proof garbage containers would be provided where wildlife-human interactions are documented or observed, as needed. Signs would continue to educate visitors about the need to refrain from feeding wildlife.

Table 2-7. Management Objectives and Desired Future Conditions

Native Plants and Animals / Ecological Integrity

Resource and Values	Management Objectives	Desired Future Conditions
Native Vegetation Communities and Habitat	• Protect vegetation from disturbance outside of access points and designated trails. • Reduce the spread of invasive plants and animals. • Maintain a fire management regime that protects against undesirable wildfire.	• Potential impacts to flora and fauna from backcountry use are minimized. • Campsites and trails are located in areas most resilient to potential adverse impacts. • Natural fire regimes are restored to ecosystems.
Protected Species	• Protect and restore federal and state listed species and their habitat. • Maintain the natural abundance and distribution of wildlife populations. • Minimize potential wildlife stressors resulting from backcountry use.	• Trails avoid areas where their construction, maintenance, and use may have a detrimental effect on listed species or their habitat. • Detrimental effects on listed species and their habitat are avoided or minimized.
Soils	• Reduce impacts resulting from backcountry use that adversely affect natural elevation, composition, and integrity of soils.	• Trails and backcountry destinations are designated in areas that offer the most suitable substrate or in areas of previous disturbance.
Air Quality	• Maintain air quality in the preserve at a Class II level or better.	• Air quality is not degraded by backcountry use.

Water Resources

Resource and Values	Management Objectives	Desired Future Conditions
Water Resources	• Minimize disruption of natural water flows in the preserve and outflows to the surrounding watershed. • Maintain the water quality within the preserve.	• Disruptions to natural hydrologic conditions from backcountry uses are avoided or minimized.

Cultural Resources

Resource and Values	Management Objectives	Desired Future Conditions
Cultural Resources (Archeological Resources, Prehistoric/Historic Structures, Cultural Landscapes)	• Protect all known cultural resources on, eligible for, or potentially eligible for listing on the National Register of Historic Places (NRHP).	• Known archeological and cultural sites within the preserve are protected from adverse impacts from backcountry uses.

Cultural Experiences

Resource and Values	Management Objectives	Desired Future Conditions
Ethnographic Resources	• Consult with the Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida regarding usual and customary use and occupancy of preserve lands. Protect Indian sacred sites within the preserve.	• The known Indian sacred sites are protected from impacts related to backcountry use.

Visitor and Public Enjoyment

Resource and Values	Management Objectives	Desired Future Conditions
Trails	• Provide a range of resource-related recreational opportunities for visitors to explore the preserve. • Maintain the scenic quality of the preserve. • Manage adverse impacts of trails and their use on natural and cultural resources. • Provide for public safety and avoid or minimize safety hazards. • Maintain a fire management regime that allows for visitor access to backcountry.	• The location of trails avoids or minimizes conflicts among backcountry users. • Trail use is managed at levels that avoid or minimize impacts to natural and cultural resources. • Trails provide visitor access to remote areas of the preserve, which allows visitors to experience unconfined nature. • Trails are located to avoid known cultural resources and minimize impacts to natural resources.
Camping	• Provide a range of backcountry camping opportunities and experiences. • Maintain the scenic quality of the preserve. • Avoid and minimize adverse impacts of camping on natural and cultural resources. • Provide for public safety and avoid or minimize safety hazards.	• The location and design of campsites minimizes impacts to natural resources and avoids known cultural resources. • Campsite use is managed at levels that do not cause unacceptable impacts to natural resources and visitor experiences. • Location of campsites protects the scenic qualities of the preserve. • Conflicts between user groups are minimized.
Noise/Soundscapes	• Impacts to the natural soundscape in the backcountry are avoided or minimized.	• Noise conflicts between user groups are minimized. • Preserve visitors are provided opportunities to experience natural quiet.
Aesthetic/Scenic Resources	• Impacts to the aesthetic / scenic quality of the preserve from the placement of trails and campsites are minimized.	• Trails and campsites are designed to protect the natural aesthetic values and scenic resources of the preserve.

Resource and Values	Management Objectives	Desired Future Conditions
Hunting	• Provide access to a range of hunting opportunities and experiences.	• Major game species in the preserve are maintained at a level consistent with natural ecological processes. • A sustainable deer population is maintained in the preserve, which ensures that the effects of hunting in the preserve are beneficial, discountable, or insignificant to the Florida panther population, as specified in the 2014 Final Hunting Management Plan.

Table 2-8. Indicators, Thresholds, and Adaptive Management Actions[1]

Indicator	What does it indicate? / What type of impact does the indicator measure?	Threshold	Justification for Threshold	Adaptive Management Actions
Secondary trail braiding / widening as a result of motorized use	• Off-trail use • Trail condition • Substrate suitability • Disturbance to adjacent habitats (vegetation and soils) • Intensity of visitor use	Widening and braiding occurring on no more than 20% of any single trail. Widening and braiding is generally defined as trail widths that exceed 20 feet.	To provide adequate access for visitor use, trails may be wide enough to allow passage of two ORVs (8 feet wide each).	• Evaluation • Education • Enforcement • Clearer or additional trail markings • Temporary or permanent closure of trail[2] • Reduction of allowable visitor numbers for the trail and corresponding destinations (reservation system)

Indicator	What does it indicate? / What type of impact does the indicator measure?	Threshold	Justification for Threshold	Adaptive Management Actions
Trail braiding / widening / rutting as a result of nonmotorized use	• Off-trail use • Trail condition • Substrate suitability • Disturbance to adjacent habitats (vegetation and soils) • Intensity of visitor use	Widening and braiding occurring on no more than 20% of any single trail. Widening and braiding is generally defined as trail widths that exceed 8 feet.	To provide adequate access for visitor use, trails may be wide enough to allow passage of two people (4 feet wide each).	• Evaluation • Education • Enforcement • Spot trail repairs/re-contouring (via hand and mechanical tools if approved by regulatory agencies) • Minor re-routing of trail to more sustainable alignment. • Closure of trail[2] • Clearer or additional trail markings • Reduction of allowable visitor numbers for the trail and corresponding destinations (reservation system)
Trail depth / rutting	• Off-trail use • Trail condition • Substrate suitability • Disturbance to adjacent habitats (vegetation and soils) • Intensity of visitor use	Ruts 12 inches deep observed on more than 20% of a secondary trail.	Trail depth, mainly ORV rutting, which can extend up to 2 feet in depth, can act as drainage ditches, channeling water and potentially altering natural water flow patterns (Leung and Marion 1996).	• Evaluation • Education • Enforcement • Spot trail repairs/re-contouring (via hand and mechanical tools if approved by regulatory agencies) • Minor re-routing of trail to more sustainable alignment. • Temporary or permanent closure of trail[2] • Restrictions on vehicle clearance to limit depth of soil rutting and increase the ability of trails to sustain traffic • Reduction of allowable visitor numbers for the trail and corresponding destinations (reservation system)

Indicator	What does it indicate? / What type of impact does the indicator measure?	Threshold	Justification for Threshold	Adaptive Management Actions
Number of incidences of off-trail travel by motorized vehicles	Vegetation loss, degrading trail conditions, contact with sensitive resources, noncompliance with preserve rules and regulations	Observed noncompliance.	The threshold is critical to preserve both natural and cultural resources.	• Evaluation • Education • Enforcement • Clearer or additional trail/destination markings • Exclusion/Closure of secondary trails, destinations, and/or area[2]
Natural resource impacts at destinations	Vegetation loss, habitat loss	Failure to adhere to Leave No Trace principles at backcountry destinations.	This threshold would help measure impacts to natural resources as a result of visitor use.	• Evaluation • Education • Reservation system for use of destination/area • Exclusion/Closure of secondary trails, destinations, and/or area[2] • Restoration
Disturbance of special status species (2010 Addition GMP)	Avoidance of impacts to special status species from backcountry access and use	Visual observations or regulatory consultation.	Potential impacts to protected species via human disturbance must be minimized.	• Temporal or spatial Exclusion/Closure of secondary trails, destinations, and/or areas[2]
Invasive plants (2000 Recreational ORV Management Plan)	Spread of invasive plants or identification of newly established growth along a trail; % of plant densities, presence of individual nonnative or invasive plants	Visual observation of any new invasive plants adjacent to designated trails and destinations.	Invasive species can be introduced from motorized vehicle use within the preserve. Disturbance of sites can allow for species to take hold. These species can disrupt ecosystem balance and native species distribution.	• Education • Restoration • Area closure[2]
Documented visitor use related complaints or conflicts per area	Visitor conflict, competition, and/or crowding	Complaints could be written or verbal, or an observation of a conflict by a ranger. One substantive complaint would trigger evaluation of the conflict.	Protection of visitor experiences would be ensured, and conflicts between user groups would be minimized.	• Evaluation • Education • Enforcement • Reservation system for selected trails and destinations

Indicator	What does it indicate? / What type of impact does the indicator measure?	Threshold	Justification for Threshold	Adaptive Management Actions
Number of substantive complaints relating to user conflicts between users on trails	Visitor conflict, competition, and/or crowding.	Complaints could be written or verbal, or an observation of a conflict by a ranger. One substantive complaint would trigger evaluation of the conflict.	Protection of visitor experiences would be ensured and minimize conflicts between user groups would be minimized.	• Evaluation • Education • Enforcement • Reservation system for selected trails and destinations
Visual observation of disturbance to cultural sites or to archeological sites (2000 Recreational ORV Management Plan)	Visual observation of disturbance (which includes digging, removal of resources, destruction, or social trails leading up to cultural sites) Disturbance for the active cultural site would include documentation of any unauthorized uses, vandalism, camping, creation of a new trail, looting, digging, or any motorized use Discovery of previously undocumented cultural resources due to visitor activity in the backcountry, or a new trail formation	No visual observation of disturbance to cultural resources or archeological sites. No unauthorized use or disturbance to actively used cultural sites.	Protection of cultural resources and archeological sites and compliance with laws and policies would be ensured.	• Evaluation • Education • Enforcement • Exclusion/Closure of trail, destination, and/or area.[2]

Note:
[1] The identified adaptive management actions do not include those mitigation measures required to compensate for any additional loss of wetland functions. Additional compensation will be required if use of the trail results in additional loss of wetland function. Compensation will be provided such that no net loss of wetland function is achieved.
[2] If a trail is closed for any reason, the preserve would not automatically open a new trail in order to bring the system mileage back to levels described in this Draft Environmental Impact Statement. Any new trails would be evaluated on a case-by-case basis through separate compliance efforts.

Overhanging vegetation would be hand and mechanically trimmed along the trails and destinations, leaving potential suitable habitat for special status species untouched. Removal of trees is not necessary to implement the trails and destinations.

In consultation with the US Fish and Wildlife Service (USFWS) and FWC, and in accordance with their guidelines and recommendations, appropriate measures would be taken to protect special status species whether identified through surveys or presumed to occur in areas that contain suitable habitat characteristics.

2.11.6 Natural Soundscapes

Standard noise abatement measures would be followed during trail and destination improvements, reopening, and maintenance. Standard noise abatement measures could include a schedule that minimizes impacts on adjacent noise-sensitive resources, the use of electric power tools, and the use of the best available noise control techniques (wherever feasible).

2.11.7 Cultural Resources

In compliance with section 106 of the National Historic Preservation Act, the National Park Service would ensure that all practical measures would be taken to avoid, minimize, or mitigate adverse effects in consultation with the State Historic Preservation Officer (SHPO) and, as necessary, the Advisory Council on Historic Preservation, American Indian tribes, and other concerned parties. (Note that this Plan is not intended to constitute joint NEPA and Section 106 compliance; rather, the preserve is preparing a cultural resources assessment and will consult separately with the SHPO and tribal representatives.) In addition to adhering to the legal and policy requirements for cultural resources protection and preservation, the National Park Service would also undertake the measures listed below to further protect the preserve's resources:

- Areas for any trail improvements would be surveyed to ensure that any previously unidentified cultural resources (i.e., archeological, historic, ethnographic) in the area of potential effects are adequately identified and protected by avoidance or, if necessary, mitigation.
- If during ground-disturbing activities, previously unidentified archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented. If the resources could not be preserved in situ, an appropriate mitigation strategy would be developed in consultation with the SHPO and, if necessary, federally recognized Indian tribes and associated groups. Archeological documentation would be done in accordance with the Secretary of the Interior's Standards for Archeology and Historic Preservation (1983, as amended).
- In the unlikely event that human remains believed to be American Indian are discovered during ground-disturbing activities, compliance with the Native American Graves Protection and Repatriation Act of 1990 would apply. Prompt notification and consultation with the federally recognized tribes would occur in accordance with the act. If such human remains are believed to be non-Indian, standard reporting procedures to the proper authorities would be followed, as would all applicable federal, state, and local laws.
- Visitors would continue to be educated on the importance of protecting the preserve's cultural resources and leaving these undisturbed for the enjoyment of future visitors.

2.12 COST AND PERSONNEL CONSIDERATIONS

Implementation of the preferred alternative would be subject to available funding and staff, and would be done in a phased manner as resources allow. The preserve would create a strategy to guide the phased approach following this planning effort. The preserve would also seek assistance from stakeholder and volunteer groups in opening, marking, monitoring, and maintaining ORV trails, destinations, and hiking trails.

The costs and operation implications of alternatives are an important consideration in comparing them and determining their advantages and disadvantages. The costs and staff needs presented in tables 2-9 and 2-10 are estimates for comparison purposes only and are not to be used for budgetary purposes or implementation funding requests. When the actions in this Plan are implemented, actual costs would likely vary from what is presented below.

Table 2-9. Estimated Costs and Full-Time Employees (FTE) for 25 Years

FTE / Costs	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5 (NPS Preferred)
Total FTE	76	79	81	82.25	85.5
Additional FTE	0	3	5	6.25	9.5
Annual Operating Costs	—	—	—	—	—
Current ONPS[1]	$6,750,000	$6,750,000	$6,750,000	$6,750,000	$6,750,000
Additional FTE Cost	$0	$189,725	$298,472	$377,244	$577,713
Additional Maintenance Cost	$39,842	$51,921	$66,267	$87,763	$114,808
Total Annual Cost	$6,789,842	$6,991,645	$7,114,738	$7,215,006	$7,442,521
One-Time Costs	—	—	—	—	—
One-Time Non-Facility Costs[2]	$560,000	$560,000	$580,000	$820,000	$840,000
One-Time Facility Costs	$0	$63,675	$125,950	$844,675	$1,216,675
Total 25-Year Life Cycle Cost[3]	$1,583,000	$6,735,000	$9,968,000	$13,615,000	$18,213,000

Notes:
[1] Operation of the National Park System
[2] Vehicles
[3] Present value of all one-time and annual operating costs

Table 2-10. Preferred Alternative – Additional Full-Time Employee (FTE) Comparison

FTE	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5 (NPS Preferred)
Law Enforcement	0	1	2.25	2.5	3
Maintenance	0	1	1.5	2.5	4.5
Resource Management (for education and monitoring efforts)	0	1	1.25	1.25	2
Total Added FTE (Currently 76 FTE in the preserve)	0	+3	+5	+6.25	+9.5

2.13 THE NATIONAL PARK SERVICE PREFERRED ALTERNATIVE

Alternative 5 is the preferred alternative of the National Park Service because it provides the greatest amount of public access to the preserve. The trail system in this alternative is large enough to provide motorized and nonmotorized access to those parts of the preserve traditionally used by people in the past, and sufficiently spread out to distribute users safely over a large area during hunting season. Of all the alternatives, alternative 5 maximizes opportunities for public use.

Chapter 3

Affected Environment

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CHAPTER 3: AFFECTED ENVIRONMENT

This chapter describes the characteristics of the various environmental resources that could be affected as a result of implementation of any of the alternatives. The topics presented in this chapter are those related to the key issues described in chapter 1 ("Introduction") that inform the NPS decision. The descriptions of the resources provide the baseline conditions against which the potential effects of the various alternatives considered are compared. The effects on these baseline conditions are described in chapter 4 ("Environmental Consequences"). Descriptions of the following resources are included in this chapter: soils, vegetation and habitat, wetlands, special status species, visitor use and experience, ethnographic and archeological resources, and natural soundscapes. Reference maps for this section are provided in appendix E, Affected Environment Reference Maps.

3.1 SOILS

The preserve spans three Florida counties: Collier, Miami-Dade, and Monroe. Several different sources were consulted in order to obtain a comprehensive depiction of soil resources within the preserve. For preserve lands within Collier County, the 1954 Soil Survey of Collier County, published by the US Department of Agriculture, is the most current resource available for this area. Although more recent soil surveys produced by the Natural Resource Conservation Service (1995 and updated in 2005) exist, they do not include areas east of State Road (SR) 29 to the Miami-Dade County line. Therefore, soils mapping through historical (1954) studies was used for this report, as it is the most complete dataset available.

3.1.1 Soils at the Preserve

Duever et al. (1986a) conducted extensive research related to the geology of the preserve prior to completion of the 1991 GMP. They reported that most of the soils in the preserve are simple geological and biological products that have not had sufficient time or environmental conditions for evolution into true soils. Marl, sand, organic matter, and rock are the four substrate types in the preserve. Sand deposits within the preserve are thin, infrequent, and likely derived from old shoreline deposits. Peats derived from partially decayed plant material are also present within the preserve and are identified by their major plant components.

Carbonate marls are the most widespread, unconsolidated soil type in the preserve. Marls are mixtures of calcareous clays with calcite particles, sand, and/or shell fragments and may have periphyton precipitates at the surface. Marl soils support few trees and provide poor traction when wet.

A hard limestone substrate, commonly called cap rock, is usually only a few inches beneath the surface. In some instances, limestone outcrops are present at the land surface, particularly within hardwood hammocks. The shallow limestone rock is typically pitted with solution holes of many sizes. Cypress forests typically occur in the areas of the solution holes. The breaks in the limestone allow plant root systems to penetrate well below the soil surface, so trees can become established. As cypress and other trees become established, the leaves and branches that are shed from the trees collect in the depression. These areas are typically inundated and the organic material settles underwater. As a result, organic materials in the soils of these communities decompose slowly and often become a thick mantle on the substrate surface.

This slow decomposition and buildup of organic material tends to increase the acidity of the water in these communities. Limestone (calcium carbonate), which is common in the substrate surrounding the cypress forests, is soluble in acidic solutions and neutralizes acidity as it dissolves. The dissolution of limestone results in a surface water solution that is saturated with calcium. This is important in the formation of marl, a soil component of prairies.

3.1.2 Soil Suitability for Off-Road Vehicle Use

Marl soils are the most fragile and can be found within the large contiguous prairies present in many areas of the preserve. These areas were classified as "unsuitable" and would be avoided completely for wheeled vehicles within the action alternatives. Smaller prairies and marshes both contain fragile substrates, marshes being classified as "least resilient" due to their inundation and soft, organic soils. These two habitats were considered "least resilient" and were largely, but not completely, avoided within the action alternatives. Prairies are generally unsuitable for wheeled ORV use; however, exceptions can be made in cases where the cap rock is at or near the surface. Shrub cypress and hardwood swamps have much more resilient substrates and were classified as "resilient." Areas with these substrates were considered suitable for ORV and recreational use. Cypress forest, hammocks, pinelands, and disturbed areas contain the most compact, resilient substrates, and were classified as "highly resilient." The areas where substrate is "highly resilient" are located largely within pinelands and hammocks where cap rock is close to the surface and there is less frequent inundation and organic buildups. Although hardwood hammock soils are "highly resilient," they are avoided for cultural resource reasons (discussed in section 3.7). The substrate suitability associated with each habitat type present in the preserve is listed in table 3-1.

Table 3-1. Substrate Suitability In the Preserve

Habitat Type	Substrate Suitability
Cypress (shrub cypress and swamp forest)	Resilient to Highly Resilient
Prairie	Least Resilient to Unsuitable
Pinelands/Pine Flatwoods (Mesic + Hydric)	Highly Resilient
Hammocks (Mesic + Hydric)	Highly Resilient
Marsh	Least Resilient
Mixed Hardwood Swamp	Highly Resilient
Disturbed	Highly Resilient
Mangrove	Unsuitable
Water	Unsuitable

3.2 VEGETATION AND HABITAT

3.2.1 Native Vegetation Communities and Habitat

The preserve hosts a variety of plant communities, including pinelands, prairies, marshes, mangroves, hammocks, cypress savannahs, and mixed swamp forests. Variability within the preserve results from differences in elevation, water, fire, and soil conditions. Given the limited range of elevation in the preserve, minor changes in elevation (i.e., just a few inches) bring about vastly different plant communities. Marshes, mangroves, cypress strands, and cypress savannahs are found at the lowest elevations. Prairies typically are found in the middle elevations, while the higher elevations are characterized by pinelands and hammocks (Ewel 1990, Kushlan 1990).

Seven major vegetation communities can be found in the preserve: (1) cypress strands, domes, and sloughs (2) hardwood swamps, (3) prairies, (4) pinelands, (5) hammocks, (6) marshes, and (7) mangroves. Disturbed areas can also be found throughout the preserve and are intermixed within these vegetation communities. Numerous protected plant species can be found within these vegetation communities, as well as species that serve as habitat for the protected animal species that use the preserve. Table 3-2 summarizes the native vegetation communities, the typical dominant vegetation species in each vegetation community, and the overall percentage of cover of each vegetation community within the preserve.

Both temperate and tropical plants are present in the preserve. Prairies and cypress strands and domes are the most prevalent vegetation types and are dominated by temperate species. Tropical species primarily occur in hardwood hammocks, but are also found in pinelands, mixed-hardwood swamps, and cypress strands. Endemic plants, native only to the preserve area, comprise 10% of the vegetation found in the preserve (Long 1974). NPS staff members are active in the NPS Inventory and Monitoring Program and have completed a thorough inventory of the preserve's vascular plants, which include some that are afforded special protection.

Table 3-2. Vegetation Communities in the Preserve

Vegetation Community	Typical Vegetation/Community Type	Percentage of Cover within the Preserve
Cypress[1]	Cypress Savannah, Dwarf Cypress Forest	45
Prairie[1]	Cordgrass, Graminoid Prairie, Sawgrass, Muhly Grass, Broom and White-top Sedge	25
Pinelands	Savannah, Slash Pine	16
Hammocks	Slash Pine, Cabbage Palm, Hardwood Scrub, Saw Palmetto Scrub	5
Marsh[1]	Broadleaf Emergent Marsh, Sawgrass, Cattail Marsh	3
Mixed Hardwood Swamp[1]	Cypress, Red Bay, Sabal Palm, Pond Apple, Laurel Oak	3
Disturbed	Brazilian Pepper, Exotics, Melaleuca, Java Plum, Spoil Area, Roadway	1
Mangrove[1]	Mangroves	1
Water	Water	1
TOTAL	—	100

Note:
[1] These vegetation communities are described in more detail in section 2.11.4 Wetlands.

The proposed alternatives include existing and proposed trails and destinations throughout the myriad of vegetation communities in the preserve. Vegetation types associated with marsh, prairie, mangrove, and cypress wetland communities are described in detail in the wetlands impact topic section of this Environmental Impact Statement. The remainder of the preserve comprises a mosaic of habitats, including pinelands, hammocks, and disturbed areas (see figure 1 in appendix E).

3.2.2 Pinelands

Pinelands in the preserve are dominated almost exclusively by south Florida slash pine (*Pinus elliottii* var. *densa*) in the canopy. Sub-canopy vegetation varies depending upon soils and hydrology. Pinelands are scattered across wide areas of the preserve, particularly north of US 41, and comprise 16% of the total vegetation cover. Pinelands occur in areas that are higher than most wetlands, so their substrates are inundated less frequently.

Several distinct types of pinelands occur with the preserve: Slash pine forest, pine rocklands, and pine palmetto. These communities are most prevalent in the preserve within the western portion of Zone 4 of the Stairsteps Unit, across a central band of the Deep Lake, Turner River, and Corn Dance Units, and scattered across the Bear Island Unit and Northeast Addition.

Slash pine forests are woodland communities with scattered pine trees that form an infrequent canopy. Depending on substrate, some of these woodlands contain pine and palmetto communities, where scattered pine trees form an open canopy with a dense understory mostly consisting of saw palmetto (*Serenoa repens*). The palmetto shrub layer is usually dense so that groundcover does not become well established.

Pine rocklands are slash pine-dominated communities that occur on limestone outcrops. These areas also develop a saw palmetto shrub layer; however, this shrub layer is usually less dense than that same layer in the pine and palmetto communities. This allows the establishment of other types of groundcover and shrub species. Because of this, pine rocklands are often more diverse than pine and palmetto communities living on sandy substrates. Pineland 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 areas that are adjacent to wetlands. These ecotonal communities have brief or infrequent hydroperiods and contain elements of the adjacent wetlands. Saw palmetto does not typically survive in hydric conditions and is not common in areas that are saturated or inundated often. Slash pines have the ability to tolerate 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 grass-like cover is commonly found.

Pine needles, grasses, and other combustible materials accumulate relatively quickly in pinelands, which 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.

Pinelands provide habitat for the federally listed red-cockaded woodpecker (*Picoides borealis*). Red-cockaded woodpeckers form clusters in this habitat, where they construct cavities in living pines.

3.2.3 Hammocks

Hardwood hammocks are dense and diverse forests of hardwood trees mixed with sabal palms, shrubs with saw palmettos, ferns, and epiphytes that are relatively small in area (2.5 acres or less). These communities are typically found on slightly elevated bedrock areas overlain with sandy peat soils that are slightly drier than those in the surrounding swamps (wetlands dominated by trees) and herbaceous wetlands. Hardwood hammocks are scattered throughout the preserve and often appear as tree islands, which function as refuges for wildlife during periods of high water. Many hardwood hammocks are located on slightly elevated shell mounds that were left by the Calusa Indians. These shell mounds support tropical hardwoods including gumbo limbo (*Bursera simaruba*), mastic (*Mastichodendron foetidissimum*), and poisonwood (*Metopium toxiferum*).

Hammocks that occur inland are usually surrounded by freshwater wetlands. Inland hammocks are usually dominated by live oak or laurel oak trees with understories made up of coco plum (*Chrysobalanus icaco*), snowberry (*Chiococca alba*), and beautyberry (*Callicarpa americana*). Ground cover is sparse, usually consisting of tufted grasses such as bluestem (*Andropogon virginicus*). Epiphytes are common, especially on the branches of oak trees, where resurrection fern (*Polypodium*

polypodioides), many bromeliads, and several uncommon orchids grow. Many epiphytes also occur on the trunks of sabal palms; vines such as poison ivy, grapes (*Vitis* spp.), and pepper vine (*Ampelopsis arborea*) are common.

Trees that dominate these hardwood hammock communities are often large, such as oaks, sabal palms, or wild tamarind (*Lysiloma latisiliquum*). As a result of the numerous large trees, ORV riders usually avoid hardwood hammocks, although the substrate in these areas would support ORV use. Hardwood hammocks are susceptible to invasion by unwanted exotic species, especially Brazilian pepper, when their soils and tree canopies are disturbed.

3.2.4 Disturbed Areas

Disturbed areas, found throughout the preserve, are intermixed within native vegetation communities. These areas have been affected by nature (fire, freeze, storms, extreme tides, etc.) or by human activities such as logging, canal and road construction, farming and grazing, oil extraction, ORV use, fire, introducing exotic 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 ruderal (weedy) species. These weeds are often exotic plants that outcompete native plants and quickly dominate the disturbed area.

3.2.5 Protected Plant Species

Protected plant species include those species that are listed under the federal Endangered Species Act of 1973, as amended (16 United States Code [USC] 1531-1544; Endangered Species Act), and those species identified by the State of Florida as endangered, threatened, or commercially exploited. The list of State of Florida listed plant species is maintained by the Florida Department of Agriculture and Consumer Services under rule 5B-40.0055, Florida Administrative Code.

Three plant species known to occur in the preserve are federally listed. A final rule published in the Federal Register on October 6, 2017 (82 FR 46691) listed the Florida prairie clover (*Dalea carthagenensis* var. *floridana*) as endangered and the Everglades bully (*Sideroxylon reclinatum* ssp. *austrofloridense*) and Florida pineland crabgrass (*Digitaria pauciflora*) as threatened. These species are also listed by the State of Florida as endangered.

In addition, the State of Florida lists 37 additional species that occur in the preserve as threatened or endangered, along with two 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 3-3 displays the status of protected plant species that occur in the preserve.

Table 3-3. Listed Plant Species in the Preserve

Common Name	Scientific Name	Designated Status[1] Federal	Designated Status[1] State
Federally Listed Species	—	—	—
Florida prairie clover	*Dalea carthagenensis* var. *floridana*	E	E
Florida pineland crabgrass / twospike crabgrass / Everglades grass	*Digitaria pauciflora*	T	E
Everglades bully	*Sideroxylon reclinatum* ssp. *Austrofloridense*	T	E
State Listed Species	—	—	—
Everglades palm, paurotis palm	*Acoelorraphe wrightii*	—	T
meadow jointvetch	*Aeschynomene pratensis*	—	E
wild birdnest fern	*Asplenium serratum*	—	E
Fahkahatchee bluethread	*Burmannia flava*	—	E
manyflower grasspink	*Calopogon multiflorus*	—	T
leafless bentspur orchid	*Campylocentrum pachyrrhizum*	—	E
powdery strap airplant	*Catopsis berteroniana*	—	E
Florida strap airplant	*Catopsis floribunda*	—	E
coffee colubrina, greenheart	*Colubrina arborescens*	—	E
pepperbush	*Croton humilis*	—	E
cowhorn orchid	*Cyrtopodium punctatum*	—	E
clamshell orchid	*Encyclia cochleata*	—	E
Tampa butterfly orchid	*Encyclia tampensis*	—	CE
brown-flowered butterfly orchid	*Epidendrum anceps*	—	E
night scented orchid	*Epidendrum nocturnum*	—	E
stiff flower star orchid	*Epidendrum rigidum*	—	E
West Indian tufted airplant	*Guzmania monostachia*	—	E
needleroot airplant orchid	*Harrisella porrecta*	—	T
Poeppig's rosemallow	*Hibiscus poeppigii*	—	E
delicate violet orchid	*Ionopsis utricularioides*	—	E
pineland clustervine	*Jacquemontia curtissii*	—	T
skyblue clustervine	*Jacquemontia pentanthos*	—	E
pine lily	*Lilium catesbaei*	—	T
hidden orchid	*Maxillaria crassifolia*	—	E
giant swordfern	*Nephrolepis biserrata*	—	T
erect pricklypear	*Opuntia stricta*	—	T
royal fern	*Osmunda regalis var. spectabilis*	—	CE
baby rubberplant	*Peperomia obtusifolia*	—	E
yerba linda	*Peperomia rotundifolia*	—	E
greater yellowspike orchid	*Polystachya concreta*	—	E
Bahama brake	*Pteris bahamensis*	—	T
lacelip ladiestresses	*Spiranthes laciniata*	—	T
giantspiral ladiestresses	*Spiranthes longilabris*	—	T
latticevein fern	*Thelypteris reticulate*	—	E

Common Name	Scientific Name	Designated Status[1] Federal	Designated Status[1] State
northern needleleaf	*Tillandsia balbisiana*	—	T
giant air plant	*Tillandsia fasciculata var. densispica*	—	E
twisted air plant	*Tillandsia flexuosa*	—	T
fuzzywuzzy air plant	*Tillandsia pruinosa*	—	E
spreading air plant	*Tillandsia utriculata*	—	E

Source: Personal Communication, Pernas 2016
— Not listed
[1]E = endangered T=threatened CE=commercially exploited

Everglades Bully. On October 6, 2017, the Everglades bully was listed by the US Fish and Wildlife Service under the Endangered Species Act as threatened. It is also a species protected by the State of Florida. Critical habitat has not been proposed or designated for this species.

Everglades bully is found in pinelands, prairies, and in the ecotone between them. This species also grows on the sunny edges of hammock habitat (FR 2016). These plants can tolerate inundation of freshwater for a portion of the year, but do not tolerate saline water. Hydrology within pine rocklands is largely dependent on the porosity of the limestone substrates; however, most sites are only wet following heavy events. In contrast, prairie is typically inundated for less than 6 months of the year (USFWS 1999a).

Historically, the range of the Everglades bully was limited to Collier, Miami-Dade, and Monroe Counties. It is currently known to occur in the Long Pine Key region of Everglades National Park and in pine rockland adjacent to the park. In the preserve, surveys conducted in the Gum Slough region of Zones 3 and 4 of the Stairsteps Unit in 2013 identified 17 plants within prairie habitats. The plant currently has limited distribution with the preserve. As part of the proposed listing, the US Fish and Wildlife Service identified a number of threats to the continued existence and risks to the species viability, including ORV use. The National Park Service would avoid and/or minimize potential impact to this species by siting proposed trails and destinations in areas that do not contain this plant species.

Florida Prairie-Clover. Florida prairie-clover was listed under the Endangered Species Act as an endangered species on October 6, 2017. It is also protected as an endangered species by the State of Florida. Critical habitat has not been proposed or designated for this species.

Florida prairie-clover is restricted to south and southwest Florida with small, scattered populations found within the preserve (in Monroe and Collier Counties), three Miami-Dade County conservation areas, and three unprotected lands within the Cutler Bay region of Miami-Dade County (FR 2016). Three populations were known to exist in the preserve (i.e., North of Oasis Visitor Center, 11-Mile Road, and Pinecrest); however, the 11-Mile Road population appears to have been extirpated in 2014. The North of the Oasis Visitor Center population is one of the largest known populations, consisting of 35 plants of various age groups.

Florida prairie-clover is typically found in pine rocklands, edges of rockland hammocks, coastal uplands, prairie, and ecotones between these habitats. This species may also occur along roadsides, where there is regular mowing, other native herbs and grasses are present, and exotic lawn grasses have not been planted (Gann et al. 2006; FR 2016). Fire is probably an important component to the livelihood of this plant and the habitats in which it resides. Historical declines have been partially attributed to fire suppression or an inadequate fire regimen. Florida prairie-clover occurs in

association with south Florida slash pine, live oak, gumbo limbo, poisonwood (*Metopium toxiferum*), willow bustic (*Sideroxylon salicifolium*), white stopper (*Eugenia axillaris*), bluestem grasses (*Schizachyrium* spp.), and paspalum grasses (*Paspalum* spp.).

As part of the listing, the US Fish and Wildlife Service identified a number of threats to the continued existence and risks to the species viability. One of the identified threats includes ORV use, particularly when operators travel off established trails (FR 2016). The National Park Service would avoid and/or minimize potential impact to this species by siting proposed trails and destinations in areas that do not contain this plant species.

Florida Pineland Crabgrass. Florida pineland crabgrass was listed as a threatened species under the Endangered Species Act on October 6, 2017, and is protected as an endangered species by the State of Florida (FR 2017). Critical habitat has not been proposed or designated for the Florida pineland crabgrass.

Florida pineland crabgrass was historically found in central and southern Miami-Dade County, along the Miami Rock Ridge, from south Miami to the Long Pine Key region of the Everglades National Park (FR 2016). The current range includes Everglades National Park, where it is much wider ranging than previously known, and the preserve, where it was discovered in 2002 in Zones 3 and 4 of the Stairsteps Unit, which are the first known occurrences outside of Miami-Dade County. Subsequent survey efforts have identified up to nine separate occurrences within the preserve, with a total population estimated in 2007 of greater than 10,000 individuals (FR 2016).

Florida pineland crabgrass most commonly occurs along the ecotone between pine rockland and prairie, with some overlap into the two ecosystems. These habitats occasionally flood during the wet season, especially within the prairie habitat. These preferred habitats indicate that this species is associated with low-elevation pinelands and pineland/prairie ecotones that flood for several months each year during the wet season. These habitats are maintained by periodic fires, which are important for maintaining healthy populations of Florida pineland crabgrass for both the removal of overstory hardwoods and the removal of accumulated litter. Dominant vegetation types associated with this species include gulf muhly grass and little bluestems (grasses); sawgrass and rushes (*Rhynchospora* spp.) (sedges); saw palmetto and cabbage palm (palms); and coco plum (*Chrysobalanus icaco*), buttonwood (*Conocarpus erectus*), and white indigoberry (mixed shrubs); and it has been found to be most abundant with grasses and sedges.

Habitats within the preserve that may potentially contain this species include pinelands and prairie. Similar to the other two species discussed above, the US Fish and Wildlife Service identified a number of threats to the continued existence and risks to the species viability, including ORV use. The National Park Service would avoid and/or minimize potential impact to this species by siting proposed trails and destinations in areas that do not contain this plant species.

3.2.6 Nonnative and Invasive Species

Thousands of nonnative plant species have been introduced to south Florida for ornamental plantings, agriculture, and other human uses. Due to the relatively young age 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 category I and category II nonnative plants in Florida, which represents about 11% 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 nonnative 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 old-world climbing fern (*Lygodium microphyllum*) – are fairly common in the preserve. Control efforts have been concentrated on melaleuca and Brazilian pepper, as these species are capable of displacing native plant communities.

Australian pine (*Casuarina equisetifolia*) was identified as a nonnative invasive species of concern; in the last two decades it has been largely eradicated. All known large stands of Australian pine trees have been eliminated from the preserve except for those on private property (NPS 2012a). Crested floating heart (*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 members 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.

3.3 WETLANDS

South Florida lies within the Atlantic Coastal Plain physiographic province. This province is divided into several subprovinces in the region: Big Cypress Swamp, Everglades, Southern Atlantic Coastal Strip, Ten Thousand Islands, Florida Keys, and Southwestern Flatwoods (see figure 2 in appendix E). The rocks underlying this area are among the oldest in south Florida and comprise silt, sand, and carbonate materials (NPS 2008). Coral-rich limestone is exposed in vast expanses of the preserve because the elevation is slightly higher than the neighboring Everglades basin. The land surface of the swamp is flat, except for numerous, low-mounded limestone outcrops and small, circular, elongated depressions in the limestone. In the swamp, water drains slowly through a number of cypress strands into the coastal mangrove forest.

Wetlands comprise approximately 85% of the preserve (figure 1-1). The 1991 GMP/Environmental Impact Statement includes a comprehensive description of the vegetation resources within the preserve (Welch et al. 1999). Specifically, proposed trails and destinations occur in or near cypress, mixed hardwood swamp, prairie, marsh, and mangrove habitats. These community types are described below.

3.3.1 Cypress

Two cypress species are the dominant trees throughout the preserve – bald cypress (*Taxodium distichum*) and pond cypress (*T. ascendens*). Cypress are deciduous trees that can grow to 130 feet tall and reach diameters of 7 to 10 feet. Despite the name of the preserve, most of the larger cypress trees have been removed by logging, and only a few large cypress trees remain. Cypress trees are highly resistant to fire and thrive in saturated soils. Cypress systems in the preserve primarily occur as domes, strands, and prairies and are determined by the underlying soils and hydrology. Cypress systems are the most dominant vegetation communities, comprising 45% of the preserve.

Cypress Domes. Cypress domes are characterized by a cypress overstory, which grows tallest in the center of a depression and tapers off toward the fringes, forming a dome-like feature. This depression in the limestone bedrock fills with organic soils, and eventually peat forms due to constant saturation and slow decomposition. The largest cypress trees are found in these wetter, deeper peat deposits. Trees toward the dome edge are thought to be smaller because of soils that are more marginal, lower water levels, and more frequent susceptibility to fires (Duever et al. 1986b). Flooding for the majority of the year is essential for maintaining cypress domes; average maximum water levels reach about 2 feet (Duever et al. 1986a). Periodic fires play an important role because they limit hardwood invasion, remove peat, and generally leave the cypress unharmed. Ponds often form in the center of cypress domes and are important habitat for alligators and aquatic wildlife. Because of tree density and topographical variations in cypress domes, ORV use is largely constrained to the margins of these systems.

Cypress Strands. Cypress strands are distinct from cypress domes because they form along major drainages and generally retain a north-south orientation. Tall cypress trees dominate the overstory. Unlike cypress domes, understory vegetation is diverse and includes shade-tolerant hardwoods, ferns, and epiphytes. Cypress strands are also associated with relatively deep water and are flooded for the majority of the year (Duever et al. 1986a). The interiors of cypress domes and strands serve as important refuges for water-dependent wildlife during the dry season.

Historically, the preserve's cypress strands have been logged and now many sites are more characteristic of mixed-hardwood swamps. Generally, these communities are natural barriers to ORVs. Because these wetlands are associated with topographic depressions, water depth increases substantially from their edges to the center. Most of the areas covered by these wetlands have unstable substrate, water that is too deep, or too many trees to support ORV use.

Cypress Prairie. Cypress prairies are communities that transition between shortgrass prairies and cypress-dominated swamp communities. Cypress prairies are typically dominated by grass-like ground cover common in prairies, such as muhly grass (*Muhlenbergia capillaris*) or sawgrass. Bald cypress trees are common but typically smaller partly because the limestone cap rock can inhibit the trees' 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.

3.3.2 Mixed Hardwood Swamp

Mixed hardwood swamps contain hardwood trees such as red bay (*Persea borbonia*), sabal palm, pond apple (*Anona glabra*), or laurel oak that co-dominate the tree canopy with bald cypress trees. Greater tree diversities lead to greater epiphyte diversities. Several bromeliads (*Tillandsia* spp., *Guzmania monostachia*) and orchids, such as epidendrums (*Epidendrum* spp.) and ghost orchids (*Polyradicion* (*Polyrrhiza*) *lindenii*), are found on the trunks and branches of these trees. Epiphytic ferns, such as shoestring fern (*Vittaria lineata*) and golden serpent fern (*Phlebodium aureum*), are common on the trunks of sabal palms. Vines, including poison ivy (*Toxicodendron radicans*), several grapes (*Vitis* spp.), and rattan vine (*Berchemia scandens*), are also common components of the tree

canopy. Similar to the cypress strand communities, the interiors of mixed hardwood swamps serve as refuges for water-dependent wildlife during the dry season and also provide a natural barrier to ORVs.

3.3.3 Prairie

Prairies are treeless areas dominated by an herbaceous understory and groundcover. Prairies occur extensively throughout the preserve, particularly in the western and southern portions. Wet prairies in the preserve are characterized by muhly grass (*Muhlenbergia capillaris*), love grass (*Eragrostis* sp.), and sand cordgrass (*Spartina bakeri*); tend to have sandier soils than the wetter marsh systems; and are inundated up to around 8 inches during the wet season. Prairie communities are often found on frequently flooded fine sands or calcium carbonate marls. Limestone is commonly found near the soil surface. These areas are inundated for part of the year, and they receive considerable sunlight. Prairies burn during periods of drought; fires maintain the prairie by eliminating trees and shrubs.

3.3.4 Marsh

Since the preparation of the 1991 GMP, the classification of marshes in the preserve has been changed to be consistent with vegetation classification throughout south Florida. Under the new classification of Welch et al. (1999), marshes now include many of the areas previously identified as prairies (figure 1 in appendix E denotes the current vegetation classes and their areal extent within the preserve).

Marshes are open communities with few trees or shrubs; ground cover is dominated by emergent herbs. Inundation is year-round or nearly year-round. The preserve supports both freshwater and saline marshes. Freshwater marshes are wetland communities that are typically inundated nearly year-round and have substrates with a thick organic surface layer. Freshwater marshes are commonly dominated by broad-leafed plants, such as pickerel weed (*Pontederia cordata*), cattail (*Typha domingensis* or T. *latifolia*), and duck potato (*Sagittaria* spp.). These wetlands have comparatively deep water during the wet season, which provides refuge for fish and other aquatic animals during the dry season. Wading birds, such as wood storks (*Mycteria americana*) and American egrets (*Casmerodius albus*), depend on these concentrated prey populations to find sufficient food. Saline marshes occur in coastal areas, are often affected by tidal marine systems, and have higher soil salinity than inland freshwater systems. These communities are usually populated with freshwater marsh plants that are able to tolerate small increases in salinity, including cattail (*Typha domingensis*), pond apple (*Anona glabra*), and cordgrass (*Spartina bakeri*).

3.3.5 Mangrove Forests

Mangrove forests (a.k.a. mangrove swamps) are intertidal wetlands dominated by hardwood trees that are tolerant of coastal, saline conditions. Three trees commonly occupy these areas – red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), and white mangrove (*Laguncularia racemosa*) – and are closely associated with buttonwood (*Conocarpus erectus*) in south Florida mangrove communities along much of the coastline. Florida law prohibits destruction of mangrove trees.

The mangrove communities in the preserve are found primarily in the Stairsteps Unit Zone 1 and along the southern edge of Zone 2. Per the 2000 Recreational ORV Management Plan, Zone 1 is currently closed to ORV use and only wheeled ORVs are allowed to travel in Zone 2. In contrast to wheeled vehicles, airboats can navigate the mangrove forests but have been known to cause damage when wind generated by propellers damage mangrove leaves and small branches. The alternatives presented in this Environmental Impact Statement do not include ORV trails or destinations that extend into the mangrove forest.

3.4 SPECIAL STATUS ANIMAL SPECIES

Special status species are species listed under federal and state statutes and species considered sensitive by the preserve that are protected to prevent further population decline. The Endangered Species Act of 1973, as amended (16 USC 1531 et seq.), seeks to conserve threatened and endangered species and the ecosystems upon which they depend. It is NPS policy to survey, protect, and strive to recover all Endangered Species Act-listed species that are native to national park system units (NPS 2006a). The National Park Service strives to meet fully its obligations under the Organic Act of 1916 and the Endangered Species Act to both proactively conserve federally listed species and prevent detrimental impacts on these species.

All native birds within the preserve are protected under the Migratory Bird Treaty Act (16 USC 701 et seq.) (MBTA). The MBTA makes it illegal to "take" migratory birds or their eggs, feathers, or nests. "Take" is defined in the MBTA as hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof by any means or in any manner. The MBTA allows legal hunting of certain species, as do the hunting regulations established by the State of Florida.

The preserve is noted for its diversity of rare and endangered animal species that are protected by state and federal law. Occurrences of rare and/or protected animal species have been mapped for the preserve. The preserve is known to contain, be adjacent to, or occur near the following:

- US Fish and Wildlife Service Consultation Areas for:
    - Everglade snail kite (*Rostrahamus sociabilis plumbeus*) – Federally Endangered (FE) species with mapped critical habitat
    - Red-cockaded woodpecker – FE species
    - Florida panther (*Puma concolor coryi*) – FE species with primary zone habitat in the preserve
    - Audubon's crested caracara (*Polyborus plancus audubonii*) – Federally Threatened (FT) species
    - Florida scrub-jay (*Aphelocoma coerulescens*) – FT
    - Florida bonneted bat (*Eumops floridanus*) – FE
    - Cape Sable seaside sparrow (Ammodramus maritimus mirabilis) – FE
- Within the Core Foraging Area of one or more wood stork (*Mycteria americana*, FT) nesting colonies
- Potential habitat for state and federally listed species:
    - Big Cypress fox squirrel (*Sciurus niger avicennia*), State Threatened (ST)
    - Gopher tortoise (*Gopherus polyphemus*) – ST
    - Everglades mink (*Neovison vison evergladensis*) – ST
    - Eastern indigo snake (*Drymarchon corais couperi*) – FT
    - Little blue heron (*Egretta caerulea*) – ST
    - Tricolored heron (*Egretta tricolor*) – ST
- In the US Fish and Wildlife Service Critical Habitat for the West Indian manatee (*Thichechus manatus*) – FT

- Bald eagle (*Haliaeetus leucocephalus*) nests – CO-044; CO-012; MO-003; MO-001
- Primary and secondary range for the Big Cypress population of Florida black bear (*Ursus americanus floridanus*) – South Bear Management Unit

With the exception of the manatee, no designated critical habitat for federally protected species occurs within the preserve (see figure 3 in appendix E). There is US Fish and Wildlife Service designated critical habitat adjacent to the preserve for the following species: American crocodile (*Crocodylus acutus*), West Indian manatee, Cape Sable seaside sparrow, and Everglade snail kite.

Based on recommendations received from the Florida Fish and Wildlife Conservation Commission and historical agency consultations for the preserve related to ORV access and use (see section 4.7), each of the state or federally listed species that have the potential to be affected by the backcountry access plan are described in more detail below. The Florida Fish and Wildlife Conservation Commission did not provide recommendations or express concerns regarding impacts that had the potential to occur as a result of backcountry use to the Big Cypress fox squirrel, gopher tortoise, or Everglades mink; therefore, they are not discussed further in this document.

3.4.1 Florida Black Bear

The Florida black bear (*Ursus americanus floridanus*) is a subspecies of the American black bear. Historically, this species ranged throughout Florida, but human development has reduced its range and fragmented existing populations. Most major populations of bears live in protected areas like the preserve. There are five subpopulations of Florida black bears in Florida, and the Big Cypress subpopulation is estimated at 1,035 individuals (FWC 2015).

The Florida Black Bear Management Plan (FWC 2012) identifies a number of objectives for the Big Cypress subpopulation, including: maintain or increase the current bear subpopulation, create forested connection with the South Central bear management unit, and reduce human-bear conflicts and habitat fragmentation (FWC 2012). The number of the bears in this subpopulation is above the bear management unit minimum subpopulation objective (greater than 700 bears), and the amount of habitat located within conservation lands is almost sufficient to meet the minimum subpopulation objective. Human and bear conflicts are relatively low in the South bear management unit, as are vehicle-related bear deaths. Ways in which the National Park Service would avoid or minimize potential impact to this species are identified in chapter 2.

3.4.2 Florida Panther

The Florida panther (*Puma concolor coryi*) is a subspecies of *Puma concolor* and represents the only known breeding population of puma in the eastern United States. An adult Florida panther is typically tan in overall coloration but may be darker brown to rust-colored along the midline of the back. Since it is distinct from other subspecies and is a small, isolated relic population, the Florida panther is listed as a federal and state endangered species (USFWS 2016a). The Florida panther was listed as federally endangered by the US Fish and Wildlife Service in 1967, and no critical habitat has been designated for this species.

Panthers require large, contiguous areas of suitable habitat; their habitat selection is most closely related to prey availability. Their diet mainly consists of white-tailed deer (*Odocoileus virginianus*) and wild hogs (*Sus scrofa*), but smaller mammals such as raccoons (*Procyon lotor*), armadillos (*Dasypus novemcinctus*), and rabbits (*Sylvilagus palustris*) are also an important part of their diet (USFWS 2016a). Preferred vegetation communities include native upland forests and communities with a dense saw palmetto (*Serenoa repens*) understory for denning and resting.

Historically, this species ranged throughout most of the southeastern United States. Now, the only known self-sustaining population occurs in south Florida, generally in Lee, Collier, Hendry, Miami-Dade, and Monroe Counties (USFWS 2016a), which is less than 5% of its historical range. Potential panther habitat throughout the Southeast continues to be affected by human development. The small population size makes this species susceptible to a genetic bottleneck caused by a lack of genetic diversity, and the spread of contagious diseases has the potential to wipe out a large number of the remaining population. Additionally, panther mortality resulting from vehicle collisions threatens the potential for population expansion (USFWS 2016a).

The 26,400-acre Florida Panther National Wildlife Refuge was established in 1989 to protect the Florida panther and provide optimum habitat for this species. The refuge is near several state, federal, and tribal properties, including the preserve, Big Cypress Seminole Indian Reservation, Everglades National Park, Fakahatchee Strand Preserve State Park, and Picayune Strand State Forest. Together these lands form a large, contiguous tract of panther habitat. The preserve is within the primary zone of the US Fish and Wildlife Service Panther Focus Area (USFWS 2008a). The primary zone, as defined by the US Fish and Wildlife Service, is occupied habitat that supports the only known breeding population of Florida panther. Conservation of these lands is essential for the long-term survival of this species, and any disturbance within the focus area has the potential to impact the species.

Inside the US 41 corridor through the preserve, the Florida Department of Transportation installed several Roadside Animal Detection Systems. The Roadside Animal Detection System employs sensors to detect panthers and other animals crossing the roadway. When activated, the sensors turn on flashing warning signs that inform motorists of the potential hazard. It is hoped that the warning provided by the Roadside Animal Detection System would cause motorists to reduce speed and be more alert to the presence of wildlife on the roadway and ultimately reduce panther and wildlife mortality from motor vehicle collisions.

Extensive prior knowledge of panther movements from radio-tracking enabled placement of wildlife underpasses along I-75 at all identified panther crossing points. Twenty-four wildlife crossings and 12 other bridges modified for panther use were completed in the early 1990s within a 40-mile stretch of I-75, as well as a continuous barrier fence that directed animals to the crossings. Currently, there are 60 wildlife crossings or bridges that have been modified for use by panthers on Florida's roads. Panther deaths caused by vehicle collisions have been sharply reduced in areas where crossings and fencing are in place (FWC 2017). To date, FDOT has built six wildlife crossings with associated fencing on SR 29 to benefit the panther and other wildlife. The wildlife crossings allow panthers and other animals to move between Fakahatchee Strand State Forest and the Florida Panther National Wildlife Refuge on the west side of SR 29 and Big Cypress National Preserve on the east side (USFWS 2015c).

3.4.3 West Indian Manatee

The West Indian manatee (*Trichechus manatus*) is a gentle, slow-moving herbivore that is found along the coast of Florida and in the Caribbean. Manatees move between freshwater, brackish, and saltwater environments. They prefer large, slow-moving rivers, river mouths, and shallow coastal areas, but may be found in canals during winter months as they search for warmer waters.

The West Indian manatee was listed as endangered by the US Fish and Wildlife Service in 1967. Critical habitat was designated by the US Fish and Wildlife Service in 1976. Some of this critical habitat exists within the preserve boundary in the southwest portion of Stairsteps Zone 1. A large portion of critical habitat exists adjacent to the preserve within the Ten Thousand Islands National Wildlife Refuge. Petition to the US Fish and Wildlife Service to revise the critical habitat for the

manatee was issued in 2009, and the US Fish and Wildlife Service concurred that revision of the critical habitat was warranted. On April 5, 2017, the US Fish and Wildlife Service reclassified the West Indian manatee from endangered to threatened under the Endangered Species Act. However, the US Fish and Wildlife Service has not yet moved forward with re-designation of critical habitat areas.

3.4.4 Cape Sable Seaside Sparrow

Cape Sable seaside sparrows (*Ammodramus maritimus mirabilis*) are medium-sized sparrows endemic to south Florida. They are non-migratory residents of freshwater to brackish marshes. They prefer nesting in mixed prairie community that often includes muhly grass (*Muhlenbergia filipes*) (Stevenson and Anderson 1994). The short-hydroperiod prairies contain moderately dense, clumped grasses, with open space permitting ground movements by the sparrows. The restricted range of the Cape Sable seaside sparrow led to the US Fish and Wildlife Service listing the species as endangered in 1967. Changes in habitat that have occurred as a result of changes in the distribution, timing, and quantity of water flows in south Florida continue to threaten the subspecies with extinction (USFWS 1999b).

Critical habitat for the Cape Sable seaside sparrow was designated in 1977 and revised in 2007. No critical habitat has been mapped within the preserve; however, the preserve is situated within the consultation area. A core subpopulation of sparrows has historically existed within the southeastern boundary of Stairsteps Unit Zone 4. This subpopulation has experienced a sharp decline, and as of the 2010 US Fish and Wildlife Service 5-Year Species Review (USFWS 2010), there were an estimated 93 individuals left of what was once a population of more than 2,500 individuals.

3.4.5 Everglade Snail Kite

The Everglade snail kite (*Rostrhamus sociabilis plumbeus*), now officially known as the snail kite, is a wide-ranging raptor found primarily in lowland freshwater marshes in tropical and subtropical America. The US Fish and Wildlife Service listed the snail kite as endangered in 1967. Because of a highly specific diet composed almost entirely of apple snails (*Pomacea paludosa*), survival of the snail kite depends directly on the hydrology and water quality of these watersheds, each of which has experienced pervasive degradation as a result of urban development and agricultural activities (USFWS 1999c).

Critical habitat for the snail kite was designated by the US Fish and Wildlife Service in 1977. No critical habitat is within the preserve; however, the eastern boundary of the preserve directly abuts the western boundary of the critical habitat. The preserve contains abundant suitable habitat and forage area within its vast prairies and marshes for this species.

3.4.6 Audubon's Crested Caracara

Audubon's crested caracara (*Polyborus plancus audubonii*) is a large, boldly patterned raptor, with a crest and unusually long legs. It is a resident, diurnal, and nonmigratory species. Its habitat mainly consists of the prairie and rangeland areas of the south-central region of Florida. Only the Florida population, which is isolated from the remainder of the subspecies in the southwestern United States and Central America, is listed under the Endangered Species Act (USFWS 1999d). Audubon's crested caracara was listed as threatened by the US Fish and Wildlife Service in 1987. No critical habitat has been designated for this species. A large portion of central and south Florida lies within the species' consultation area, including the lands in the preserve.

Audubon's crested caracara lives in a wide variety of semi-open habitats offering open ground for hunting and dense cover for nesting. These birds feed by flying low and taking small animals by surprise and by flying along highways in early morning, searching for road kill (Audubon Society 2016). The mosaic of open and semi-open habitats in the preserve provide suitable habitat for this species.

3.4.7 Florida Bonneted Bat

The Florida bonneted bat (*Eumops floridanus*) is the largest species of bat in Florida (Belwood 1992); it can reach up to 6.5 inches in length, with a wingspan of 20 inches. Its name refers to its large, broad ears, which project forward over the eyes. Its fur ranges in color from dark gray to brownish-gray (NPS 2016b). Its diet primarily consists of flying insects, beetles, and flies. It has been known to forage in tropical hardwood, pineland, and mangrove habitats, as well as developed areas. It roosts in cliff crevices, tree cavities, and buildings. It is present in rural areas, as well as residential and urban areas (NPS 2016b). This species was listed as endangered by the US Fish and Wildlife Service in 2013. On June 10, 2020, the USFWS proposed that approximately 77% of the preserve be designated critical habitat for this species (USFWS 2020).

Because of its extremely limited range and low numbers, the Florida bonneted bat is vulnerable to a wide array of natural and human-related threats. Habitat loss, degradation, and modification from human population growth and the associated development and agriculture are major threats to this species (NPS 2016b). This species is active year-round and endemic to south Florida and is nonmigratory. To date, Florida bonneted bats have only been found in the south Florida counties of Lee, Collier, Charlotte, Monroe, and Miami-Dade (FWC 2016). The presence of this species in the preserve has been confirmed and one roost site has been identified.

3.4.8 Wood Stork

The wood stork (*Mycteria americana*) is a large, long-legged wading bird, standing about 50 inches tall, with a wingspan more than 60 inches (USFWS 2016b). The wood stork's US range consists of parts of Florida, Georgia, and South Carolina. The wood stork forages for small fish, mainly in shallow water in freshwater marshes, swamps, lagoons, ponds, tidal creeks, flooded pastures, and ditches.

Highly social, these birds nest in large rookeries and feed in flocks. In south Florida, nesting occurs as early as October, with young leaving the nest in February or March. Nests are frequently located in the upper branches of large cypress trees or in mangroves on islands (USFWS 2016b).

The wood stork was listed as threatened by the US Fish and Wildlife Service in 1984. No critical habitat has been designated for this species. Based on data from 1996, there are eight wood stork rookeries in and directly adjacent to the preserve (see figure 4 in appendix E). As part of the Plan evaluation, each trail and destination was assessed for potential impacts within 1,000 feet from active wood stork colonies.

3.4.9 Eastern Indigo Snake

The Eastern indigo snake (*Drymarchon corais couperi*) is a large, nonvenomous snake that may reach up to 8 feet in length. The snake gets its name from its shiny, blue-black color. Its diet consists mainly of other snakes, amphibians, small mammals, and occasionally birds. Over most of its range (throughout Florida and along the coastal plain of Georgia) the Eastern indigo snake frequents several habitat types, including pine flatwoods, scrubby flatwoods, high pine, dry prairie, tropical hardwood hammocks, edges of freshwater marshes, agricultural fields, coastal dunes, and human-

altered habitats. 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.

The Eastern indigo snake was listed as threatened by the US Fish and Wildlife Service in 1978. No critical habitat has been designated for this species. While this species is often associated with the gopher tortoise, the Eastern indigo snake uses both uplands and wetlands throughout its life cycle. The Eastern indigo snake was listed as a threatened species as a result of dramatic population declines caused by over-collecting for the domestic and international pet trade, as well as mortalities caused by rattlesnake collectors who gassed gopher tortoise burrows to collect snakes. Since its listing, habitat loss and fragmentation by residential and commercial expansion have become much more noteworthy threats (USFWS 1999e). The habitat mosaic in the preserve supports an abundance of prey opportunities for the indigo snake. However, seasonal hydroperiods in the preserve are not conducive to the species and few records indicate the existence of the Eastern indigo snake in the preserve during these times.

3.4.10 American Crocodile

The American crocodile (*Crocodylus acutus*) is one of two species of crocodilians endemic to the United States. The American crocodile inhabits coastal habitats of extreme south Florida, the Caribbean, Mexico, Central America, and northern South America. The American crocodile is found primarily in mangrove swamps and along mangrove-lined bays, creeks, and inland swamps (Kushlan and Mazzotti 1989). Highly used inland waters suggests crocodiles prefer less saline waters, using sheltered areas such as undercut banks and mangrove snags and roots that are protected from wind and wave action. Access to deep water is also an important component of preferred habitats (Mazzotti 1983).

In Florida, the American crocodile was listed as threatened in 1975 by the US Fish and Wildlife Service. Critical habitat was designated by the US Fish and Wildlife Service in 1976. There is no critical habitat in the preserve; however, critical habitat is identified in the neighboring Everglades National Park. Crocodiles have been known to occur in southwestern Collier County and are occasionally spotted in the preserve.

3.4.11 American Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is one of the largest birds of prey found in North America. It is most commonly seen along coasts and near other large bodies of open water with an abundance of fish. The bald eagle prefers old growth and mature stands of coniferous or hardwood trees for perching, roosting, and nesting. Its diet is opportunistic and varied, but most feed mainly on fish. Since the 1980 listing for protection under the Endangered Species Act, gentler treatment by humans, along with the banning of the chemical dichloro-diphenyl-trichloroethane (the bird's main pesticide threat), have led to a dramatic resurgence (USFWS 2015a). Bald eagles were delisted due to recovery and are no longer protected under the Endangered Species Act, but this species remains protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The Bald and Golden Eagle Protection Act is the state and federally enforced mechanism that makes it illegal to "take" bald or golden eagles, their parts, nests, or eggs. Under the Bald and Golden Eagle Protection Act, "take" is defined as any action that will kill, injure, molest, or disturb these species to the point where productivity or reproduction is affected. There are currently five known bald eagle nests within the preserve (see figure 5 in appendix E).

3.4.12 Red-Cockaded Woodpecker

The red-cockaded woodpecker (*Picoides borealis*; RCW) is approximately 7 inches long with a wingspan of about 15 inches. Its back is barred with black and white horizontal stripes, and its most distinguishing feature is a black cap and nape that encircle large white cheek patches. The diet of RCWs consists mostly of insects, including beetles, ants, roaches, spiders and other insects found in or on pine trees. Fruits and seeds make up a small portion of the overall diet. RCWs were once considered common throughout the longleaf pine ecosystem, which historically covered approximately 90 million acres before European settlement. The birds inhabited the open pine forests of the Southeast from New Jersey, Maryland, and Virginia to Florida, west to Texas, and north to portions of Oklahoma, Missouri, Tennessee, and Kentucky. The precipitous decline in RCW populations was caused by an almost complete loss of habitat. Longleaf pine ecosystems, of primary importance to RCWs, are among the most endangered systems on earth (Center for Biological Diversity 2016).

RCWs were listed as endangered by the US Fish and Wildlife Service in 1970. No critical habitat has been designated for this species.

Today, the RCW makes its home in mature pine forests and many RCW populations are located in the preserve. Longleaf pines (*Pinus palustris*) are most commonly preferred, but other species of southern pine are also acceptable (USFWS 2015b). The RCW is well established in mature slash pines (*Pinus elliottii*) in the preserve. Preserve staff periodically monitor the locations and status of these populations, and there are 70 to 80 active colonies in the preserve.

3.4.13 Special Status Wading Birds

Three state listed wading birds occur in the preserve. They are not listed or afforded protection under the federal Endangered Species Act. The population of wading bird species declined in the early 1900s due to egg and plume hunting, and currently habitat degradation and loss, reduced prey availability, and disturbance at breeding and foraging sites contribute to ongoing population decline. These species range throughout Florida. In general, they forage in shallow water on a variety of fish, crustaceans, insects, and small reptiles, and they are colonial breeders.

3.4.14 Little Blue Heron

The little blue heron (*Egretta caerulea*) is state listed as threatened and is commonly found within the preserve throughout the year. It feeds in a variety of aquatic habitats, including freshwater, brackish, and estuarine habitats. Nesting colonies are typically in coastal areas, usually in cypress, willow, maple, black mangrove, and cabbage palms. Foraging generally occurs in freshwater lakes, marshes, swamps, and streams; this habitat is abundant in the preserve (Florida Natural Areas Inventory 2001).

In 2013, the Florida Fish and Wildlife Conservation Commission finalized a Species Action Plan for Six Imperiled Wading Birds, (FWC 2013), including the little blue heron, snowy egret, and tricolored heron. The objectives of the plan are to reverse the decline of the little blue heron and tricolored heron, maintain populations of the snowy egret, and improve the quality and amount of wading bird habitat. The plan identifies 31 conservation actions that contribute toward management and protection efforts so that the species does not warrant re-listing on the Florida Endangered and Threatened Species List (FWC 2013). Based on the criteria identified in the Species Action Plan, the little blue heron met criteria for listing as a threatened species because the population size has been reduced by 30% over the last three generations (36 years) due to decline in habitat (FWC 2013).

3.4.15 Tricolored Heron

The tricolored heron (*Egretta tricolor*) is state listed as threatened, and is commonly found in the preserve in all seasons. Like the other wading birds, this species nesting is primarily in colonies of mixed species on mangrove islands or willow thickets in freshwater habitat and coastal environments. It forages in permanent and seasonal wetlands including mangrove swamp, tidal creeks, ditches, and the edge of ponds and lakes. Habitats for colony nesting and foraging are abundant in the preserve.

The same Species Action Plan, including the management and protection efforts, objectives, and conservation actions described for the little blue heron, apply to the tricolored heron. Like the little blue heron, the tricolored heron also meets criteria for listing as a threatened species.

3.6 VISITOR USE AND EXPERIENCE

The preserve is a destination for both local residents and nonlocal visitors (NPS 2010). In the 1970s and 1980s, the primary visitors to the preserve were hunters, ORV users, and owners of improved properties (NPS 2010). Since the 1990s, there has been an increase in other recreational activities such as hiking, canoeing, wildlife viewing, bird watching, photography, bicycling, camping, picnicking, and sightseeing. This increase has happened concurrently with an increase in overall visitors to the preserve since the 1970s (NPS 2010).

According to the Addition GMP (NPS 2010), between 1997 and 2004, recreational visits to the preserve averaged between 400,000 and 500,000 per year. In 2005, visitation-counting methods changed to include vehicle counts at the Oasis Visitor Center parking lot and the east and west ends of Loop Road. From 2005 to 2010, recreational visits to the preserve averaged approximately 785,000 per year (NPS 2012b).

Between 2005 and 2010, annual visits to the preserve included an average of 20,000 campground overnight stays, 11,000 backcountry overnight stays, 12,000 visits for hunting, 1,200 visits to the FNST, 71,000 visits to boat launch areas, 108,000 visitor center and headquarters visits, 14,000 interpretive program visits, and 3,000 visits as a part of a commercial tour. Visits by vehicle were recorded in the following locations (rounded to the nearest 1,000): 128,000 at Loop Road (east and west); 24,000 at Bear Island; 225,000 at Turner, Birdon, and Wagonwheel Roads; 21,000 at Mitchells Landing; 28,000 at Pinecrest; 41,000 at Turner River Launch site; and 192,000 at Oasis parking lot (NPS 2012b).

Existing visitor amenities and opportunities provided at the preserve include visitor centers, campgrounds, scenic drives, picnic facilities, trailheads, and trails. There are 16 permitted commercial operators that are authorized to provide visitor services in the preserve. These activities include swamp buggy tours, canoe and kayak rentals and tours, pole boat tours, camping and hiking tours, and bike rental and tours.

Due to the wide variety of uses, there is a potential for use conflicts between motorized and nonmotorized users seeking different experiences in the preserve. While there are many recreational activities available in the preserve, the dominant ones are discussed below.

3.6.1 Off-Road Vehicle Use

Remote backcountry areas of the preserve are challenging to reach by foot. ORVs are a practical way to access the preserve's interior, and thus, ORV use is a traditional, popular recreational activity. Several types of ORVs are used to access the backcountry, including street-legal four-wheel-drive

vehicles (4 x 4s), lightweight all-terrain vehicles, utility task vehicles, swamp buggies, and airboats. Motorcycles and other two-wheeled, motorized vehicles are not permitted in the backcountry.

Recreational activities that involve ORV use include hunting, fishing, frogging, camping, wildlife observation, transportation to private property, and recreational driving. ORV use is heaviest during the fall, winter, and spring hunting seasons. The greatest use is on opening weekends of hunting seasons and holidays.

Obtaining an ORV permit is a three-step process. First, before a vehicle permit sticker can be issued, a vehicle inspection (including meeting certain safety requirements) must be performed. Second, operators are required to complete an online ORV operator course before an operator permit can be issued. Lastly, ORV operators must also purchase an annual ORV permit ($100 annually) to be displayed on the inspected vehicle. The vehicle permit is required for recreational ORV operation along preserve trails. All permit sales are on a first-come, first-served basis at this time, but a drawing system may be used as demand approaches the 2,000-permit per year limit. The National Park Service maintains a record of applicant and ownership information for each permitted ORV. Vehicle operators are responsible for knowing NPS regulations that apply to ORV use in the preserve.

Within the original preserve, ORV permit numbers have declined over recent years, going from a high of 2,000 in 2010 to 1,087 in 2016. Fluctuations in the number of ORV permits issued each year also reflect water levels in the preserve, with fewer registered vehicles in the wetter years (e.g., 1995) when portions of the preserve are closed to hunting (NPS 2010).

Management of ORVs in the original preserve is guided by the 2000 Recreational ORV Management Plan (NPS 2000a). Management of ORVs in the Addition is guided by the Addition GMP (NPS 2010). ORV use by the general public is currently prohibited in the Addition; however, under the Addition GMP the National Park Service anticipates phasing it in over time (NPS 2010), and expects to designate up to 130 miles of primary trails and issue 650 ORV permits in the Addition.

There is an extensive network of primary ORV trails in the original preserve (table 3-4). No secondary ORV trails are currently open. There are 15 ORV access points distributed across four management units in the preserve.

Table 3-4. Current Primary Trail Network In the Preserve

Management Unit	Miles of Existing Primary ORV Trails
Bear Island Unit	22
Corn Dance Unit	65
Deep Lake Unit	—
Loop Unit	—
Stairsteps Zone 1	—
Stairsteps Zone 2	6
Stairsteps Zone 3	3
Stairsteps Zone 4	57
Turner River Unit	125
TOTAL	278

3.6.2 Camping

3.6.2.1 Established Campgrounds.

The preserve offers several campgrounds, some of which are closed seasonally, with options for RV sites, restroom facilities, electrical hookups, and drinking water (table 3-5). These campgrounds offer easy access to backcountry areas, and some backcountry users stay in the campgrounds. Reservations for camping can be made through www.recreation.gov for all campgrounds except Pink Jeep, Gator Head, and Bear Island Campgrounds, which are first-come first-served; no reservations are taken. Within the Bear Island Unit, camping is allowed only in designated campgrounds including Bear Island Campground (40 sites). The Bear Island Campground is accessible by road vehicle. The Pink Jeep and Gator Head campgrounds are accessible only by permitted ORVs, biking, or hiking.

Table 3-5. Campgrounds In the Preserve

Campground (type)	# of Sites	Availability	Drinking water?	Dump Station? [1]	Electrical Hookups?	Restroom?	Fee (per night)
Bear Island (primitive)	40 tent	Varies: campsites 1-12 are open year-round. Sites 13-40 are open August 15 to April 15.	No	No	No	Vault Toilets	$10
Burns Lake (primitive)	8 RV / 6 tent	August 15 -April 15. But open year round for day use and backcountry access parking.	No	No	No	Vault Toilets	$24
Gator Head (primitive)	9 tent	August 15 - April 15	No	No	No	Vault Toilets	$10, ORV permit required
Midway (developed)	26 RV / 10 tent	Open year round	Yes	Yes	Yes	Yes	RV site $30; tent site $24
Mitchell Landing (primitive)	11 RV/tent	August 15 - April 15	No	No	No	Vault Toilets	$24
Monument Lake (developed)	26 RV / 10 tent	August 15 - April 15	Yes	No	No	Yes	RV site $28; tent site $24
Pinecrest Group Campground (primitive)	4 group sites (8 tents, 15 people each)	Open year round	No	No	No	No	$30
Pink Jeep (primitive)	9 tent	August 15 - April 15	No	No	No	Vault Toilets	$10, ORV permit required

Note:
[1] Dump stations are located at Midway Campground and at Dona Drive (2.5 miles east of SR 29 on US 41). Dump stations may be used free of charge by campers paying for NPS campgrounds in the preserve. There is a $10 fee for those campers not paying for a preserve campground.

3.6.2.2 Backcountry Camping.

Backcountry camping is allowed in almost all of the preserve. It gives visitors a chance to experience the preserve's interior. Backcountry users must carry everything they need to survive on their back or in an ORV. A free Backcountry Camping Permit is required for all backcountry camping. The permit can be filled out online and printed or obtained at a backcountry trailhead or visitor center.

Except as restricted in the Bear Island Unit and Zone 4 of the Stairsteps Unit, dispersed camping in nondeveloped areas is allowed in the preserve. Visitors may drive ORVs to a location along a designated trail nearest the preferred camping spot, park the ORV along the shoulder of the trail in such a manner that does not impede travel by others, and carry equipment to the campsite. Backcountry camping is prohibited within 0.5 mile of any developed area or county or state roads.

3.6.2.3 Backcountry Camping Rules and Regulations.

The maximum length for a single stay in the preserve designated backcountry areas is 10 days from January 1 through April 30, and 14 days from May 1 through December 31. The total number of days a visitor may camp in the preserve backcountry in a calendar year is 180 days. Once the daily limit has been reached for each time period, the person, party, or organization must move as instructed to another designated camping area. Except for the periods and locations indicated below, no camping gear can be left in the backcountry when the user is not actively camping and staying overnight at the campsite.

An individual may camp or leave camping gear unattended in backcountry areas of the preserve for the length of the following specific hunting seasons, except for Zone 4 of the Stairsteps Unit and the designated sites in the Gator Head and Pink Jeep Campgrounds:

- Archery Season/Muzzle Loading Season
- General Gun Season
- Spring Turkey Season

ORV use in campgrounds is limited to Burns Lake, Pink Jeep, and Gator Head Campgrounds only. Travel by ORV is for the purpose of accessing the backcountry trails from parking areas or campsites by permitted ORVs. Mitchell's Landing allows for launching of permitted airboats from the launch site.

In the Bear Island Unit, backcountry camping is permitted only at designated campsites: 9 tent sites at Gator Head Campground and 9 tent sites at Pink Jeep Campground. Campers who leave equipment at the Gator Head and Pink Jeep Campgrounds would be required to pay the daily camping fee for the days their equipment occupies the site.

In Stairsteps Unit Zone 4, airboat users must camp in designated campsites only (1–17). Backcountry camping is allowed in other areas of Zone 4 (except the seaside sparrow closure area) when access is gained by foot or nonmotorized vessel and the campsite is at least 0.5 mile from Loop Road and 0.25 mile from any designated campsite or airboat trail. No personal property (e.g., tents, grills, cookware, tables, bedding) can be left in the backcountry anywhere in Zone 4 when the user is not actively camping and staying overnight at the campsite.

3.6.3 Hunting

The preserve has been designated by the state as a wildlife management area, and the National Park Service permits hunting by the public in accordance with state laws and regulations. The National Park Service and the Florida Fish and Wildlife Conservation Commission have concurrent jurisdiction for enforcing game and fish laws in the preserve. Similarly, although the National Park Service has authority to manage wildlife in the preserve, the National Park Service cooperatively manages the Big Cypress Wildlife Management Area along with the Florida Fish and Wildlife Conservation Commission. The Commission manages species restoration; conducts research, surveying, and monitoring activities; sets regulations and seasons for hunting and fishing; and in addition to other activities, conducts outreach and education initiatives. The Florida Fish and Wildlife Conservation Commission consults with the National Park Service and US Fish and Wildlife Service before issuing regulations that affect hunting within the preserve. Likewise, the National Park Service consults with the Commission before establishing any temporary or permanent closures or public use limits.

Hunting regulations within the preserve are outlined in the Florida Fish and Wildlife Conservation Commission Big Cypress Wildlife Management Area Regulations brochure, which is updated annually and posted on the websites of both the Commission and the preserve. 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, muzzle-loading gun season, modern gun season, small game season, trapping (which is prohibited in the preserve), spring turkey season, migratory bird seasons, fishing and frogging, and general NPS rules and information (FWC 2011).

Hunting seasons in the preserve include archery, muzzle-loading gun, general gun (rifles or shotguns), small game, spring turkey, and migratory bird. Hunters typically access stands and camps via ORVs. Hunters may take antlered deer, wild hogs, and turkeys (spring turkey season only). Hunters may also take gray squirrels, quail, rabbits, raccoons, and coyotes, as well as migratory game birds in season.

Fishing and frogging are allowed year-round. Fishing requires a license and anglers must adhere to Florida's Freshwater Fishing Regulations published by the Florida Fish and Wildlife Conservation Commission. Recreational frogging for personal use is allowed and does not require a license. Frogs may be taken by gig (multipronged spear) only.

Deer and hog hunting season takes place from September through December. From 2008 to 2012, deer and hog hunting seasons averaged 14,285 man-days of hunter pressure, with a mean annual harvest (over the past five years) of 226 deer (bucks only) and 3 hogs (FWC 2009-2013 annual harvest reports) (NPS 2014). FWC and the National Park Service monitor deer population trends through aerial surveys, since deer and hogs are the main prey species of the Florida panther (NPS 2014).

3.6.4 Wildlife Viewing

Several major highways transect or run adjacent to the preserve. Interstate 75, Alligator Alley, crosses the northern portion of the preserve for approximately 30 miles. Although this highway is the primary transit route between Fort Lauderdale and Naples, it also offers views into the undeveloped land in the preserve. US 41, Tamiami Trail, is a paved highway that crosses the southern portion of the preserve for about 36 miles. SR 29 is a paved highway that forms the western border of the Western Addition for approximately 29 miles.

There are various opportunities for visitors to view wildlife along the extensive network of paved and unpaved roads throughout the preserve, such as Burns Road, Bear Island Grade, portions of the L-28 levee road, the Jetport access road, Bass Road, and others. Popular scenic drives in the preserve include Loop Road and the Turner River/ Wagonwheel/ Birdon Roads loop. Visitors can view birds, alligators, and other wildlife. There is also a nature center and an interpretive trail along Loop Road. In 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 the Oasis Visitor Center. Within the Addition, wildlife viewing and bird watching opportunities are relatively primitive in nature and self-directed because no infrastructure is available (NPS 2010).

The preserve supports bird watching as one of its principal attractions in both frontcountry and backcountry areas. Cypress strands, hardwood hammocks, old-growth pinelands, sawgrass prairies, and mangrove forests support an array of bird diversity. Nearly 200 species of birds may be seen throughout the year, including limpkins, purple gallinules, roseate spoonbills, snail kites, swallow-tailed kites, and wood storks. The preserve is part of The Great Florida Birding and Wildlife Trail, a collection of 445 sites throughout Florida selected for their excellent bird watching or bird education opportunities.

3.6.5 Hiking

Hiking in the preserve can be along designated trails, including ORV trails, or orienteering through unmarked territory. There are 64 miles of dedicated hiking trails in the preserve, 37 miles of which are part of the FNST. The FNST is a 1,400-mile nonmotorized, recreational trail that stretches across Florida; it received federal designation as a National Scenic Trail in 1983. The FNST provides backcountry hiking experiences to visitors; its southern terminus is the Oasis Welcome Center.

The FNST within the preserve can be divided into two sections from north to south:

- Northern Preserve Boundary to I-75 (approximately 8 miles) – This section of trail follows Nobles Grade, an old oil road, through hardwood, prairie, and pineland habitats. Because it follows an old road, it makes for an easier hiking experience and is not subject to becoming overgrown like the southern portion of the trail.
- I-75 to US 41 (approximately 29 miles) – Trailheads are located on US 41 near the Oasis Visitor Center and on I-75 at the rest area at Mile Marker 63. The trail passes through a variety of habitat types including hardwood hammocks, pinelands, prairies, and cypress. This walk is not for the casual hiker. It is not heavily marked and vegetation grows over it during the rainy season when there is little foot traffic. During the dry season, there is no water available on this part of the FNST and visitors must carry all water.

The US 41 to Loop Road Trail (approximately 6.5 miles), formerly part of the FNST, is also available for visitors to experience the preserve's backcountry. The trail begins at Loop Road and ends across the highway from the Oasis Visitor Center. The trail traverses dwarf cypress and prairies and crosses through Robert's Lake Strand. It is well marked and easy to moderate in the winter season, but knee to waist deep in water during the rainy season. Additionally, there are several short (less than 3 miles) frontcountry trails available for hiking, including Bass Lake Trail, Deep Lake Trail, Fire Prairie Trail, Gator Hook Trail, and Tree Snail Hammock Trail

3.6.6 Paddling (Canoeing/Kayaking)

There are several designated paddling (nonmotorized) trails available for visitors in the preserve, most of which are south of US 41. The options range from easy to moderate trails including the Turner River Paddling Trail (9.93 miles), the Halfway Creek and Halfway Creek Loop Paddling

Trails (7.28 miles), and the Lefthand Turner River Paddling Trail (3.65 miles). Other areas are open to motorized and nonmotorized 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 2010).

3.6.7 Motorboat Use

Use of motorboats throughout the preserve is generally restricted to the deeper water estuarine environments south of US 41 outside of Everglades City and the L-28 Interceptor Canal in the Northeast Addition. The Stairsteps Unit (south of US 41) is the wettest area of the preserve and is often referred to as "airboat country." Access to Zone 3 and Zone 4 of the Stairsteps Unit is restricted to airboats.

In accordance with the principles of adaptive management, the preserve has established water levels for airboat use in Stairsteps Unit Zone 4. Different low-water levels have been established for the summer-fall (June through December) and winter-spring (January through May) seasons. As described in the 2000 Recreational ORV Management Plan, airboat use in Zone 4 is allowed as follows:

- during the summer-fall season only when water levels at the P34 gauging station are above 2.2 feet above sea level (asl) and below 4.0 feet asl
- during the winter-spring season only when water levels at the P34 gauging station are above 3.0 asl and below 4.0 feet asl

Motorized vessels are regulated by the Florida Fish and Wildlife Conservation Commission, which serves as the state boating law administrator, and the US Coast Guard. All vessels must comply with applicable federal and state laws (NPS 2010). Airboats must meet all Florida and US Coast Guard rules and regulations for vessels, including lighting and registration.

3.7 ETHNOGRAPHIC AND ARCHEOLOGICAL RESOURCES

The preserve is situated within the Glades region of south Florida – an area defined by hardwood and pinewood hammock, sawgrass, and dwarf cypress interspersed with shallow freshwater marshes and prairies. Human habitation of this region can be traced back to the late Pleistocene or Lithic eras. Paleo-Indian populations migrating throughout North America likely arrived in south Florida more than 13,000 years ago. Florida's environment was substantially different during this period. Sea levels were much lower and Florida's land mass was about twice the size it is today. The climate was much cooler and drier. The story of human activity in Florida during this period is not well understood, due in part to the fact that much of the area occupied by humans was inundated by rising sea levels that occurred with the retreat of the continental ice sheets that began around 12,000 to 13,000 years ago. This change in global glaciations signaled the end of the Pleistocene era.

The prehistoric periods of human culture include the Paleo-Indian period, the Archaic period (8,000 BC to 500 BC), and the Glades Tradition period, which extends into the historic period (500 BC to AD 1760). The historic periods of human culture begin within the initial Spanish contact in 1513 and continue through the 20th century.

There are fewer than 100 Paleo-Indian archeological sites in Florida, and none located within the boundary of the preserve. In all likelihood, most sites associated with the Paleo-Indians of this era are submerged beneath the state's coastal waters. However, at least one area, within Deep Lake management unit, has the potential for association with this prehistoric period.

The Archaic period that followed the Pleistocene is divided into three distinct divisions: early, middle, and late. The Archaic cultures of south Florida are distinguished by progressively more diversified hunting, fishing, and gathering; the creation of more permanent settlements; and increasingly sophisticated tools, trade networks, and in the late Archaic the appearance of pottery. A few Archaic period sites have been identified within the preserve.

The Glades period or Glades Tradition succeeded the Archaic period and incorporates both the end of the prehistoric period in south Florida and the first historic documentation of indigenous culture in south Florida. The Glades Tradition witnessed the introduction of decorated pottery and woodworking, as well as the introduction of European trade goods such as metal implements and trade beads. Spanish explorers documented the extant tribal cultures, which included the Calusa, Tequesta, and Key Indians.

The Spanish established forts and settlements along the Florida coast, raided the tribes for slaves, and sought to convert the indigenous peoples to Christianity. The Spanish managed to retain some control of Florida despite repeated incursions by the English and French. Following the end of the Seven Years' War in 1763, Spain ceded Florida to Great Britain. At the end of the American Revolution in 1783, the British returned Florida to Spain. The Spanish maintained at least nominal control of Florida while the British and the Americans tried to assert control over the region. The United States officially acquired Florida in 1821. American expansion into Florida led to the establishment of ports and towns, the introduction of the plantation system, and a policy of Indian removal, which in turn triggered prolonged and intense conflict with the Seminoles.

The Seminoles trace their origins back to groups in the Creek Confederacy, many of whom migrated into Florida in the 18th century. Additionally, according to Seminole oral tradition they joined with the remaining people of the Florida tribes. Many Seminoles sought to escape Indian removal by taking refuge in the Everglades and Big Cypress swamp, where they managed to maintain a presence even as European settlers ultimately asserted control over the rest of Florida.

The pace of modern development in Florida greatly accelerated in the 20th century. Farming, ranching, logging, oil and gas exploration, and land development opened areas that earlier European contact had left relatively undisturbed. The completion of the Tamiami Trail in 1928 connected Florida's Atlantic and Gulf coasts and opened the interior to recreation. The Big Cypress area has been home to a wide range of recreational activities, such as hunting, fishing, trapping, boating, and hiking for many generations.

Despite changes in use, development, and access, the Seminole Tribe of Florida and Miccosukee Tribe of Indians of Florida have maintained a presence in the Big Cypress area. The preserve's establishing legislation recognizes special access rights for both tribes for "usual and customary use and occupancy within the preserve, including hunting, fishing, and trapping on a subsistence basis and traditional tribal ceremonials."

There are approximately 500 known archeological sites within the preserve. The NPS Southeastern Archeological Center anticipates that there are also several hundred unrecorded sites in the preserve. Recorded sites and anticipated cultural resources may include prehistoric habitation areas, burial areas, special use camps, 19th century military camps, fortifications, trails, and historic Seminole or Miccosukee camps and sacred areas, as well as 20th century hunting and lumber camps.

All of these sites are protected under the Archaeological Resources Protection Act of 1979, as amended (16 USC 470 et seq.) and by NPS *Management Policies 2006* (NPS 2006a). The 2000 Recreational ORV Management Plan established criteria for developing the designated ORV trail system and access points, including criteria for resource protection. The goal of the criteria was to

"protect important environmental and cultural areas, restore heavily impacted and environmentally sensitive areas, and direct use to areas of suitable substrate." These criteria were designed to entirely avoid archeological sites (NPS 2000a). This same goal was carried into this Plan, as trail and destination criteria were designed to entirely avoid known archeological sites and additional sites where there is higher potential for these resources to be present, specifically hammock habitat.

Currently, there is no available database for ethnographic resources in the preserve. An ethnographic resource is a site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it (NPS 2006a). The Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida are both recognized in the enabling legislation as peoples traditionally associated with the preserve. Many resources within the original preserve and the Addition have traditional associations with the Seminole and Miccosukee tribes.

American Indian ceremonial sites exist in the preserve. The National Park Service, in accordance with the American Indian Religious Freedom Act of 1978, is working with the various Miccosukee and Seminole groups to protect the privacy and sanctity of their ceremonial and burial sites.

3.8 NATURAL SOUNDSCAPES

The natural soundscape is considered a resource and includes sounds found desirable during times of rest and relaxation. The enjoyment of natural sounds in the preserve enhances the visitors' experience, and natural quiet can be essential in order for some individuals to achieve a feeling of peace and solitude. Natural sounds throughout the preserve (e.g., flowing water, animals, rustling leaves) are not considered noise. There are no absolute standards that define unacceptable levels, duration, or qualities of environmental noise (NPS 2013).The frequencies, magnitudes, and durations of human-caused sound considered acceptable vary among the NPS units (NPS 2012b). In the preserve, the levels and types of noise that are considered acceptable vary based on management zoning, resource sensitivity, human activity, and expectations of visitor experiences (NPS 2000b).

As stated in Director's Order 47: *Sound Preservation and Noise Management* (NPS 2000b), 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 Organic Act of 1916. Per NPS *Management Policies 2006* (NPS 2006a) and Director's Order 47 (NPS 2000b), the National Park Service seeks to preserve natural soundscapes and restore degraded soundscapes whenever possible. The National Park Service is responsible for preserving, to the greatest extent possible, the natural quiet and natural sounds associated with physical and biological resources and restoring the natural condition wherever possible of those soundscapes that have become degraded by noise /unnatural sounds (NPS 2010). Sound levels are usually measured and expressed in decibels (dB) that are weighted to frequencies perceivable by the human ear, known as A-weighted sound levels (dBA).

There are many sources of noise within the preserve. Human-generated sounds within the preserve include sounds created by NPS administrative operations such as resource management, prescribed fire activities, emergency response, and facility maintenance; overflight sources such as high-altitude, commercial jet traffic, military activity, and general aviation; recreational activities such as ORV use, hunting-related firearm use, and watercraft; oil and gas operations and development; and vehicles (NPS 2010). Vehicle noise levels (for both on-road vehicles and ORVs) may vary depending on vehicle type, speed of travel, and type of tires. NPS administrative operations may also use helicopters to access the backcountry (NPS 2000b); however, the Plan does not contemplate or include public or private use of helicopters within the preserve.

Sound levels in the preserve vary greatly, depending on the area and activities. Ambient sound levels in the preserve generally range between 24 dBA and 40 dBA, depending on the contribution of noise by insects (NPS 2010). Typical sounds and their approximate levels are shown in table 3-6.

Table 3-6. Typical Sounds In the Preserve

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

Sources: NPS 2013, NPS 2011b

There are about 278 miles of primary trails where ORV use is permitted (table 3-4). Recreational ORV use is not allowed in the Deep Lake Unit, Loop Unit, Stairsteps Unit Zone 1, or the Addition, and impacts to the natural soundscape are least pronounced in these areas. With nearly 125 miles of available primary ORV trails, Turner River Unit provides visitors with the most trails, with corresponding impacts to natural soundscapes. ORV users must procure permits for backcountry trips, and if the National Park Service temporarily closes certain areas of the preserve for safety or resource protection reasons, ORV users must not operate in closed areas (NPS 2000a). These policies ensure that ORV users can use the preserve while limiting impacts to the natural soundscape.

Chapter 4

Environmental Consequences

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CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discusses the likely environmental consequences resulting from a no-action alternative and four proposed action alternatives.

The analysis is the basis for comparing the beneficial and adverse effects of implementing the alternatives. By examining the environmental consequences of the alternatives on an equivalent basis, decision makers can evaluate which approach would create the most desirable combination of benefits with the fewest adverse effects.

4.2 ANALYSIS METHODS AND ASSUMPTIONS

The analysis of impacts follows Council on Environmental Quality guidelines, Director's Order 12 procedures, the NPS *NEPA Handbook* (NPS 2015a), and NPS *NEPA Handbook Supplemental Guidance: Writing Impact Analysis Section of EA and EISs* (NPS 2015b).

The planning team based the impact analysis and the conclusions in this chapter on the review of existing literature and field studies, information provided by experts in the preserve and in other agencies, and professional judgment. The team's method of analyzing impacts is further explained below. Impacts were assessed with the assumption that the implementation of mitigation measures would minimize, reduce, and/or avoid impacts to resources. If mitigation measures described in chapter 2 "Alternatives," including the preferred alternative, were not implemented, the potential for resource impacts and the magnitude of those impacts would increase.

The environmental consequences for each resource were identified and characterized based on impact type (adverse or beneficial), intensity, area of analysis, and duration. Cumulative effects are discussed in section 4.3, "Cumulative Impacts Analysis."

Impact Type refers to whether the impact would be beneficial or adverse:

- *Beneficial*: A favorable 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

Impact Intensity refers to the degree or magnitude to which a resource would be beneficially or adversely affected.

Area of Analysis refers to the geographic setting within which an impact may occur, such as the affected region or locality. In this document most impacts are either site-specific or are expected to occur throughout the preserve.

Impact duration refers to how long an impact would last. For many of the resources evaluated, the duration is estimated based on whether restoration to pre-disturbance conditions would require mechanical manipulation or human intervention, or would occur under natural ecological processes within a given period.

Impacts on a resource area may result from a variety of direct or indirect effects. *Direct effects* are caused by an action and are effects that occur at the same time and place as the action. *Indirect effects* are caused by the action and occur later or farther away, but are still reasonably foreseeable. This document discloses and analyzes both direct and indirect effects, but does not differentiate between them in the discussions.

The impacts of the action alternatives describe the impacts that would occur as a result of implementing the no-action alternative and implementing each of the action alternatives. To understand the full scope of the impacts of implementing any of the action alternatives, the reader should also consider the impacts that would occur in the no-action alternative. While the "Affected Environment" section (chapter 3) serves as the baseline for assessing impacts, it is important to understand that impacts occur even under the no-action alternative.

The impact analysis for natural resource impact topics (wetlands, soils, vegetation, and special status species) was based on research; the National Park Service and other expert knowledge of the area's resources; and the best professional judgment of planners, resource specialists, and biologists who have experience with similar types of projects. Additional methods and assumptions used in characterizing the severity or intensity, as well as the duration, of impacts for certain resource areas (e.g., special status species) are discussed below.

4.2.1 Special Status Species

Impacts on special status species are characterized according to impact type, intensity, context, and duration. In this document, the anticipated Endangered Species Act determination categories are based on the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service guidance for implementing section 7 consultation under the Endangered Species Act (USFWS 1998), and are as follows.

- *No effect*: The appropriate conclusion when the action agency determines its proposed action would not affect a listed species or designated critical habitat.
- *May affect, not likely to adversely affect*: The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous favorable effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- *May affect, likely to adversely affect*: The appropriate finding in a biological assessment (or conclusion during consultation) if an adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial (see definition of may affect, not likely to adversely affect). In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action is likely to adversely affect the listed species. If incidental take is anticipated to occur as a result of the proposed action, a likely to adversely affect determination should be made.

4.2.2 Cultural Resources and Section 106 of the National Historic Preservation Act

The impact analyses provided in section 4.11, "Ethnographic and Archeological Resources," are intended to comply with the requirements of both NEPA and section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing section 106 (36 CFR Part 800), impacts on cultural resources were also identified and evaluated by

1. determining the area of potential effects;
2. identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the NRHP;
3. applying the criteria of adverse effect to affected, NRHP-eligible or NRHP-listed cultural resources; and
4. considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council's regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected, NRHP-listed or eligible cultural resources depending on the impacts to any characteristics of the resource that qualify it for inclusion in the NRHP. An *adverse effect* occurs whenever an impact alters (directly or indirectly) a characteristic of a cultural resource that qualifies it for NRHP inclusion (e.g., diminishing the integrity or the extent to which a resource retains the historic appearance of its location, design, setting, materials, workmanship, feeling, or association). Cultural resources are nonrenewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an *adverse effect* under section 106 may be mitigated, the effect remains adverse. Adverse effects also include reasonably foreseeable effects caused by actions proposed in the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5). A determination of *no adverse effect* means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

A section 106 summary is provided at the end of the impact analysis sections for each alternative. It is an assessment of the effect of the undertaking (implementation of the alternative), based upon the criterion of effect and criteria of adverse effect found in Advisory Council regulations. In addition to NRHP-eligible and listed sites, NPS is required to protect sites not yet assessed for eligibility, and ethnographic resources.

4.3 CUMULATIVE IMPACTS ANALYSIS

The Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508) require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined 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" (40 CFR 1508.7). As stated in the Council on Environmental Quality handbook, *Considering Cumulative Effects* (Council on Environmental Quality 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful.

Cumulative impacts are considered for the alternatives and are presented for each resource. To determine potential cumulative impacts, projects in the vicinity of the proposed action were identified. Projects identified as cumulative actions included any planned development activity that was already implemented, is currently being implemented, or would be implemented in the reasonably foreseeable future (within a range of three to five years). These cumulative actions are evaluated in the cumulative impacts analysis, in conjunction with the impacts of each alternative, to determine if they would have any additive effects on each resource analyzed.

Cumulative impact projects considered in this Environmental Impact Statement include the following:

- In 2019, FWC contractors and National Park Service authorized agents became authorized to utilize secondary ORV trails for python management activities (administrative access). Python contractors and authorized agents have been granted administrative access to 178 miles of secondary ORV trails. The secondary trails are being opened in Phases to allow NPS staff to assess the safety of the trails and the presence of threatened and endangered species, as Hurricane Irma in 2017 led to many downed and hazardous trees along the trails. BICY staff will address and clear (Phases 1-3) trails of encroaching vegetation, downed trees, and hazardous trees using an excavator with a mulching head and/or a skid steer with flail mower to a width of 8-12 feet.
- The ORV Management Plan for the preserve, completed in 2000, prescribes designated ORV trails and established parking/staging areas for ORV users. The ORV Management Plan established maximum trail mileages within each management unit. To provide a broader range of backcountry access, the Plan uses the framework provided in this document to propose additional mileage to the current primary trail network, establish the secondary trail network, and to establish designated backcountry destinations.
- The Resource Management 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. This plan establishes the goals for preserving resources, along with management objectives to obtain those goals. Ongoing activities such as fire management and exotic species controls are discussed in this Plan.
- The Addition GMP, completed in 2010, "provides 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 2010). The Addition GMP outlines diverse frontcountry and backcountry recreational opportunities, a wilderness proposal, enhanced day use and interpretive opportunities along road corridors, and enhanced recreational opportunities with new facilities and services. The 125 miles of conceptual primary ORV trails in the Addition are common to the alternatives proposed in this Environmental Impact Statement.
- Improvement of up to six ORV trailheads and construction of up to five turn lanes on US 41 were analyzed as part of the preferred alternative in the Environmental Assessment of ORV Trailheads and Turn Lanes; approved in June 2012. Trailhead improvements at Skillet Strand North (US 41), Monroe Station (US 41), and Paces Dike (Loop Road) were completed in 2013, and construction at additional sites and turn lanes would occur as funding becomes available. Trailhead and turn lane construction would involve filling of wetlands and onsite mitigation by wetland restoration.

- In 2006, the National Park Service completed construction of 10 visitor safety highway improvements along US 41 and Loop Road in the preserve. These improvements resulted in benefits to visitor use by improving visitor safety and providing visitors information about the preserve and its resources. The construction resulted in adverse, long-term impacts on vegetation and wetlands; however, the impacts were mitigated by locating the improvements to maximize the use of previously disturbed lands.
- Burnett Oil Company, Inc. completed an environmental assessment in 2016 to plan for a seismic survey of a 110-square-mile area that includes the northern portion of Turner River Unit and Nobles Grade in the Northeast Addition Unit. The purpose of the survey was to explore for new oil and gas accumulations in the area. Seismic exploration activities were conducted in 2017 and 2018.
- A commercial services plan for the preserve was completed in July 2009. The selected alternative for the plan assesses the levels of necessary and appropriate commercial service operations at the preserve, and the means to manage those activities. Commercial services that would be expanded under the plan include developing the preserve's visitor services. Developing new frontcountry locations at Monroe Station and Seagrape Drive, and developing a new backcountry camping complex, would potentially introduce more visitors to the Loop Road, resulting in visitor use and transportation impacts.

4.4 SOILS

This section addresses the potential consequences of the no-action and action alternatives on soils.

4.4.1 Basis of Analysis

The soil substrates underlying the various vegetation communities in the preserve range from unsuitable for recreational use to highly resilient for recreational use, as detailed in chapter 3. Data on historical impacts and subsequent monitoring of trails demonstrate the impacts of ORV use on the shallow soils in the preserve, which can last more than seven years. Both the no-action and the action alternatives would involve displacement and disturbance of soils, depending upon the degree of use and substrate suitability of a particular trail or destination.

Research by Duever et al. (1981) indicated that water elevation was a factor influencing the severity of ORV impacts on soils. In areas where the water table was at the surface at the time ORV impacts occurred, the degree of impact and time required for recovery increased. Data on historical impacts and subsequent monitoring of trails demonstrate the long-term impacts of ORV use on the shallow soils in the preserve. The extent to which ORV operation affects soils within the preserve was analyzed in detail in the 2000 Recreational ORV Management Plan (NPS 2000a), which reported that impacts on soils as a result of ORV use vary based on soil depth, soil composition, plant cover, and frequency of use. Impacts are easily observable and range from exposed bedrock, rutting and ridging of soils, and water channelization to lateral expansion of trail network by users as they avoid areas that are excessively muddy or rutted. ORV-induced deformation of soil structure and level causes an overall depletion of the soil resource through such processes as oxidation and erosion (Yamataki 1994). ORVs also affect processes that are influenced by soils, such as surface flows, evaporation, and the abundance and distribution of plants and wildlife. In accordance with the principles of adaptive management, the National Park Service would continue to implement a hydrologic trigger as described in the 2000 Recreational ORV Management Plan. These trigger levels for resource protection may be updated as additional data are collected.

Establishing a designated trail system has prevented dispersed use and concentrated impacts along established trails, which can be monitored and managed by the National Park Service. These impacts (described below) can be minimized and managed (see minimization measures described in chapter 2). Duever et al. (1986b) indicated that once soils had been displaced, there are few natural mechanisms for restoring ground contour, and the ruts remain indefinitely. Therefore, it is likely that soil impacts are cumulative and can worsen over time. Because of the fragile nature of certain soil substrates within the preserve, substrate types, their associated habitat type, and their respective ability to withstand ORV use are the key factors for determining sustained ORV and recreational use. Based on the approach used in the 2000 Recreational ORV Management Plan (NPS 2000a) and experience and observations of preserve staff, substrate habitat types were assigned a relative suitability type of highly resilient, resilient, least resilient, or unsuitable for ORV traffic (table 3-1). Soil types have a strong correlation to the various habitat types found on the preserve. Because the physical expression of the soils is most readily visible through vegetation communities, the substrate suitability for ORV use is based in the habitat types found in the preserve.

In all the alternatives, ORV use and backcountry camping would be the main actions causing impacts to soils. Many preserve users access backcountry areas by ORV, which would result in soil disturbance and displacement along existing and/or proposed travel routes. The extent of these impacts would vary based on soil suitability, depth, composition, moisture, plant cover, and frequency of use. Use of access points, campsites/destinations, trail maintenance (e.g., light vegetation trimming and replacement of trail markers and signs), trail stabilization, and NPS administrative use for law enforcement and/or resource management, would also cause displacement and disturbance of soils. Local impacts from the above activities include exposure of bedrock, trail rutting and braiding (lateral expansion), placement of fill (amounting to less than 1 cubic yard for each sign/trail marker), erosion, and water channelization. Soil impacts that occur as a result of light use would have the ability to recover with implementation of adaptive management actions (identified in table 2-8).

Users participating in nonmotorized activities (e.g., camping, hiking, bicycling) could also cause soil displacement and disturbance, and some impacts would be visible on aerial photography. Some impacts, but not all, would likely recover with implementation of adaptive management actions identified in table 2-8 and natural ecological processes (such as wind and rain). Impacts to soils as created through nonmotorized uses (i.e., pedestrian foot traffic and bicycles) were analyzed utilizing a worst-case scenario through application of recovery timeframes as analyzed by *Off Road Vehicles and Their Impacts in the Big Cypress National Preserve* (Duever et al. 1981). This study evaluated recovery times of ORV-related impacts, which are of a higher intensity (per individual pass) than impacts created by foot traffic or bicycle tires. Through professional best judgment, it is assumed that nonmotorized soils impacts could recover through natural ecological processes within the same recovery timeframes that ORV impacts could recover under the same conditions.

Across all the action alternatives, trails and destinations were generally sited in highly resilient to resilient soil types. The soil substrates underlying the trails and destinations in each alternative are summarized in table 4-1.

TABLE 4-1. SUMMARY OF SOIL SUBSTRATE SUITABILITY OF TRAILS AND DESTINATIONS

Trails / Destinations	Highly Resilient to Resilient[1] Alt. 1	Highly Resilient to Resilient[1] Alt. 2	Highly Resilient to Resilient[1] Alt. 3	Highly Resilient to Resilient[1] Alt. 4	Highly Resilient to Resilient[1] Alt. 5	Least Resilient to Unsuitable[1] Alt. 1	Least Resilient to Unsuitable[1] Alt. 2	Least Resilient to Unsuitable[1] Alt. 3	Least Resilient to Unsuitable[1] Alt. 4	Least Resilient to Unsuitable[1] Alt. 5
Primary Trails (miles)	200[1]	200[1]	200[1]	230[2]	234[2]	78[1]	78[1]	78[1]	107[2]	110[2]
Secondary Trails (miles)	0[3]	33	88	88	135	0[3]	0	0	12	19
Nonmotorized Trails (miles)	61[1]	66[2]	66[2]	107[2]	107[2]	3[1]	5[2]	5[2]	15[2]	15[2]
Number of Existing Backcountry Destinations [1]	13	13	13	13	13	10	10	10	10	10
Number of Proposed Backcountry Destinations [3]	0	45	86	94	144	0	1	2	42	59

Notes:
Mileages within this table are rounded to the nearest whole mile and describe trails only; destinations are noted as the number of occurrences within each habitat type under each alternative.
[1] Includes existing trails/destinations. There are no proposed trails under this alternative.
[2] Includes both existing and proposed trails.
[3] There are currently no designated secondary ORV trails.

The majority of trails and destinations are located in highly resilient to resilient substrates, thereby minimizing impacts to soils across each of the alternatives (table 4-1). The greatest potential for soil impacts occurs when trails and/or destinations are located in the least resilient to unsuitable substrates types. Alternative 5 has the most trails and destinations sited in the least resilient to unsuitable category.

To provide spatial perspective on the extent of impacts, the acreages of trails were calculated by applying an average 12-foot width to primary and secondary ORV trails to establish the percentage of cover within the preserve, as summarized in table 4-2. Overall, the amount of primary and secondary trails traversing least resilient to unsuitable substrates doubles between the no-action alternative and alternative 5 but still occurs in less than 0.1% of the preserve.

TABLE 4-2. PERCENTAGE OF TOTAL ACREAGE AFFECTED

Type of Trail	Highly Resilient to Resilient[1] Alt. 1	Highly Resilient to Resilient Alt. 2	Highly Resilient to Resilient Alt. 3	Highly Resilient to Resilient Alt. 4	Highly Resilient to Resilient Alt. 5	Least Resilient to Unsuitable[1] Alt. 1	Least Resilient to Unsuitable[1] Alt. 2	Least Resilient to Unsuitable[1] Alt. 3	Least Resilient to Unsuitable[1] Alt. 4	Least Resilient to Unsuitable[1] Alt. 5
Primary Trails (% of Total Preserve Acreage)	0.04	0.04	0.04	0.05	0.05	0.01	0.01	0.01	0.08	0.08
Secondary Trails (% of Total Preserve Acreage)	N/A	0.007	0.02	0.02	0.03	N/A	N/A	<0.001	0.008	0.01

4.4.2 Impacts of Alternative 1

Direct and Indirect Impacts. The primary ORV trail system, comprising 278 miles of existing trails, would remain unchanged and no secondary ORV trails would be opened. The existing primary ORV trails generally traverse highly resilient soil substrates. Less than 5% of these existing trails would need periodic stabilization (on an as-needed basis) utilizing lime rock and geotextiles. Primary ORV trail mileage that occurs in least resilient to unsuitable soils (78 miles) would have the greatest potential to impact soil resources in the preserve. ORV use in these areas would continue to cause rutting and lateral expansion, thus leading to soil disturbance and displacement.

When ruts are created, ORV users travel along the sides of the trail to avoid passing through the deeper and stirred-up mud that accumulates within the channel, thereby expanding the footprint of the trail. This trail expansion is commonly referred to as braiding. Braiding can have an adverse effect on the adjacent wetland because it increases the surface area vulnerable to rutting and trampling of vegetation. Because of their fragile underlying substrate, these impact areas would likely require mechanical restoration of grades to restore pre-disturbance conditions. In addition, braiding of trails results in temporal loss of wetland function, requiring compensation via mitigation.

Tire ruts would average less than 1 foot in depth. Trail widths would expand from 12 feet to 20 feet (on average). These two impacts would continue to affect approximately 5% of the entire trail system in highly resilient to resilient substrate types, totaling 10 linear miles. In least resilient to unsuitable substrate types, 10% of the entire trail system would continue to be affected by rutting and braiding, totaling 8 linear miles. Overall, 18 miles of primary trail would continue to be subject to rutting and braiding and the consequent soil displacement and disturbance. These impacts would remain as long as visitor use continued.

Camping opportunities would continue in alternative 1, consisting of 23 existing backcountry campsites in the Stairsteps Unit, along the FNST, and two existing backcountry campgrounds within the Bear Island Unit. These campsites are located in highly resilient to resilient soil types, and are already disturbed. At each of these sites, the average area affected would be10 x 20 feet (0.005 acre). Thus, soil erosion and soil compaction (caused by camping in designated areas) would continue to be minimal, amounting to 0.115 acres across the entire preserve. The impacts would mostly be unnoticeable on satellite imagery.

Dispersed camping is allowed throughout the preserve (with the exception of the Bear Island Unit) under the no-action alternative. Many backcountry campers, especially during hunting seasons, prefer dispersed camping at sites of their choosing. Many return to these same locations year after year. Historical observations show some of these sites are located in less suitable substrates. This analysis assumes 100 of the dispersed camping sites would be located in less suitable substrates, and would thus be denuded and/or would have trampled vegetation. For each of these 100 sites, the average area affected would be 10 x 20 feet (0.005 acre). For the entire preserve, the net area adversely impacted by soil compaction and erosion would total 0.5 acre. These adverse effects would remain as long as visitor use continued. Preserve staff would continue to implement management actions in accordance with the 2000 Recreational ORV Management Plan.

There are currently 64 miles of hiking trails in the preserve, 37 along the FNST and an additional 27 miles of shorter trails. Pedestrian traffic along trails would continue to lead to some small ruts (less than a few inches) and widening of trails (to less than 10 feet in width). The area affected would generally be less than 1% of the length of any given trail, totaling 0.6 linear miles in the entire preserve. The impacts of pedestrian traffic would continue as long as visitor use continued. If visitor use ceased, these areas may recover through natural ecological processes (Duever et al. 1981).

Conclusion. Under the no-action alternative (alternative 1), soil resources in the preserve would continue to be impacted as they are now. Existing ORV and/or hiking trails and campsites that have been previously disturbed would continue to be disturbed and the soils outside of the relatively small direct impact areas would not be expected to be adversely affected. Under the no-action alternative, direct and indirect impacts on soil resources as a result of the primary ORV trail use would cause rutting and braiding, thus leading to soil disturbance and displacement along 18 miles of trails. However, these effects would occur in less than 0.05% of the overall preserve. These impacts would continue as long as visitor use continued.

4.4.3 Impacts of Alternative 2

Direct and Indirect Impacts. The primary ORV trail system would be the same as in the no-action alternative (alternative 1), although a designated secondary ORV trail system would also be established. The majority of the primary ORV trail system traverses highly resilient substrate types.

The additional 33 miles of reopened secondary ORV trails are in areas of highly resilient substrates. They would require minimal NPS maintenance in order to be reopened and maintained for the long term. NPS maintenance actions would consist of removal of obstacles (such as downed trees and branches), hand and mechanical trimming of vegetation obstructing the trail corridor, and sign installation, which would displace 1 cubic foot of soil per sign. Soil resources may recover from maintenance activities under natural ecological processes. ORV use of secondary trails (by visitors) would cause minor soil displacement; this displacement would come from ruts less than 1 foot in depth and trail expansion to widths of approximately 20 feet. These impacts would affect 1.7 miles or 5% of the proposed 33 miles of reopened secondary trails.

The additional 7 miles of nonmotorized trails associated with the realignment of the FNST would also be located in previously disturbed areas. The realignment of the FNST would require minimal NPS maintenance, including removal of obstacles (such as downed trees and branches), hand and mechanical trimming of vegetation obstructing the trail corridor, and projected installation of three pitcher pumps and signs along the trail. Installation of pitcher pumps would result in displacement of 20 cubic feet of soil per pump. Installation of signs would displace one cubic foot of soil. Overall displacement of soil due to signs and pitcher pumps would be a small, adverse impact, affecting less than 0.01% of the top soil in the preserve. Visitor use of nonmotorized trails would result in small ruts (less than a few inches) and trail braiding (to widths less than 10 feet). These impacts would affect less than 1% of the 7 miles of new nonmotorized trails, or 0.04 linear miles. Soil resources would remain affected as long as visitor use continued.

Alternative 2 would create an additional 46 backcountry destinations. Forty-five of these destinations were chosen due to their stable substrate conditions and their ability to be maintained as primitive, minimally developed areas. One proposed destination is in least resilient to unsuitable substrate. However, no stabilization or installation of impervious surface would be required to designate any of these areas. Many preserve users, including NPS staff, would likely access these campsites by ORV, which would cause minor soil displacement along the travel routes, primarily as a result of rutting and trail expansion.

Dispersed camping would be discontinued in this alternative, and all camping would occur in designated sites / destinations. Camping and recreational activities at each destination would result in trampled vegetation and may over time, and with repeated use, result in denuded areas. The reduction in vegetation increases the potential for degradation and erosion of soils, particularly at destinations that are least resilient to unsuitable. These effects would likely occur in areas averaging 10 x 20 feet (0.005 acre); soils that are least resilient to unsuitable are most susceptible to these effects. As noted above, the great majority of these existing and proposed sites are located in suitable

substrates. These sites would also be monitored for resource impacts. However, even if the soils at all of the proposed destinations were affected by degradation or erosion, potential impacts would amount to less than 0.23 acre.

The elimination of dispersed camping and the movement of all camping to designated areas would have a beneficial impact on soils by concentrating impacts to a smaller, more resilient total area.

Conclusion. The opening of an additional 33 miles of secondary trails—and the consequent visitor use—would lead to erosion, degradation, displacement, trail braiding, and rutting of soils. These adverse impacts would only affect about 0.006% of the preserve. The adverse impacts would occur along 19 miles of primary and secondary trails, and would expand the area adversely affected relative to alternative 1. Use of an additional 46 proposed backcountry destinations, relative to alternative 1, would lead to denuded and/or trampled vegetation, adversely affecting a total area of 0.23 acre, a small additional adverse impact relative to the size of the preserve. These impacts would continue as long as visitor use continued. The elimination of dispersed camping would minimize the resultant adverse soil impacts in much of the preserve, but would increase impact intensity at destinations. This would result in small adverse impact overall, compared to the no-action alternative.

4.4.4 Impacts of Alternative 3

Direct and Indirect Impacts. The primary ORV trail system under this alternative would be the same as under the no-action alternative (alternative 1) and alternative 2. The majority of the primary ORV trail system traverses highly resilient to resilient substrate types.

The additional 88 miles of reopened secondary ORV trails are located in areas of highly resilient to resilient substrates. They would require minimal NPS maintenance in order to be reopened and maintained. The types of impacts to soils resulting from reopening, maintaining, and use of secondary trails would be the same as those discussed in alternative 2. These impacts would affect 4 linear miles or 5% of the proposed 88 secondary trail miles.

The impact of the additional proposed 7 miles of nonmotorized trails associated with the realignment of the FNST would be the same as discussed under alternative 2.

Alternative 3 would create an additional 88 proposed backcountry destinations. Eighty-six of these destinations would be located in highly resilient to resilient substrate, and were chosen due to their stable substrate conditions and their ability to be maintained as primitive, minimally developed areas. Two proposed destinations would be located in least resilient to unsuitable substrate. The types of impacts that result from the establishment of backcountry campsites would be the same as those discussed in alternative 2.

Camping and recreational activities at each destination would result in trampled vegetation and may over time, and with repeated use, result in the same types of impacts as described for alternative 2. Even if the soils at all of the proposed destinations were adversely affected by degradation or erosion, impacts would amount to 0.44 acre (0.005 acre/site x 88 sites).

Dispersed camping would be permitted throughout much of the preserve, although in a smaller total area than the no-action alternative. Dispersed camping would be allowed in areas more than 0.5 mile from paved roads and 0.25 mile from trails. As discussed under the no-action alternative, dispersed camping results in trampling of vegetation and potentially denuded sites that increase the potential for soil erosion and compaction. Assuming 100 of the dispersed camping sites would be located in less suitable substrates, and the average area affected would be 10 x 20 feet (0.005 acre), the net area adversely affected would total 0.5 acre (the same as the no-action alternative, and alternatives 4 and 5). However, relative to alternative 2, which concentrates camping at designated destinations,

this alternative would reduce the intensity of the impacts (e.g., trampling, denuded vegetation) at destinations, resulting in a beneficial impact at destinations. These impacts would remain as long as visitor use continued. If preserve staff detects dispersed camping site impacts, adaptive management would be implemented as identified in table 2-3 to ensure indicators do not exceed the established thresholds.

Conclusion. The reopening of 88 miles of secondary trails—and the consequent visitor use—would lead to erosion, degradation, displacement, trail braiding, and rutting of soils of 0.007% of the preserve. Comparatively, these adverse impacts would expand the area adversely affected relative to alternative 2. Use of 88 proposed backcountry destinations would lead to denuded and/or trampled vegetation, adversely affecting a total area of 0.44 acre, a slightly larger area than alternative 2, but a very small amount compared to the overall size of the preserve. These impacts would continue as long as visitor use continued. The availability of dispersed camping would reduce adverse impact intensity at destinations. This would result in beneficial impacts to soils.

4.4.5 Impacts of Alternative 4

Direct and Indirect Impacts. The primary ORV trail system would be expanded by 59 miles, part of which would consist of reopened airboat trail on pre-existing routes. Of this total, 30 miles would be located in highly resilient to resilient substrate and 29 miles in least resilient to unsuitable substrate. The reopened secondary trail system would be 100 miles longer than under the no-action alternative; 88 miles are located in areas of highly resilient to resilient substrate and 12 miles are located in least resilient to unsuitable substrate. The types of adverse impacts to soils required to open and maintain ORV trails are the same as those discussed in alternative 2. Overall, these impacts would affect 26 linear miles, 15 linear miles in highly resilient to resilient substrates and 11 linear miles in least resilient to unsuitable substrates.

The impacts associated with the realignment of the FNST are the same as discussed under alternative 2. The additional 51 miles of nonmotorized trails (i.e., Cross Preserve Trail, Gator Hook Extension, R-T Day Hike to Charlie Cypress Camp, Airplane Prairie) would be located in previously disturbed areas. These impacts would affect less than 1% of the 51 miles of new nonmotorized trails, or 0.51 linear miles. These impacts would continue as long as visitor use continued. If visitor use ceased, soil resources may recover under natural ecological processes (Duever et al. 1981).

Alternative 4 incorporates 136 proposed backcountry destinations occurring at the end of secondary trails; 94 of these destinations were chosen due to their stable substrate conditions and their ability to be maintained as primitive, minimally developed areas. Forty-two proposed destinations would be located in least resilient to unsuitable substrate. However, no stabilization or impervious surface would be required to designate any of these areas. The types of impacts that result from the establishment of backcountry campsites would be the same as those discussed in alternatives 2 and 3.

Camping and recreational activities at each destination would result in trampled vegetation and may over time, and with repeated use, result in the same types of impacts as in alternatives 2 and 3. These effects are most likely to occur in areas where soils are least resilient to unsuitable, which for this alternative includes 42 of the proposed destinations, or 0.21 acre; however, even if the soils at all the proposed destinations were affected by degradation or erosion, it would amount to adverse effects in 0.68 acre.

Dispersed camping would be allowed in more areas than under alternatives 2 and 3, with the same types of effects. Assuming that 100 of the dispersed camping sites would be located in less suitable substrates, and the average area affected would be 10 x 20 feet (0.005 acre), the net area adversely impacted would be 0.5 acre (the same as the no-action alternative and alternatives 3 and 5).

However, the larger total area available for dispersed camping would allow campers to choose from more locations. Compared to alternatives 2 and 3, this increase in choices would lead to more dispersion, and would reduce the intensity of impacts at destinations. Impacts would continue as long as visitor use continued. If preserve staff detected dispersed camping site impacts, adaptive management would be implemented as identified in table 2-8 to ensure indicators do not exceed established thresholds.

The removal of the annual 60-day closure for ORVs is not expected to adversely affect soils, because visits during this period are typically low due to summer heat, and because ORVs would remain on designated trails.

Conclusion. The reopening of 59 miles of the primary trail system and the reopening of 100 miles of secondary trails—and the consequent visitor use—would lead to erosion, soil degradation and displacement, trail braiding, and rutting of soils. These adverse impacts would affect an area totaling 26 linear miles and would expand the area adversely affected relative to alternatives 1 through 3. However, no impacts would occur on more than 99.9% of the preserve (less than 0.1% of the preserve would be affected). Use of 136 proposed backcountry destinations would lead to denuded and/or trampled vegetation, adversely affecting a total area of 0.68 acre, a larger area than alternatives 2 and 3, but a very small amount compared with the size of the preserve. These impacts would continue as long as visitor use continued. The availability of more total area for dispersed camping would reduce adverse impact intensity at destinations. This would result in beneficial impacts to soils.

4.4.6 Impacts of Alternative 5: NPS Preferred Alternative

Direct and Indirect Impacts. The primary ORV trail system would be expanded by 66 miles, part of which would consist of reopened airboat trail on pre-existing routes. Of this total, 34 miles would be located in highly resilient to resilient substrate and 32 miles would be located in least resilient to unsuitable substrate. The reopened secondary trail system would be expanded by 154 miles; 135 miles would be located in areas of highly resilient to resilient substrate and 19 miles would be located in least resilient to unsuitable substrate. The types of impact to soils required to open and maintain ORV trails are the same as those discussed in alternative 2. ORV use of primary and secondary trails would cause minor soil displacement; this displacement would come from ruts less than 1 foot in depth and trail expansions up to 20 feet wide. These impacts would affect 17 miles of highly resilient to resilient substrate and 11 miles of least resilient to unsuitable substrates.

The proposed nonmotorized trails and potential impacts as a result of the expansion of that system would be the same as alternative 4.

Alternative 5 incorporates 203 proposed backcountry destinations that would occur at the termini of secondary trails. One hundred and forty-four of these destinations were chosen due to their stable substrate conditions and their ability to be maintained as primitive, minimally developed areas. Fifty-nine proposed destinations would be located in the least resilient to unsuitable substrate. No stabilization or installation of impervious surface would be required to designate these areas. The types of impacts that result from the establishment of backcountry campsites would be the same as those discussed in alternative 2. However, the scale of the impacts would increase relative to alternatives 1 through 4. Camping and recreation activities at each destination would result in trampled vegetation and may over time, and with repeated use, result in denuded areas. These effects would likely occur in areas averaging 10 x 20 feet (0.005 acre). The reduction in vegetation increases the potential for degradation and erosion of soils, particularly those that are least resilient to unsuitable, which for this alternative includes 59 proposed destinations and would amount to 0.30 acre. Even if the soils at all of the proposed destinations were affected by degradation, erosion, or

compaction, it would amount to 1.02 acres. Dispersed camping and associated impacts would also be the same as described in alternative 4.

Conclusion. The reopening of 66 miles of primary trails, reopening of 154 miles of secondary trails, and 203 destinations representing all substrate types (highly resilient to unsuitable) would lead to erosion, degradation, displacement, trail braiding, and rutting of soils. These impacts would adversely affect areas totaling 28 linear miles of trail and would expand the area affected relative to alternatives 1 through 4. However, no impacts would occur on more than 99.9% of the preserve (less than 0.1% of the preserve would be affected). Use of 203 proposed backcountry destinations would lead to denuded and/or trampled vegetation, adversely affecting a total area of about 1.02 acres, a larger area than alternatives 2 through 4, but a very small amount compared to the overall size of the preserve. These impacts would continue as long as visitor use continued.

4.4.7 Cumulative Impacts

Implementation of the ORV Management Plan (NPS 2000a) has minimized impacts to soils throughout the preserve. Impacts, such as rutting, channeling, and soil displacement, were substantially reduced with the implementation of the primary ORV trail network and the elimination of dispersed ORV travel that had historically occurred in the preserve. Moving ORV use onto a designated trail system has resulted in an overall beneficial impact on soil resources in the preserve.

Implementation of future oil and gas plans of operation could have adverse impacts on soils. The use of off-road equipment and construction of roads and pads could result in soil compaction, disturbance, and displacement. One such plan was the recent Burnett Oil Company Seismic Monitoring Environmental Assessment (NPS 2016a), published on March 25, 2016. Within this planning effort, there were 46 mitigation measures to be implemented to prevent impacts to natural resources within the survey area, including soils. Mitigation measures included daily restoration of contours, “single pass” limitations, and temporal restrictions to reduce potential impacts on native soils. Future oil and gas activities would likely result in similar mitigation measures that would reduce potential for adverse impacts on soils.

Development of trailheads, access points, and recreational facilities under the Addition GMP (NPS 2010) and the ORV Trail Heads and Turn Lanes Environmental Assessment (NPS 2012b) have all contributed to some permanent soil loss within the preserve due to the addition of impervious and semi-impervious surface area. The use of the primary trail network for ORV travel is anticipated to contribute to minor amounts of soil displacement within the trail corridor, but these impacts are negligible when compared to the overall benefit to soil resources that has occurred as a result of ending dispersed ORV use. When looked at collectively, these management actions have contained adverse ORV impacts to smaller, more stable areas, resulting in a beneficial impact.

Overall, the effects of the projects discussed above would likely result in the addition of a small amount of impervious and semi-impervious surface areas, an adverse impact. The impacts would continue as long as the impervious or semi-impervious areas were in use. When no longer in use, these areas might require mechanical manipulations or active revegetation to recover. Under all of the alternatives in this Plan, soil resources would be preserved with minimal changes—the overwhelming majority would remain largely undisturbed. The range of actions contained in implementing the various alternatives would contribute incrementally but minimally to the overall cumulative impact. Alternatives 1 through 3 would contribute a smaller overall footprint of impacts, whereas alternatives 4 and 5 would result in a larger overall footprint of impacts, due to increases in trail mileage and the number of backcountry camping opportunities.

When the likely effects of implementing the alternatives are added to the effects of other past, present, and reasonably foreseeable actions, there would be a small adverse cumulative impact on soil resources. The adverse impacts would be most pronounced in places where trails traverse substrates that are classified as either least resilient or unsuitable. The percentage of primary and secondary trails traversing least resilient to unsuitable substrates doubles between the no-action alternative and alternative 5, but still constitutes less than 0.1% of the preserve.

4.5 WETLANDS

This section discusses the direct, indirect, and cumulative impacts related to vegetation and function of wetland communities in the preserve. As discussed in chapter 3 "Affected Environment," wetland communities in the preserve comprise cypress domes, cypress strands, sloughs, mixed hardwood swamps, hydric hammocks, prairies, and marshes. Wetlands are formed by the area's topography and the presence of water; they influence the nature and development of the soils and the types of plant and animal communities present. Impacts on wetland soils are discussed in section 4.4, "Soils"; the current section focuses on impacts on wetlands vegetation and hydrology. Impacts to upland vegetation and habitat are discussed in section 4.6, "Vegetation and Habitat." Impacts to wetland dependent special status species are discussed in section 4.7, "Special Status Species."

4.5.1 Basis of Analysis

Over 80% of the lands within the preserve are wetlands. A large portion of the activities proposed within the action alternatives would take place in wetland habitat. No activities within the range of alternatives would result in the conversion of wetlands to either impervious surface or an alternative habitat type. ORV-related facilities that would affect wetlands, such as canal crossings and trail stabilization, would require a section 404 permit and compensatory mitigation. To protect wetlands, the National Park Service would obtain the requisite permits prior to construction.

Spot stabilization on primary trails may involve small amounts of fill, typically along less than 30 linear feet of trail. Placing fill would result in small losses of wetland acreage and function. However, analysis of aerial imagery, and staff knowledge of the preserve, indicate that few, if any, areas along the primary trails would require stabilization before opening. A section 404 permit would not be required for routing unimproved trails through wetland areas, because they would not result in the dredging or filling of wetlands.

The trails and destinations proposed in each alternative have been used by motorized or nonmotorized recreational user groups in the past and are currently disturbed areas. The extent, occurrence, and severity of effects that ORVs have on wetlands are largely attributed to ruts that can channel water, which have the potential to alter water depths and inundation durations, thereby affecting the diversity of vegetation. Trails that become extensively rutted and oriented parallel to natural flow would drain surface water from an adjacent wetland, particularly in low-lying marshes and prairies in the preserve.

Herbaceous wetland communities would be most impacted by ORV use, as evidenced in extensive, braided networks of trails and rutting caused by dispersed use, easily visible on aerial photography (Welch and Madden 1998; Welch et al. 1999). Forested wetland communities in the preserve (i.e., hammocks, strands, swamps, sloughs, and domes) are less susceptible to trail-braiding and off-trail use, due to the presence of trees and depths of water inundation. In cypress strands, deep water and large, closely spaced trees confine ORVs to existing, previously established trails along the margins, where soil or bedrock provides sufficient traction and water depth is relatively shallow. Duever et al. (1981) found that established ORV trails through swamps (and sloughs) had some of the deepest ruts

of all vegetation types, and that typically trails were worn down to bedrock and filled with standing water. The majority of ORV use would be to cross through the strand, as opposed to along the strand.

Prairies appear to be the vegetation community most impacted by ORV use, resulting in vegetation loss and exposed soils. ORV trails in this community are easily distinguished even on small-scale aerial photography. Duever et al. (1981) and Duever et al. (1986b) described effects of dispersed ORV traffic in marl marshes and sand marshes in the original preserve (now classified as prairies). Duever et al. (1986b) observed that sand marshes that were not inundated were less likely to sustain heavy impacts from ORV use. This suggests that seasonal variation in hydrology may be an important factor in determining impacts resulting from ORV use, and that ORV use in prairies during the wet season should be minimized.

ORV use has been shown to alter plant community structure. After one year of recovery in the original preserve, Duever et al. (1981) found that sawgrass and muhly grass were reduced in the tire lanes. Hyssop (*Bacopa* sp.) and bladderwort (*Utricularia* sp.) were common in the rutted areas; this was attributed to an increased hydroperiod in the tire ruts and increased sunlight from tree or shrub canopy removal within ORV use areas. After seven years, Duever et al. (1986b) found that four grass-like species were more common in ORV trails than in comparison areas. Sawgrass was less common in the trails used by ORVs than in the undisturbed comparison areas.

ORV use has been shown to alter marsh plant composition and structure. Duever et al. (1981, 1986a, and 1986b) described effects of ORV traffic in inundated sand marshes and peat marshes (wheeled vehicles were not tested in peat marshes). Duever et al. (1981) indicated that ORVs produced heavy impacts in inundated sand prairies, but less impact in non-inundated sand prairies with the same amount of ORV use. Continuously inundated marl marshes were not tested with wheeled vehicles but appeared to be more affected when they were inundated than not. This suggests that marl marshes with extended hydroperiods may be quickly impacted by ORV use.

In marl marsh communities in the original preserve, Duever et al. (1981) found that panic grass (*Panicum* sp.), sawgrass, and muhly grass decreased with increased ORV use. Bladderwort, a floating aquatic plant, was common in the rutted areas; this was attributed to an increased hydroperiod in the tire ruts. Sand marsh communities showed little difference in plant diversities relative to comparison areas after one year. After seven years, coinwort (*Centella asiatica*) was more common in marl marsh areas used by ORVs.

All new adverse impacts associated with wetland fill and degradation (such as rutting and vegetation damage/removal) will be compensated in accordance with the *National Park Service Procedural Manual #77-1: Wetland Protection* (NPS 2016c) and detailed in the Wetland Statement of Findings (WSOF), which will be prepared and released for public comment when NPS has completed the detailed design of the trail system and has specific trail-siting locations to propose (see discussion in appendix B). Compensation mitigation will be proposed to offset (at a minimum 1:1 ratio) the adverse impacts to wetlands.

The wetland vegetation communities underlying the trails and destinations per alternative are summarized in table 4-3.

Table 4-3. Trails and Destinations in Preserve Wetlands

Trails / Destinations	Herbaceous Wetlands[1] Alt. 1	Herbaceous Wetlands[1] Alt. 2	Herbaceous Wetlands[1] Alt. 3	Herbaceous Wetlands[1] Alt. 4	Herbaceous Wetlands[1] Alt. 5	Forested Wetlands Alt. 1	Forested Wetlands Alt. 2	Forested Wetlands Alt. 3	Forested Wetlands Alt. 4	Forested Wetlands Alt. 5
Primary Trails (miles)	77	77	77	107	110	77	77	77	98	101
Secondary Trails (miles)	0	0	0	12	19	0	8	31	37	55
Nonmotorized Trails (miles)	4	5	5	15	15	31	34	34	49	49
Existing Backcountry Destinations	4	4	4	4	4	7	7	7	7	7
Proposed Backcountry Destinations	0	1	2	7	9	0	8	21	33	54

Note: Mileages within this table are rounded to the nearest whole mile and describe trails only; destinations are noted as the number of occurrences within each habitat type under each alternative.

Overall, table 4-3 shows the increases in trail mileage and number of destinations in herbaceous and forested wetlands between alternative 1 and alternative 5. The number of primary trail miles is similarly distributed between herbaceous and forested wetlands. Alternatives 2 and 3 contain secondary trails solely within forested wetlands. In alternatives 4 and 5, the great majority of secondary and nonmotorized trail miles would occur in forested wetlands.

To provide spatial perspective, ORV trail acreage was calculated using trail length and with an average 12-foot width (for both primary and secondary ORV trails). This average was used to establish the percentage of preserve wetlands covered by trails. The results are summarized in table 4-4.

Table 4-4. Percentage of Trails Traversing Wetland Communities in the Preserve

Types of Trails	Herbaceous Wetlands[1] Alt. 1	Herbaceous Wetlands[1] Alt. 2	Herbaceous Wetlands[1] Alt. 3	Herbaceous Wetlands[1] Alt. 4	Herbaceous Wetlands[1] Alt. 5	Forested Wetlands Alt. 1	Forested Wetlands Alt. 2	Forested Wetlands Alt. 3	Forested Wetlands Alt. 4	Forested Wetlands Alt. 5
Primary Trails	0.060	0.060	0.060	0.083	0.086	0.030	0.030	0.030	0.039	0.040
Secondary Trails	0	.0001	.0001	0.009	0.015	0	0.003	0.012	0.015	0.022

Table 4-4 shows that the amount of primary trails traversing herbaceous wetlands increases between alternatives 1 and 5 but still occurs in less than 0.1% of the preserve. Most proposed secondary trails are located in forested wetlands. The total amount of secondary trails occurring inside forested wetlands is highest in alternative 5.

Under all of the alternatives, impacts on wetlands would be attributed to trail and destination maintenance, NPS administrative ORV use (for law enforcement and/or resource management), and visitor use.

Use of destinations that are located in wetlands would result in adverse impacts such as trampling (loss of plant cover) and removal of vegetation, soil degradation, and compaction. The adverse impacts would occur over a small geographic area (0.005 acre at each destination), and would be dispersed throughout the preserve. Those destinations that are less frequently visited, or are on suitable soils, have a lower potential to experience these adverse effects, and such impacts would not likely be detectable on aerial photography. Those destinations that are in herbaceous wetlands (i.e., least resilient to unsuitable substrates) or are frequently used would likely exhibit loss of vegetation and changes in soils. These impacts may be detectable in some instances from aerial photography, and in others may require site visits to detect. If visitor use ceased, or was light, wetland vegetation and soils could recover from these impacts with implementation of adaptive management actions identified in table 2-8. If preserve staff detects destination site impacts, adaptive management would also be implemented to ensure indicators do not exceed the established thresholds. Such NPS actions that could affect wetlands include primary trail stabilization, light vegetation trimming, and displacement of vegetation and soil to replace or establish pitcher pumps, signage, and trail markers (amounting to less than 1 cubic yard for each location for signs and 20 cubic feet for pitcher pumps). These actions would have a slight adverse effect on wetlands. Duration of these impacts would be relatively permanent for placement of signage, pumps, and trail stabilization material, and temporary for vegetation trimming.

Visitors participating in nonmotorized activities on designated trails (e.g., camping, hiking, bicycling) could also cause small (i.e. a few inches deep) ruts in wetlands, but these would be imperceptible on aerial photography, are not likely to exceed indicator thresholds, and should recover under natural ecological processes.

The conditions that often discourage ORV use in forested wetlands, including deep water and closely spaced trees, would persist; impacts from ORV use would often be limited to the outer margins of these wetland communities. Adverse impacts could include vegetation trampling and a reduction in vegetation diversity. Forested wetlands are less susceptible to rutting due to the underlying stable substrate. If preserve staff monitoring indicates ORV use in forested wetlands is approaching the threshold identified in table 2-8, then adaptive management actions would be implemented to ensure wetland resources are at acceptable levels.

ORV trails that traverse prairies and marshes primarily do so along the margins, in the ecotonal area between forested and non-forested wetland areas. ORV use in these communities would cause rutting, which alters wetland hydrology and plant diversity.

Ongoing vegetation management, including the use of prescribed fire, and efforts to restore natural hydrologic processes, would continue to improve conditions for native wetland vegetation, because water availability and connectivity would increase, and plant diversity would be enhanced. These efforts result in beneficial impacts to wetlands and increase their function and value.

4.5.2 Impacts of Alternative 1

Direct and Indirect Impacts. The existing primary ORV trail system, which comprises 278 miles, would remain unchanged under alternative 1; no secondary ORV trails would be opened. The existing primary ORV trail system traverses highly resilient substrates, 77 miles of which support forested wetland communities that are not as vulnerable to impacts by ORV use as herbaceous wetland communities. The general use of designated primary trails would result in adverse impacts

from ORV tires (rutting) that is generally not perceptible on aerial photography. Preserve staff would continue to implement management actions in accordance with the ORV Management Plan. Depending on the type of substrate, recovery may either continue to occur under natural ecological processes or will require mechanical or other intervention (see section 4.4, Soils). Other adverse impacts would continue, including vegetation trampling and a reduction in vegetation diversity. Because of the highly resilient substrates within forested wetlands, these effects are limited to approximately 5% of the trail mileage.

There are 77 miles of the existing primary trail network that would continue to traverse marsh and prairie wetlands, the wetland communities most susceptible to adverse impacts by ORV use. Along the primary trails, these impacts would continue to be rutting and braiding, resulting in a change in the depth and duration of inundation, and expansion of the trail footprint from an average of 12 feet to approximately 20 feet, except where the trails traverse herbaceous wetland communities, where the ruts would be less than 2 feet deep. In prairies and marshes, these ruts would continue to require grade restoration through mechanical means or active revegetation. Overall, based on the susceptibility of the substrate, rutting and braiding would affect approximately 10% of motorized trail mileage traversing prairies and marsh wetlands.

Camping opportunities under alternative 1 consist of 11 backcountry destinations located in wetlands. Dispersed camping would continue to be allowed throughout the preserve (with the exception of the Bear Island Unit) under the no-action alternative. Camping would continue to result in adverse impacts to wetlands, mainly through denuded or trampled vegetation in campsites. The size of these denuded or trampled areas would vary, but averages 10 x 20 feet (0.005 acre).

The impacts of dispersed camping would continue to be spread over the entire preserve. Because of the small size of dispersed campsites, the dispersed nature of the impacts, and their seasonal nature (camping would occur in wetlands during the dry season), the effects of dispersed camping would be small. These adverse effects are not anticipated to be visible from aerial photography. Preserve staff would continue to implement management actions identified in the ORV Management Plan. At the 11 designated backcountry campsites, the combined adverse impacts on wetlands would affect less than 0.1 acre.

Cypress Strands and Domes, Sloughs, Mixed Hardwood Swamp and Hardwood Hammocks — Under alternative 1, approximately 77 miles of primary ORV trails traverse forested wetlands. Forested wetlands comprise cypress strands and domes, sloughs, mixed hardwood swamps, and hardwood hammocks and contain the greatest mileage of primary ORV trails both through them and around their margins. Adverse impacts from ORV and visitor use would include vegetation trampling and a reduction in vegetation diversity. Rutting and braiding would be less likely to occur than in herbaceous wetlands. Overall, in forested wetlands, approximately 5% of the trail corridors would experience these harmful impacts, totaling 4 miles or roughly 6 acres.

Seven backcountry destinations that occur in forested wetlands would continue to be susceptible to vegetation trampling, and with repeated use, would likely be denuded of vegetation. The impacts would occur over a relatively small area, totaling 0.035 acre over the entire preserve. Wetland functions and services may be degraded at destinations that are heavily used. These impacts would be visible from the ground level, but possibly not on aerial photography due to canopy coverage. Preserve staff would continue to implement management actions per the ORV Management Plan.

Prairies and Marshes — The current primary ORV trail network traverses approximately 77 miles of prairies and/or marshes. The soil substrate underlying herbaceous wetlands causes poor traction for ORVs, and rutting and braiding of trails are common. Cumulatively, rutting or braiding is expected

to affect 8 miles (10%) of trails, or 19 acres. Preserve staff would continue to implement management actions in accordance with the ORV Management Plan.

The four backcountry destinations that occur in herbaceous wetlands would continue to be susceptible to vegetation trampling, and with repeated use, may be denuded of vegetation. In addition, because the soils are located on least resilient to unsuitable substrates, they would continue to be degraded and susceptible to erosion. The adverse impacts would occur over a relatively small area, totaling 0.05 acre, and all are located in Stairsteps Unit Zone 4. These impacts would be visible from the ground level, and depending on the time of year, on aerial photography. Preserve staff would continue to implement management actions in accordance with the ORV Management Plan.

Airboats are allowed in Stairsteps Unit Zone 4. Users may camp aboard their vessels, thereby minimizing the potential for adverse impacts.

Conclusion. Under the no-action alternative, more than 99.9% of the wetland resources in the preserve would continue to provide natural ecological functions and services, with only a small amount, 0.005%, continuing to be adversely impacted. Existing primary ORV trails and campsites would continue to disturb wetlands. Visitor use, particularly ORV use, would result in slight loss of vegetation along trail corridors, small changes in inundation depth and duration due to rutting and braiding of trails, and denuded areas at campsites. These adverse effects would continue to degrade wetland functions as long as visitor use continued. The adverse impacts on herbaceous wetlands would be small, affecting approximately 19 acres, or 0.003%, of the herbaceous wetlands in the preserve. Adverse impacts to forested wetlands would be less, consisting primarily of vegetation trampling and reduction in vegetation diversity, and would affect 6 acres, or less than 0.001%, of forested wetlands in the preserve. These effects would not be perceptible on aerial photography, and preserve staff would continue to implement management actions per the ORV Management Plan. Denuded areas and/or trampled vegetation at campsites would total less than 0.09 acre. As needed, preserve staff would continue to implement management actions in accordance with the ORV Management Plan. Dispersed camping would result in some trampled vegetation in wetlands, but would also minimize the intensity of adverse impacts at and near most designated campsites.

4.5.2 Impacts of Alternative 2

Direct and Indirect Impacts. The primary ORV trail system would be the same as under the no-action alternative, with the same impacts.

Alternative 2 would include 8 miles of proposed secondary ORV trails in forested wetlands and no secondary ORV trails in herbaceous wetlands. The impacts associated with secondary ORV trails are the same as those described for the primary ORV trails system under alternative 1. Opening new secondary ORV trails and the realignment of the FNST would require prior inspection and clearance, which would require NPS staff to use an ORV or swamp buggy to inspect for and remove hazards such as downed trees, install signs and pitcher pumps, and trim vegetation in the trail corridor. There would be minor vegetation loss from trimming. No removal of rooted vegetation is anticipated, but if it occurred it would be confined to the trail right-of-way. Other adverse impacts resulting from ORV and nonmotorized trail use would include vegetation trampling and a reduction in vegetation diversity. Overall, these impacts are expected to occur in less than 5% of the total trail mileage, or 2.25 miles in forested wetlands and 0.05 mile in herbaceous wetlands.

Alternative 2 includes nine proposed backcountry destinations located in wetlands. Camping and recreational activities at these destinations would result in adverse impacts, including denuded and trampled vegetation in areas averaging 10 x 20 feet (0.005 acre) at each location, or a combined impact of 0.045 acre. Because dispersed camping would be discontinued, visitor use and intensity of

the impacts at destinations would increase, but the overall extent of impacts would be reduced, with a net benefit to wetlands relative to the no-action alternative.

Cypress Strands and Domes, Sloughs, Mixed Hardwood Swamp, and Hydric Hammock — Under alternative 2, approximately 77 miles of primary ORV trails, 8 miles of secondary trails, and 3 miles of the FNST would traverse forested wetlands. Forested wetlands contain the greatest mileage of trails, both through them and around their margins. Visitor use, including ORV use, would result in adverse impacts such as vegetation trampling and a reduction in vegetation diversity. These adverse impacts would affect approximately 5% of the trails in forested wetlands, amounting to 5 linear miles or 7 acres.

Backcountry destinations in forested wetlands would be susceptible to vegetation trampling. Because of the discontinuation of dispersed camping, visitor use of destinations would be expected to increase, which would accelerate trampling and removal of vegetation. Overall, these adverse impacts would affect a relatively small area, totaling 0.04 acre of the preserve, and would be noticeable at the ground level.

As identified in table 2-8, presence of impact indicators would trigger adaptive management actions to ensure wetland resources thresholds are not exceeded. Because camping would be confined to the destinations, the National Park Service would be able to effectively monitor for adverse effects and take corrective actions.

Prairies and Marshes — Adverse impacts associated with the primary ORV trail system in herbaceous wetlands would be the same as alternative 1 and would total 19 acres. Secondary ORV trails proposed under alternative 2 would not traverse herbaceous wetlands. Approximately 1 mile of the realigned FNST would traverse herbaceous wetlands.

The one proposed backcountry destination that occurs in herbaceous wetlands would be susceptible to vegetation trampling and denuding and degradation of soils. These adverse impacts would affect a relatively small area, totaling 0.005 acre. Because dispersed camping would be discontinued under this alternative, the use of destinations would increase and adverse impacts at destinations would occur more rapidly and be more severe when compared to alternative 1. These adverse impacts would be noticeable on the ground. Because camping would be confined to these destinations, the National Park Service would be able to more effectively monitor for adverse effects, and would be better able to take corrective actions, including adaptive management.

Conclusion. The increase in ORV trail mileage, realignment of the FNST, and designated destinations are anticipated to increase the total amount of adverse wetland impacts compared to alternative 1, but would be less than in alternatives 3 through 5. Visitor use, and ORV use in particular, would cause most of these adverse impacts. Specific adverse impacts include loss of vegetation, reduction in vegetation diversity, and changes in inundation depth and duration due to rutting and braiding of trails. Overall, these effects would only degrade a small amount, 0.005% of wetlands in the preserve, and the great majority (greater than 99.9%) of the wetlands would continue to provide natural ecological functions and services.

Adverse impacts to herbaceous wetlands associated with ORV trails and realignment of the FNST would total approximately 19 acres, or 0.009% of the herbaceous wetlands within the preserve. Adverse impacts to forested wetlands would be of smaller magnitude and would occur within 11.6 acres, or 0.003% of the forested wetlands in the preserve. In both cases, if conditions are not acceptable, adaptive management techniques including cessation of, or decrease in, visitor use would be implemented. Under these conditions, areas of affected vegetation would likely recover to pre-disturbance conditions under natural ecological processes.

Dispersed camping would be discontinued, leading to a concentration of users at the 26 backcountry destinations and campsites, including those in wetlands. This concentration would accelerate vegetation trampling / loss and would likely lead to longer recovery times at those individual sites. However, the net effect on wetlands would be beneficial, as the total area of adverse impact would be reduced relative to the no-action alternative. While the adverse effects would be more severe at the destinations, they would still total less than 0.1 acre, a very small amount considering the large size of the preserve. Limiting camping to these established destinations would also enhance NPS ability to monitor and take corrective actions.

4.5.3 Impacts of Alternative 3

Direct and Indirect Impacts. The primary ORV trail system and realignment of the FNST would be the same as under the no-action alternative and alternative 2, with the same impacts. Under alternative 3, an additional 31 miles of secondary ORV trails traversing forested wetlands underlain by resilient and highly resilient substrate types would be opened. No additional primary or secondary trails would be established in herbaceous wetlands. The actions required to prepare these secondary trails for opening are identical to those described under alternative 2. The types and duration of adverse impacts associated with opening, and visitor use of, secondary trails are identical to alternative 2. The overall geographic extent of the adverse impacts would be slightly larger than alternative 2.

Under alternative 3, 23 proposed backcountry destinations would be located in wetlands. The types and duration of adverse impacts resulting from camping and recreational activities at these destinations are the same as alternative 2. The overall area affected would be 0.115 acre, a slightly larger area than alternative 2.

Dispersed camping would be permitted under this alternative although excluded from areas adjacent to roads, trails, and destinations. Because of the increased number of available destinations, visitor use would be dispersed. The intensity of adverse effects at destinations in forested and herbaceous wetlands would be reduced. However, the addition of dispersed camping would increase the geographic extent of adverse impacts on wetlands and reduce the ability for the National Park Service to regularly monitor and undertake corrective actions relative to alternative 2.

Cypress Strands and Domes, Sloughs, Mixed Hardwood Swamp and Hardwood Hammock — Under alternative 3, approximately 77 miles of primary ORV trails and 31 miles of secondary trails would traverse forested wetlands. Visitor use, and ORV use in particular, would result in the same adverse impacts as under alternative 2. These adverse impacts would affect approximately 5% of the trails in forested wetlands, amounting to 6 linear miles or 9 acres.

Twenty-one backcountry destinations are located in forested wetlands. Visitor use at these destinations would result in adverse impacts, primarily vegetation trampling and loss. The impacts would affect a relatively small area, totaling 0.105 acre. If unacceptable conditions, or indicators as identified in table 2-8, are detected, NPS would implement adaptive management, including limited or restricted use, which would allow areas of denuded and trampled vegetation in forested wetlands to repair themselves to pre-disturbance conditions under natural ecological processes.

Prairies and Marshes — The primary ORV trail system, and realignment of the FNST, in prairies and marshes, would be the same as described under alternatives 1 and 2. Secondary trails proposed under alternative 3 do not traverse herbaceous wetlands. Nonmotorized trails (e.g., the FNST) proposed under alternative 3 and the impacts associated with them would be the same as under alternative 2.

Visitor use of two backcountry destinations that occur in herbaceous wetlands would result in adverse impacts as under alternative 2. The impacts would occur over a relatively small area totaling 0.01 acre. As under alternative 2, the NPS would implement adaptive management actions in response to unacceptable conditions to allow the areas to recover.

Conclusion. The increase in ORV secondary trail mileage and additional backcountry destinations would increase adverse wetland impacts compared to alternatives 1 and 2, but less than alternatives 4 and 5. Visitor use, and ORV use in particular, would result in adverse impacts. Combined, these effects would only degrade a small amount (0.006%) of wetlands in the preserve, but most (greater than 99.9 %) would continue to provide natural ecological functions and services. Preserve staff would monitor conditions of wetlands and require adaptive management if unacceptable conditions are identified.

The opening and use of primary and secondary ORV trails and nonmotorized trails in this alternative would cause adverse impacts to approximately 19 acres, or 0.009% of the herbaceous wetlands, and 15 acres, or 0.004%, of forested wetlands within the preserve.

Dispersed camping would likely reduce the intensity of impacts at individual sites but would also reduce the National Park Service's ability to regularly monitor sites for adverse impacts and undertake corrective actions compared to alternative 2.

4.5.4 Impacts of Alternative 4

Direct and Indirect Impacts. Alternative 4 would expand the primary ORV trails in herbaceous wetlands by 30 miles, and forested wetlands by 21 miles, compared to the no-action alternative. Twelve miles of secondary ORV trails would be reopened in herbaceous wetlands and 37 miles in forested wetlands. These trails would require inspection and preparation prior to opening. The types of adverse impacts that would occur as a result of these actions are as described under alternative 2.

However, the adverse impacts under alternative 4 are greater than under alternatives 1 through 3 because there would be more primary and secondary trail miles, and because some spot stabilization of primary trails might be necessary.

Besides the realignment of the FNST discussed under alternative 2, alternative 4 includes 10 additional miles of nonmotorized trails in herbaceous wetlands and 15 additional miles in forested wetlands. Anticipated impacts due to trail opening and maintenance, and visitor use of nonmotorized trails, are as described under alternative 2. Alternative 4 would increase the total amount of adverse wetland impacts compared to alternatives 1, 2, and 3 because the overall trail mileage would be higher. Overall, adverse impacts from visitor use, such as trail braiding and rutting, would likely affect less than 5% of the total trail mileage in wetland areas, amounting to less than 3 linear miles or 0.37 acre.

Under alternative 4, there would be 7 proposed backcountry destinations in herbaceous wetlands and 33 in forested wetlands. The types of adverse impacts that would result are the same as in alternatives 1 through 3. The most substantial adverse impact would be trampled and denuded vegetation at the destinations. The total area affected would be 0.2 acre.

Alternative 4 would allow dispersed camping in Bear Island and Stairsteps Unit Zone 4, along primary ORV trails, and in areas more than 0.5 mile from paved roads and 0.25 mile from trails. As described in alternative 3, dispersed camping would increase the geographic extent of adverse impacts, but would reduce the intensity of adverse impacts in and around destinations.

Cypress Strands and Domes, Sloughs, and Mixed Hardwood Swamp — Under alternative 4, 21 additional miles of primary ORV trails, 6 additional miles of secondary trails, and 15 additional miles of nonmotorized trails would traverse forested wetlands than under alternative 1. Forested wetlands contain the greatest mileage of primary ORV trails, both through them and around their margins. Adverse impacts associated with opening trails and visitor use would be the same as described under alternatives 2 and 3. Overall, approximately 5% of trails in forested wetlands, amounting to 9 miles of trail or 13 acres, would be affected.

Thirty-three additional backcountry destinations would occur in forested wetlands and would be susceptible to vegetation trampling and loss. These adverse impacts would occur over a relatively small area, totaling about 0.17 acre. Adaptive management in response to observed unacceptable conditions would be the same as under alternatives 2 and 3.

Prairies and Marshes — Under alternative 4, 30 additional miles of primary ORV trails, 12 additional miles of secondary trails, and 10 additional miles of nonmotorized trails would traverse prairies and marshes. Opening and maintaining these trails, along with regular visitor use, would create the same types of adverse impacts as under alternatives 2 and 3. Altogether, approximately 13 miles of trails, or 32 acres of herbaceous wetlands, would be affected.

Seven proposed backcountry destinations would be located in herbaceous wetlands. Visitor use of these destinations would lead to vegetation trampling/denuding and degradation of soils. These adverse impacts would occur over a small geographic area, totaling 0.035 acre. Adaptive management in response to observed unacceptable conditions would be the same as under alternatives 2 and 3.

Conclusion. The increase in primary and secondary trail mileage, hiking trails, backcountry destinations, and dispersed camping opportunities would increase the amount of adverse wetland impacts over a larger geographic area than alternatives 1 through 3, but less than alternative 5. Visitor use, and ORV use in particular, would lead to the same types of adverse impacts as under alternatives 2 and 3. Effects on wetland function would need to be mitigated. Combined, these effects would only degrade a small amount, 0.01% of wetland, with the great majority (greater than 99.9%) of the wetlands in the preserve continuing to provide natural wetland functions and services. Adaptive management in response to observed unacceptable conditions would be the same as under alternatives 2 and 3.

Alternative 4 would adversely affect approximately 32 acres, or 0.016%, of the herbaceous wetlands, and 20.8 acres, or 0.006%, of the forested wetlands in the preserve. Dispersed camping would be allowed in all units of the preserve. This would increase the magnitude of adverse impacts on wetlands, while reducing the intensity of impacts at individual sites. Dispersed camping would also reduce the NPS's ability to regularly monitor and undertake corrective actions compared to alternative 2.

4.5.5 Impacts of Alternative 5: NPS Preferred Alternative

Direct and Indirect Impacts. Under alternative 5, there would be 33 additional miles of proposed primary ORV trails in herbaceous wetlands and 24 additional miles in forested wetlands than under the no-action alternative. There would be 19 total miles of secondary ORV trails in herbaceous wetlands and 55 total miles in forested wetlands. The realignment of the FNST would be the same as under alternative 2 and the additional nonmotorized trails would be the same as under alternative 4. All trails would require inspection and maintenance prior to opening, including the potential for spot stabilization.

The adverse impacts that would occur are as described under alternatives 2 through 4. Overall, the extent of impacts under alternative 5 would be greater than those described under alternatives 1 through 4 due to the increase in ORV trail mileage.

Under alternative 5, there would be 9 proposed backcountry destinations in herbaceous wetlands and 54 proposed destinations in forested wetlands. Visitor use and NPS activities such as site maintenance would result in the same types of wetland impacts described under previous alternatives, although the total area affected by these adverse impacts would be larger, amounting to approximately 0.32 acre. Dispersed camping would result in the same adverse and beneficial impacts as described under alternative 4.

Cypress Strands and Domes, Sloughs, Mixed Hardwood Swamp, Hydric Hammock — Under alternative 5, approximately 24 additional miles of primary ORV trails and 55 additional miles of secondary trails would traverse these habitats than under the no-action alternative. The types of adverse impacts associated with opening and maintaining trails, and visitor use, are the same as previous alternatives. However, the extent of adverse impacts would be larger, affecting 9.8 miles of trail, or 14 total acres.

Visitor use of 54 proposed backcountry destinations in forested wetlands and 9 destinations in herbaceous wetlands would result in vegetation trampling and loss. These adverse impacts would affect a relatively small area, totaling 0.27 acres and 0.045 acres, respectively. Adaptive management in response to observed unacceptable conditions would be the same as under the other action alternatives.

Prairies and Marshes — Under alternative 5, approximately 33 additional miles of primary ORV trails and 19 miles of additional secondary trails would traverse marshes and prairies than under the no-action alternative. However, they would result in the same types of impacts as under the other action alternatives, and may cumulatively affect 14 miles of motorized trails, or 37 acres of herbaceous wetlands. Adaptive management in response to observed unacceptable conditions would be the same as under the other action alternatives.

Conclusion. The types of adverse impacts associated with the actions in alternative 5 are the same as discussed under alternative 4, but would occur over a larger area. Overall, these effects would only degrade a small amount, 0.011%, of wetlands in the preserve, with the great majority (greater than 99.9%) of the wetlands continuing to provide natural wetland functions and services. Adaptive management in response to observed unacceptable conditions would be the same as under the other action alternatives. Adverse impacts to herbaceous wetlands would total approximately 37 acres, or 0.02%, and to forested wetlands 23.7 acres, or 0.007%. Dispersed camping would increase the spatial extent of impacts on wetlands but would reduce the intensity of impacts at individual sites.

4.5.6 Cumulative Impacts

Implementation of the plans identified in section 4.3, Cumulative Impact Analysis, collectively addressed the management of ORV travel in the preserve. Once dispersed throughout the preserve, ORV traffic is now contained in the current primary trail network. Implementation of these plans resulted in a net benefit to wetlands due to reduced effects from trampling, rutting, and channeling of water. As a result of restricting ORV use to designated primary trails, much of the historical linear features created by intense rutting have largely dissipated in heavily impacted areas, especially prairies. Areas of impact, which were historically visible through aerial photography, have largely disappeared from aerial view.

Development of trailheads and recreational facilities under the Addition GMP (NPS 2010), ORV Management Plan (NPS 2000a), and the ORV Trail Heads and Turn Lanes Environmental Assessment (NPS 2012b) have all contributed to some loss of both wetland acreage and function due to the addition of impervious and semi-impervious surface area and vegetation removal. The utilization of the primary ORV trail network is anticipated to contribute to vegetation trampling, but these impacts are negligible when compared to the overall benefit to wetland resources that has occurred as a result of ending dispersed ORV use. The continued use of the primary ORV trail network is anticipated to contribute to negligible amounts of vegetation loss, due to any trimming required for trail access and to vegetation trampling as a result of trail straddling during periods of high water. Collectively, these management actions have contained ORV wetland resource impacts in smaller, more stable areas through managing ingress and egress of ORVs and the designation of a primary trail network in the preserve to limit dispersed ORV impacts.

Implementation of future oil and gas plans of operation could have adverse impacts on wetland composition and function. Use of off-road equipment and constructing roads and pads would result in temporary adverse impacts such as alteration of wetland soils, hydrology, and vegetation. One such plan was the recent Burnett Oil Seismic Monitoring Environmental Assessment (NPS 2016a). In this planning effort, there were 46 mitigation measures identified and required to mitigate and prevent impacts to natural resources within the survey area, including wetlands. Mitigation measures included daily restoration of contours, "single pass" limitations, and temporal restrictions to reduce potential impacts on wetlands. Future oil and gas activities would likely result in similar mitigation measures that would reduce potential for adverse impacts on wetlands.

Under all the alternatives in this Plan, wetland resources would be preserved with minimal changes—the overwhelming majority of the preserve would remain wetlands and would remain largely undisturbed. The range of actions contained in implementing the various alternatives would contribute incrementally and minimally to the cumulative impact. Alternatives 1 through 3 would result in fewer impacts, whereas alternatives 4 and 5 would result in greater impacts, due to greater increases in trail mileage and the number of backcountry camping opportunities.

When the likely effects of implementing the alternatives are added to the effects of other past, present, and reasonably foreseeable actions, there would be a small adverse cumulative impact on wetland resources. The extent of adverse impacts would be smallest with alternative 2 and largest with alternative 5. Regardless of the alternative, all loss of wetland function would need to be compensated for via mitigation to result in no net loss of wetland function. However, in all the alternatives, the great majority, 99.9%, of the wetlands in the preserve would remain undisturbed.

4.6 VEGETATION AND HABITAT

This section discusses the direct, indirect, and cumulative impacts on protected, native, nonnative, and invasive vegetation communities and habitat for species in the preserve that have the potential to be impacted. Impacts related to wetland communities are discussed in section 4.5, and impacts to special status, nonvegetation species are discussed in section 4.7.

4.6.1 Basis of Analysis

To reduce redundancy, this section is organized to discuss impacts to protected plant species, native vegetation, and nonnative and invasive species as individual groups, as management actions would affect those groups somewhat differently across alternatives. Under each alternative, impacts specific to vegetation groups are described first, followed by impacts common to all groups.

As discussed in chapter 3 "Affected Environment," pinelands make up 16% of the overall preserve, hammocks 6%, and disturbed areas 1%. Since disturbed areas have already been altered, and much of the preserve's habitat has already been addressed under section 4.5, "Wetlands," the native vegetation section for each alternative focuses on pinelands and hammocks.

Overall mileage of primary trails in pinelands (approximately one-third of the total primary trail mileage throughout the preserve) increases by approximately 16 miles, and the mileage of secondary trails by approximately 77 miles, from alternative 1 to alternative 5. Mileage of nonmotorized trails in pinelands increases by 3 miles between the no-action alternative and alternatives 2 and 3, and by 17 miles under alternatives 4 and 5.

Overall mileage of primary trails in hammocks (approximately 0.5% of the total primary trail mileage throughout the preserve) increases by approximately .78 miles, and the mileage of secondary trails by 0.2 mile, from alternative 1 to alternative 5. The current primary trail system contains 1.44 miles of trails in hammocks, which increases by almost 0.4 miles in alternative 4, and by an additional 0.4 mile in alternative 5. The number of destinations in hammocks increases from one to two between alternatives 3 and 5, with no destinations currently existing, one destination proposed in alternative 3, and one additional destination being proposed in alternative 5. No nonmotorized trails occur in hammock habitat in any of the alternatives. Because of the increased potential for impacting cultural resources, proposed trails and destinations in hammock habitat were minimized during the evaluation process.

Under all the alternatives, adverse impacts would result primarily from trail opening and maintenance (e.g., hand and mechanical trimming of overhanging vegetation), NPS administrative ORV use (e.g., law enforcement and land management), and visitor use. These actions would result in trampling of vegetation in the trail corridor, and trimming and removal of vegetation, but would not include the removal of rooted vegetation except in special circumstances. ORV use would be infrequent in areas outside existing designated trails. The adverse effects of ORVs on vegetation and habitat are largely based on diminished habitat value or habitat displacement (due to loss of vegetation), which would be limited to a 12-foot wide denuded swath in designated ORV trails and a 10-foot wide swath in nonmotorized trails.

Both trails and destinations proposed in each alternative have been used by motorized or nonmotorized recreational user groups in the past and are currently disturbed. Among other things, this means there would be little to no root removal needed during trail opening and maintenance. Thus, across all the alternatives the geographic extent of impacts is relatively small.

Throughout the alternatives, the majority of new campsites/destinations (approximately 50%) would be located in pineland habitat, as compared to other habitat types. The FWC and NPS annual surveys of red-cockaded woodpecker clusters have documented no loss of pines due to ORV traffic. According to Duever et al. (1981), pinelands were the most resistant to adverse effects from ORV use. Duever et al. (1981) also found few differences in pineland understory when they compared it to undisturbed areas. Duever et al. (1986a) indicated that pinelands recovered more quickly than other areas, so that these areas may be considered favorably for designated trails.

Visitors participating in nonmotorized activities on designated trails (e.g., camping, hiking, bicycling) would also cause adverse impacts such as vegetation trampling, but these would be imperceptible and are likely to recover under natural ecological processes.

Ongoing vegetation management, including the use of prescribed fire, would continue to improve conditions for native vegetation and decrease competition from nonnative and invasive plants across all alternatives. These efforts result in beneficial impacts to vegetation and habitat, increasing their

function and value. In addition, ongoing land management and monitoring efforts in the preserve would help detect and mitigate new nonnative and invasive species that would affect native plant communities.

As discussed in chapter 3 "Affected Environment," most nonnative plants reported in the preserve are restricted to early successional stages on disturbed sites, and five species (melaleuca, Brazilian pepper, water hyacinth, hydrilla, and old-world climbing fern) pose a long-term threat (e.g.; more than five years) to native communities. Of these, two species (melaleuca and Brazilian pepper) have the potential to displace native plant communities in pineland habitats.

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 old-world climbing fern. ORVs 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). Ways in which the National Park Service would avoid or minimize distribution of nonnative plants can be found in chapter 2.

Since this Plan would have no adverse impacts to protected plant species, they are discussed in appendix B, "Dismissed Topics."

4.6.2 Impacts of Alternative 1

Native Vegetation. Under the no-action alternative, ORV use along 102 miles of primary trails and 20 miles of nonmotorized trails in pinelands would continue. There are no existing destinations within pinelands. The durability of the substrate present in pinelands minimizes adverse impacts from ORV use. The loss of mature oak and/or pine trees due to ORV use has not been documented. However, ORV use, or the stabilization and maintenance of ORV trails, would continue to have adverse impacts on other plant species in these communities. Adverse impacts would continue to include edge effects, such as injury to a plant or group of plants, or plant loss in a discrete area, due to repeated use and trampling. The sizes of the impact areas vary, but generally, impacts occur in less than 5% (5 miles) of the designated primary ORV trails in pinelands and hammocks, totaling 7.0 acres of impacts in pinelands and less than 0.01 acre of impacts in hammocks. If visitor use ceases, these affected areas may recover via natural ecological processes.

Nonnative and Invasive Species. Under the no-action alternative, the abundance and spread of nonnative and invasive plants would continue to be limited by NPS land management efforts and a relatively small trail system. Ongoing land management would continue to decrease competition from nonnative and invasive plants and improve the integrity of native habitats, resulting in a beneficial impact on native vegetation. The continuation of monitoring efforts would also help to detect new nonnative and invasive species.

Visitors and ORVs can be agents for seed dispersal, increasing the threat to native plant communities. Nonnative and invasive plants can have severe impacts on the integrity of native systems and habitats. However, limited NPS administrative ORV use, visitor use, and trail maintenance in the preserve, would in turn continue to limit the distribution and establishment of nonnative and invasive plants, which would beneficially impact native vegetation. The harmful effects would continue to be most pronounced along travel corridors and at disturbed sites. The continuation of dispersed camping would help spread nonnative and invasive species into more areas, resulting in an adverse impact to native vegetation.

Conclusion. Under the no-action alternative, ORV use and trail maintenance would continue to result in adverse impacts to native vegetation, such as trampling and edge effects. The area affected would continue to total 12 acres. If visitor use ceased, these areas would recover naturally. Existing patterns of visitor use, especially dispersed camping, although limited, can also help disperse nonnative and invasive seeds, decreasing the overall health of native plant communities.

4.6.3 Impacts of Alternative 2

Native Vegetation. Alternative 2 would include the same 102 miles of primary trails in pinelands as under the no-action alternative. Under this alternative, there would be 17 miles of secondary trails, 3 additional miles of nonmotorized trails (from the realignment of the FNST), and 32 backcountry destinations in pineland habitat, with 0.40 mile of secondary trails and no proposed destinations in hammock habitat. The types of adverse impacts that would occur as a result of the additional motorized and nonmotorized activities would be the same as those described in section 4.6.1. Adverse impacts from the establishment of backcountry campsites/destinations would include denuded or trampled vegetation in areas averaging 10 x 20 feet (0.005 acre) at each destination, totaling 0.16 acre. While the effects associated with opening and visitor use of motorized and nonmotorized trails would be similar to those under the no-action alternative, the geographic extent would increase. Edge effects would occur along 5 miles (5%) of the ORV trails and less than 1 mile (0.24 acre) of the nonmotorized trails. Because of resilient substrate in pinelands, vegetation may be restored by implementation of the adaptive management actions identified in table 2-8.

Nonnative and Invasive Species. The types of adverse impacts associated with nonnative and invasive plant species under alternative 2 would be the same as those under the no-action alternative. The opening and use of additional secondary trails, and realignment of the FNST, would result in increased potential for nonnative and invasive plant seed dispersal. However, elimination of dispersed camping would limit campers to designated sites (destinations and campgrounds), thus making it easier to monitor and treat for nonnative and invasive species. This would result in a small beneficial impact to native habitat compared to the no-action alternative.

Conclusion. Under alternative 2, once the trails are opened, visitor use and trail maintenance would result in edge effects and some trampling of vegetation, affecting an area totaling around 7 acres, a very small area considering the total size of the preserve. If necessary, adaptive management activities identified in table 2-8 would be implemented and trail closures and other management actions may allow pinelands to recover naturally. The opening and use of backcountry destinations would result in additional disturbance of 0.16 acre of pineland habitat and no measurable impacts are anticipated to occur in hammocks. Overall, the great majority of the pinelands (over 99.9%) would be unaffected by this alternative.

4.6.4 Impacts of Alternative 3

Native Vegetation. Alternative 3 would have similar types of adverse impacts to native vegetation as alternative 2. Alternative 3 would include 47 miles of secondary trails and 64 destinations (for a total of 149 miles of ORV trails) in pineland habitat. Alternative 3 would include 2 miles of secondary trail and one destination in hammock habitat. This expanded trail system would increase the potential for edge effects to areas along 7 miles of ORV trails (5% of the total trail system), or 10.6 total acres. This would be an increase in the scale of adverse effects from alternative 2. Because of resilient substrates, the pinelands and hammocks adversely impacted may be restored through implementation of adaptive management actions identified in table 2-8. The realignment of the FNST would result in the same types, scale, and duration of adverse impacts as under alternative 2.

The increased number of destinations proposed in this alternative would increase the potential for vegetation trampling and loss when compared to alternative 2. At each destination, denuded and/or trampled vegetation would average 10 x 20 feet (0.005 acre) in area, totaling 0.32 acre for all destinations.

Dispersed camping would result in adverse impacts similar to those found at destinations. However, because visitors would have more choices in campsites, the intensity of impacts would be reduced at individual sites. If necessary, adaptive management activities identified in table 2-8 would be implemented and trail closures and other management actions may allow pinelands to recover naturally.

Nonnative and Invasive Species. The types of adverse impacts associated with nonnative and invasive plant species under alternative 3 would be similar to those under alternative 2. The opening and use of additional secondary trails in alternative 3, realignment of the FNST, and the allowance of dispersed camping would result in increased potential for nonnative and invasive plant seed dispersal into more areas. These factors would create adverse impacts on a greater scale than alternatives 1 and 2.

Conclusion. Implementation of alternative 3, and consequent visitor use, would result in the same types of adverse impacts on native vegetation as alternative 2. Edge effects would be the main adverse impact and would be greater in scale than alternatives 1 and 2, totaling 10.6 acres. Relatively speaking, these impacts would occur to a small amount of pinelands in the preserve. Visitor use of backcountry destinations may cause denuded or trampled pineland and hammock vegetation, resulting in a total disturbance to 0.32 acre, an exceedingly small amount considering the tens of thousands of acres of pinelands present in the preserve. The opening of additional secondary trails and destinations would also increase the potential for nonnative and invasive plant seed dispersal. Dispersed camping would be allowed in much of the preserve. Relative to alternative 2, this would result in an increased threat to native plant communities throughout a larger geographic footprint. If necessary, adaptive management activities identified in table 2-8 would be implemented and trail closures and other management actions may allow pinelands to recover naturally. Overall, the great majority of the pinelands (over 99.9%) would be unaffected by this alternative.

4.6.5 Impacts of Alternative 4

Native Vegetation. Under alternative 4, primary trail mileage in pinelands would include 108 miles, secondary trail mileage would include 46 miles (a decrease of 1 mile relative to alternative 3), nonmotorized trails mileage would include 43 miles (an increase of 20 miles relative to alternative 3), and there would be 79 proposed backcountry destinations. The types of adverse impacts to native vegetation in pinelands would be similar to those described for alternative 3, but the geographic area in which these effects occur would be larger. Opening and maintenance of motorized and nonmotorized trails would increase the extent of trimmed vegetation by around 18 miles. ORV use would result in edge effects on about 8 miles, or 11 acres, of trail. Visitor use of destinations would result in vegetation trampling or denuding on about 0.395 acre. Because of the resilient substrate found in pinelands, adverse effects associated with trail use and camping may be restored by adaptive management actions identified in table 2-8.

Under alternative 4, primary trail mileage in hammocks would total 15 miles (an increase of 2 miles from alternatives 1 through 3, where primary trail mileage in hammocks totaled 13 miles) and secondary trail mileage would total 3 miles (an increase of one mile relative to alternative 3). There is one proposed hammock destination in alternative 4 (no increase from alternative 3). Opening and maintenance of motorized trails would result in edge effects on about 0.24, or 0.036 acre of trail. Visitor use of destinations would result in vegetation trampling or denuding on about 0.005 acre.

Because of the resilient substrate found in hammocks, adverse effects associated with trail use and camping may be restored by adaptive management actions identified in table 2-8.

Nonnative and Invasive Species. In alternative 4, the types of adverse impacts caused by the spread of nonnative and invasive plants would be the same as described under alternative 3. However, due to alternative 4's greater number of primary, secondary, and nonmotorized trails and the allowance of dispersed camping in more areas, the seeds of nonnative and invasive plants would have a greater potential of spreading into new areas.

Conclusion. Implementation of alternative 4, and consequent visitor use, would result in the same types of adverse impacts on native vegetation as alternative 3, but the scale of those impacts would be larger than alternatives 1 through 3. Edge effects would be the main adverse impact and would be greater in scale than alternatives 1 through 3, totaling 11 acres, a very small area considering the total size of the preserve. Visitor use of backcountry destinations may cause denuded or trampled pineland and hammock vegetation, resulting in a total disturbance to 0.355 acre, a larger area than alternative 3 but a small area considering the amount of pineland vegetation in the preserve. The opening of additional secondary trails and destinations would also increase the potential for nonnative and invasive plant seed dispersal. In alternative 4, dispersed camping would be allowed in all units of the preserve, including Bear Island. Relative to alternatives 2 and 3, this would result in a small increased threat to native plant communities by increasing the potential spread of nonnative and invasive species. If necessary, adaptive management actions identified in table 2-8 would be implemented and trail closures and other management actions would allow pinelands to recover naturally. Overall, the great majority of the pinelands and hammocks (over 99.9%) would be unaffected by actions associated with this alternative.

4.6.6 Impacts of Alternative 5: NPS Preferred Alternative

Native Vegetation. Alternative 5 would result in the largest expansion of the ORV trail system, along with expanded opportunities for backcountry camping in pineland and hammock habitat. Under alternative 5, there would be 110 miles of primary trails, 71 miles of secondary trails, and 117 destinations within pineland habitat. There would be 15 miles of primary trails, 6 miles of secondary trails, and two destinations within hammock habitat. The same types of adverse impacts discussed under alternative 4 would also occur under this alternative. The increased number of trail miles being opened would result in a larger geographic extent of adverse impacts to native vegetation than under alternatives 2, 3, and 4. Once the trails are opened, the extent of adverse impacts from ORV use would also be greater than the other action alternatives.

The primary adverse impact from ORV use would be edge effects along 10 miles of trail (9.85% of the entire trail system), or 14.3 acres. Visitor use of destinations would result in vegetation trampling or denuding, adversely affecting a total of 0.59 acre, which is more than alternative 4. Because of the resilient substrate found in pinelands and hammocks, the adverse effects associated with trail use and camping may be restored through adaptive management actions identified in table 2-8.

Nonnative and Invasive Species. In alternative 5, the types of adverse impacts caused by the spread of nonnative and invasive plants would be the same as alternative 4. However, due to alternative 5's greater number of primary, secondary, and nonmotorized trails and the allowance of dispersed camping in more areas, the seeds of nonnative and invasive plants would have a greater potential of spreading into new areas.

Conclusion. Implementation of alternative 5, and consequent visitor use, would result in the same types of adverse impacts on native vegetation as alternative 4, but the geographic extent of those impacts would be larger than alternatives 1 through 4. Overall, the great majority of the pinelands

(over 99.9%) would be unaffected by actions associated with this alternative. In alternative 5, dispersed camping would be allowed in much of the preserve. Relative to alternatives 1 through 3, this would result in an increased threat to native plant communities by increasing the potential spread of nonnative and invasive species. If necessary, adaptive management actions identified in table 2-8 would be implemented, and trail closures and other management actions may allow pinelands to recover naturally.

4.6.7 Cumulative Impacts

Implementation of the ORV Management Plan (NPS 2000a) established a primary trail system and parking/staging areas for ORV users. This minimized the adverse effects of ORVs on vegetation and habitat in the original preserve by eliminating dispersed use and thereby decreasing vegetation loss and the potential for establishment of exotics and invasive plants. The establishment of these access points resulted in loss of native vegetation within the construction footprint. Overall, these access points result in a beneficial impact by confining motor vehicles to defined areas and thus preventing trampling and loss of vegetation on a larger scale.

The Addition GMP (NPS 2010) outlined frontcountry and backcountry recreational opportunities, including enhanced day use and interpretive opportunities along road corridors. It also included a wilderness proposal totaling 47,067 acres. The proposed wilderness helps reduce the potential for diminished vegetation and habitat values in the Addition and results in a permanent beneficial impact.

Implementation of future oil and gas plans of operation could have adverse impacts on native vegetation because using off-road equipment, and constructing roads and pads, would damage native vegetation. One such plan was the recent Burnett Oil Seismic Monitoring Environmental Assessment (NPS 2016a). Within this planning effort, there were 46 required measures identified to mitigate and prevent impacts to natural resources in the survey area. Mitigation measures included daily restoration of contours, "single pass" limitations, and temporal restrictions to reduce potential impacts on native vegetation. Future oil and gas activities would likely result in similar mitigation measures that would reduce potential for adverse impacts on native vegetation.

The effect of the projects discussed above would likely result in the addition of a small amount of native vegetation and habitat loss or degradation, an adverse impact. The effects of nonnative vegetation would likely continue until management controls the infestation. Habitats could be repaired under natural ecological conditions over time. Under all of the alternatives in this Plan, vegetation and habitats would be preserved with minimal changes—the overwhelming majority would remain largely undisturbed. The range of actions contained in implementing the various alternatives would contribute incrementally to the overall cumulative impact. Alternatives 1 through 3 would contribute a smaller overall footprint of impacts, whereas alternatives 4 and 5 would result in a larger overall footprint of impacts due to increases in trail mileage and the number of backcountry camping opportunities.

When the likely effects of implementing the alternatives in this Plan are added to the effects of other past, present, and reasonably foreseeable actions, there would be a small adverse cumulative impact on native vegetation and habitat in the region. Inside the preserve, the extent of adverse impacts would be smallest with alternative 2, and largest with alternative 5. However, in all the alternatives, the majority of the preserve's native vegetation and habitat would not be subject to adverse effects.

4.7 SPECIAL STATUS SPECIES

This section examines the environmental consequences on special status species that would result from implementation of the no-action and the action alternatives. The analysis is limited to fish and wildlife species; impacts on protected plant species were dismissed from further consideration (see appendix B).

4.7.1 Basis of Analysis

As discussed in chapter 3, the preserve is inhabited by a wide variety of special status species that employ a wide range of survival strategies and are dependent on a variety of habitats. None of the proposed activities within the range of alternatives would convert natural land to impervious surface or eliminate habitat for special status species.

The effects of ORVs to the Florida panther, Cape Sable seaside sparrow, red-cockaded woodpecker, and bald eagle were analyzed in the 1991 GMP (NPS 1991). Effects to these four species, in addition to the Everglade snail kite, West Indian manatee, and wood stork, were also analyzed by the US Fish and Wildlife Service during the consultation initiated in connection with the 2000 Recreational ORV Management Plan (NPS 2000a). Effects to these species were analyzed because ORV use and management activities could reduce the quality of habitat preferred by these species, directly disturb individual animals, or reduce foraging opportunities. At the conclusion of formal consultation with the US Fish and Wildlife Service for the Addition GMP (NPS 2010), the US Fish and Wildlife Service issued a biological opinion that concluded that the Florida panther is the only species that may be adversely affected.

On July 8, 2000, the US Fish and Wildlife Service issued a biological opinion for the preferred alternative identified in the ORV Management Plan. In accordance with section 7 of the Endangered Species Act, the biological opinion analyzed the potential effects and explored ways to reduce or remove adverse effects of the preferred alternative on the Florida panther, wood stork, red-cockaded woodpecker, Cape Sable seaside sparrow, West Indian manatee, bald eagle, and Eastern indigo snake. The biological opinion stated that the preferred alternative would have no effect on the West Indian manatee or the Eastern indigo snake; may affect but is not likely to adversely affect the wood stork, red-cockaded woodpecker, Cape Sable seaside sparrow, or bald eagle; and may affect, and is likely to adversely affect the Florida panther.

On November 17, 2010, the US Fish and Wildlife Service issued a biological opinion for the preferred alternative identified in the 2010 Addition GMP. The biological opinion analyzed the potential effects and explored ways to reduce and/or remove the adverse effects of the preferred alternative (NPS 2010) on the Florida panther, West Indian manatee, Everglade snail kite, red-cockaded woodpecker, wood stork, American crocodile, and Eastern indigo snake. Detailed descriptions of each species life history were provided, along with any known occurrences within the Addition. The biological opinion concluded that the proposed activities identified in the Addition GMP may affect, but are not likely to adversely affect the Eastern indigo snake, red-cockaded woodpecker, wood stork, Everglade snail kite, West Indian manatee, and American crocodile; and may affect, and are likely to adversely affect the Florida panther.

On March 11, 2016, the Florida Fish and Wildlife Conservation Commission issued comments and recommendations in a response to the preliminary alternatives newsletter and workshop for the backcountry access plan. Specific comments and recommendations were provided for the Florida panther, red-cockaded woodpecker, wood stork, state-listed wading birds, Florida black bear, and the bald eagle. The commission commented that the proposed increases in trails and camping opportunities would not substantially impact Florida panthers. It was noted that shifts in resource

management (i.e., shift to designated ORV trails, elimination of dogs for deer hunting, mandatory check-in/out) played a large role in the increase in Florida panther numbers, and water levels had a much stronger influence on panther resource selection than human disturbance.

The FWC suggested strategies for the reduction of potential impacts to red-cockaded woodpeckers, wading birds, and black bears. Establishing 200-foot buffers around red-cockaded woodpecker cavity trees was suggested, as specified in the 2000 Recreational ORV Management Plan. Buffers around wading bird colonies were suggested at a range of 330 feet for both ORV trails and campsites. The FWC suggested that the National Park Service post signs at backcountry campgrounds and campsites and provide educational materials to visitors regarding black bears in order to decrease the potential for human/bear conflicts.

No impacts on the Florida black bear, West Indian manatee, and American crocodile or their habitat would occur under any of the action alternatives. For avian species such as the American bald eagle, Everglades snail kite, Cape Sable seaside sparrow, wood stork, Audubon's crested caracara, and state listed wading birds, there would be no impact to known nest sites or rookeries. Those species that are afforded protection exclusively by the State of Florida (e.g., state listed wading birds) would not require a permit or any other authorization from the Florida Fish and Wildlife Conservation Commission prior to implementation of any of the alternatives.

The impacts to the Florida bonneted bat are expected to be the same under all alternatives. The preserve is in one of four focal areas for the Florida bonneted bat in south Florida. There is one known roost site in the preserve, but since it is more than 50 feet from an ORV trail, it is anticipated that the roost site would be unaffected by implementing the alternatives. Overhanging vegetation would be hand and mechanically trimmed along the trails and destinations, leaving potential suitable roost sites untouched. Removal of trees is not necessary to implement the trails and destinations proposed by the alternatives. Further, Florida bonneted bat movement in the preserve has been documented. This species forages at night when motorized and nonmotorized trail use would be restricted by night closures and when nonmotorized use is minimal. Therefore, no impacts to foraging individuals, their habitat, or their insect prey are anticipated as a result of implementing any of the alternatives. The National Park Service has determined that implementation of any of the alternatives would result in an Endangered Species Act determination of *may affect, not likely to adversely affect* the Florida bonneted bat.

Three special status wildlife species have the potential to be affected by the proposed alternatives and are evaluated in detail under each alternative: the Florida panther, red-cockaded woodpecker, and Eastern indigo snake. Potential impacts to suitable habitat for the red-cockaded woodpecker were quantified using known cavity tree locations, with 50-foot buffers being drawn around each cavity tree. Trails within the 50-foot buffers were flagged and further evaluated by subject matter experts. Destinations within 200 feet of known cavity trees were likewise flagged and reviewed. Along trails, the principal activities of concern would be ORVs passing by and NPS maintenance activities in the trail corridor (identified and marked cavity trees would not be touched). At destinations, the principal activity of concern would be overnight camping in the vicinity of cavity trees. It should be noted that the location of cavity trees varies over time and will change during the life of this Plan.

The analysis of the impact that motorized and nonmotorized trails would have on the Florida panther and Eastern indigo snake is based on the amount of suitable habitat contained within trail and destination locations, by alternative. The acreage of trails and destination-related disturbance in habitat suitable for the Florida panther was calculated using the upland and wetland habitats mapped by Burch (2011), and specifically excluding mangroves, open water, and developed areas. The

acreage of trails and destination-related disturbance in habitat suitable for the Eastern indigo snake was calculated using pinelands and hammocks.

All of the trails and destinations proposed in each alternative have been used by motorized and/or nonmotorized recreation user groups in the past. All the trail corridors are disturbed and this disturbance is obvious on the ground. However, the destinations show various levels of disturbance based on the amount of past use, ranging from natural conditions to heavily impacted. The extent, occurrence, and severity of destination- and trail-related effects on special status species are largely attributed to user-species encounters, noise, and visual disturbance. Reestablishing use of motorized trails would also degrade trail conditions in small areas, potentially affecting adjacent habitats through rutting and braiding (which could alter the trail), duration and flow of water, and changes to adjacent vegetation composition.

Visual and noise disturbance associated with human recreation and ORV use along trails and at destinations could affect the behavior of these species if they are nearby. Potential exposure to a single ORV user includes temporary disturbance (for less than five minutes) and breeding or foraging behavior modifications. These disturbances may result in movement of individuals (the distance depending on the species) away from the source of the disturbance. Most of these species are highly mobile, and would have access to a wide variety of high-quality habitats in the preserve to carry out their life history requirements. During periods of heavy visitor use (particularly during hunting season), ORV use may result in more pronounced effects on special status species.

A summary of the quantitative differences in potential impacts to habitat suitable for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake associated with the components of each alternative are summarized in table 4-5. Generally, the amount of species habitat affected is smallest in alternative 1, and largest in alternative 5.

Table 4-5. Potential Impacts to Habitat Used by Special Status Species

Trail / Destinations	Florida Panther[2] Alt. 1	Florida Panther[2] Alt. 2	Florida Panther[2] Alt. 3	Florida Panther[2] Alt. 4	Florida Panther[2] Alt. 5	Red Cockaded Woodpecker[1] Alt. 1	Red Cockaded Woodpecker[1] Alt. 2	Red Cockaded Woodpecker[1] Alt. 3	Red Cockaded Woodpecker[1] Alt. 4	Red Cockaded Woodpecker[1] Alt. 5	Eastern Indigo Snake[2] Alt. 1	Eastern Indigo Snake[2] Alt. 2	Eastern Indigo Snake[2] Alt. 3	Eastern Indigo Snake[2] Alt. 4	Eastern Indigo Snake[2] Alt. 5
Motorized Trails (acres)	391	428	508	620	708	0.2	0.2	0.1	0.3	0.3	166	192	238	251	293
Nonmotorized Trails (acres)	80	92	92	140	140	0.0	0.0	0.0	0.0	0.0	29	35	35	62	62
Destinations (acres)	0.1	0.3	0.5	1,379	1,816	—	—	4.0	4.0	8.7	0.02	0.2	0.3	1,013	1,309
TOTAL	**471**	**520**	**601**	**2,139**	**2,664**	**0.2**	**0.2**	**4.1**	**4.3**	**9.0**	**195**	**227**	**273**	**1,326**	**1,664**

Notes:
[1] The acreage of trails and destinations within suitable habitat for the species.
[2] The acreage of trails within 50 feet and acreage of destinations within 200 feet of the known cavity nest site.

Table 4-6 provides the percentage of cover of motorized and nonmotorized trails within suitable habitat for the Florida panther and Eastern indigo snake, relative to the total amount of suitable habitat available for the species in the preserve. For the red-cockaded woodpecker, table 4-6 provides the percentage of trails within the buffer zone for the species by alternative.

Table 4-6. Percentage of Motorized and Nonmotorized Trials in Suitable Habitat for Special Status Species

Type of Trail	Florida Panther[2] Alt. 1	Florida Panther[2] Alt.2	Florida Panther[2] Alt.3	Florida Panther[2] Alt.4	Florida Panther[2] Alt.5	Red Cockaded Woodpecker[1] Alt. 1	Red Cockaded Woodpecker[1] Alt. 2	Red Cockaded Woodpecker[1] Alt. 3	Red Cockaded Woodpecker[1] Alt. 4	Red Cockaded Woodpecker[1] Alt. 5	Eastern Indigo Snake[2] Alt. 1	Eastern Indigo Snake[2] Alt. 2	Eastern Indigo Snake[2] Alt. 3	Eastern Indigo Snake[2] Alt. 4	Eastern Indigo Snake[2] Alt. 5
Motorized Trails	0.05	0.06	0.07	0.09	0.10	0.10	0.10	0.17	0.18	0.23	0.10	0.12	0.14	0.16	0.18
Nonmotorized Trails	0.01	0.01	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.0	0.02	0.02	0.02	0.04	0.04
TOTALS	**0.06**	**0.07**	**0.08**	**0.11**	**0.12**	**0.10**	**0.10**	**0.17**	**0.18**	**0.23**	**0.12**	**0.14**	**0.16**	**0.20**	**0.22**

Notes:
[1] The percentage of trail area within the 50-foot buffer zone around known cavity nest sites. Use of the area affected (e.g., the acreage of trail within the 50-foot buffer) divided by 171 acres (e.g., the total area within the 50-foot buffer of all known cavity nest sites).
[2] The amount of suitable habitat disturbed divided by the total amount of suitable habitat available for the species in the preserve.

4.7.2 Impacts of Alternative 1

Direct and Indirect Impacts. Under the no-action alternative, impacts to special status species, including Florida panthers, red-cockaded woodpeckers, and Eastern indigo snakes, would continue to result primarily from ORV and visitor use in the backcountry, including dispersed camping.

The Florida panther uses a wide variety of habitats, and 98% of the overall preserve is within the US Fish and Wildlife Service primary zone of this species. Based on telemetry data of previously tracked Florida panthers, occupied habitats would continue to primarily occur within the Corn Dance, Turner River, Deep Lake, Bear Island, Northeast Addition, and Western Addition management units. Under the no-action alternative, use of motorized and nonmotorized trails, including the FNST, and disturbances in destinations would continue to occur in 471 acres or 0.06% of the habitat suitable for this species in the preserve.

Recreational use within suitable habitat for Florida panthers may continue to result in shifts in individual home ranges for this species, particularly during hunting season or during periods of heavy visitor use. Changes in home range would have a wide variety of potential consequences, including potential reduced encounters with mates or prey, which may influence an individual's fitness. Florida panthers may continue to be flushed or displaced by a variety of human activities that include ORV use, hiking, and NPS administrative use (including law enforcement and/or land management). However, panthers are mostly active between dusk and dawn, resting in the heat of the day when the potential to encounter recreational users would be highest, thereby reducing the potential for adverse effects to this species' home range.

The red-cockaded woodpecker occurs predominately in pineland habitat. The preserve hosts one of the largest populations (70 to 80 active colonies) of red-cockaded woodpeckers in the state. Many of the existing primary ORV trails and nonmotorized trails occur in pinelands in the Stairsteps Zones 3 and 4, Turner River, and Corn Dance Units. Under the no-action alternative, motorized and nonmotorized trails and disturbances in destinations that overlap with protection buffers for red-cockaded woodpeckers total 0.20 acres. More than 99% of ORV and nonmotorized recreation would continue to occur outside the 50-foot buffer for red-cockaded woodpeckers. Continued use of the motorized and nonmotorized trails in and outside of the identified buffers would have no direct impact, injury, or mortality to the species.

Eastern indigo snakes are rarely encountered in the preserve and habitats are primarily associated with pinelands. Motorized and nonmotorized trails, including the FNST, and disturbances in destinations under the no-action alternative would continue to occur in 195 acres or 0.12% of the habitat suitable for this species in the preserve.

Red cockaded woodpecker territories and Eastern indigo snakes occur in pineland areas that are likely the most suitable and attractive to dispersed campers. If dispersed camping occurs in proximity to active woodpecker cavity trees or Eastern indigo snake habitat, these activities could result in visual and noise disturbance, temporarily flushing or displacing these species. Impacts on red-cockaded woodpeckers and Eastern indigo snakes associated with dispersed camping would not be expected to be reoccurring. In the recent past (2016 - 2019), an average of 1,595 backcountry camping permits were issued annually. Over the preserve's entire 729,000 acres, this averages about 457 acres per camper, greatly reducing the potential to encounter occupied habitat for either of these species.

Most of the impacts on special status wildlife would continue to occur for a short duration (less than five minutes) but might reoccur throughout the day (for example, as ORVs continue to pass along a trail). While these disturbances might reoccur, they would not be expected to adversely affect the red-cockaded woodpecker or Eastern indigo snake because, given the relatively low number of permits issued by the preserve, the total number of passes is likely to be small. For the Florida panther, repeated or heavy use by motorized vehicles can result in changes to a panther's home range, a temporary adverse impact. However, a trend of decreasing ORV use in the preserve and the nocturnal behavior of panthers reduces the overall likelihood of panther disturbance.

The no-action alternative would not remove, degrade, or fragment breeding or foraging habitats or cavity trees that would be suitable for the special status species or their prey base. Indirect impacts on special status species may continue to include temporary disruption of foraging activities, which would result from flushing, or displacing individuals due to visual or noise/vibration disturbance. The species would continue to be able to use similar adjacent high-quality habitats and could return to the area after the visitor has left. Sustained noise disturbance from heavy use in a local area could continue to cause the species to avoid the area entirely.

Conclusion. The continuation of current management practices and ORV use patterns would result in small adverse impacts on special status species. Under the no-action alternative, ORV use and visitor use of trails in the backcountry and dispersed camping activities would continue to have small adverse impacts on the Florida panther, red-cockaded woodpecker, and Eastern indigo snake. The adverse impacts would primarily result in habitat and visual/noise disturbance, which may result in disruption of breeding, foraging, or dispersal behaviors and may affect species' home range or displace individuals. The impacts on special status species would continue to affect less than 0.2% of the total amount of habitat available for particular species. Specifically, 0.06% of suitable habitat for the Florida panther would have the potential to be adversely impacted, 0.1% of the habitat within 50

feet of red-cockaded woodpecker cavity trees would have the potential to be adversely impacted from motorized trail use, and 0.12% of the suitable habitat for the Eastern indigo snake would have the potential to be adversely impacted.

Based on the above factors, the National Park Service has determined that the project would result in an Endangered Species Act determination of *may affect, not likely to adversely affect* for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake.

4.7.3 Impacts of Alternative 2

Direct and Indirect Impacts. Under alternative 2, the types and duration of adverse impacts to special status species are the same as those discussed in the no-action alternative. The extent of adverse effects increases relative to alternative 1, but would be smaller than alternatives 3, 4, and 5.

The opening and use of motorized and nonmotorized trails (e.g., realignment of the FNST) and use of destinations under alternative 2 would affect 520 acres, or less than 0.1% of habitat suitable for the Florida panther in the preserve. Overall, this is a small area of disturbance, and large expanses of suitable habitat would remain available for panthers and their prey populations in the preserve. The National Park Service would implement adaptive closures if visitor use interferes with known den sites. Further, the number of annual ORV permits issued for the preserve has been decreasing in recent years, indicating an overall decrease in backcountry use. This overall trend of decreasing ORV use in the backcountry would reduce the likelihood of visitor-panther encounters in the future. On the other hand, the increased recreational opportunities afforded by this alternative could possibly result in increased ORV use on primary and secondary ORV trails. If so, impacts to panthers would be limited because the number of permits sold is capped at 2,000, a number designed to protect panther populations (NPS 2000a).

Alternative 2 would impact 0.30 acre of red-cockaded woodpecker habitat in the preserve, which is 0.10 acre more than the no-action alternative. This adverse effect would be limited, given that no cavity trees would be removed or trimmed as part of trail or destination opening or maintenance. Further, a decreasing trend in backcountry ORV use would also decrease the likelihood of disturbance to red-cockaded woodpecker habitat and cavity trees.

In alternative 2, there would be a small increase in the impacted acreage of habitat suitable for the Eastern indigo snake, resulting in adverse effect to 227 acres. This expanded footprint represents 0.14% of the total amount of suitable habitat in the preserve. Similar to the no-action alternative, the likelihood of injury or mortality is low given the small population size, presence of more than 150,000 acres of suitable habitats that would remain undisturbed, and overall decrease in backcountry ORV use.

Under alternative 2, no suitable foraging habitat for Florida panther, red-cockaded woodpecker, or Eastern indigo snake would be removed, degraded, or fragmented. Reopening of ORV trails, realignment of the FNST, and visitor use of destinations that occur in areas adjacent to suitable foraging habitat may result in indirect impacts on the species from visual or noise disturbance if an individual or congregation of individuals occurs near a trail or destination. Visual and noise disturbances may result in temporary flushing, displacement, or behavior modification. In most instances, this disturbance would be temporary in nature as the visitor passes through the area. In addition, Florida panthers and red-cockaded woodpeckers are highly mobile and can readily move to other similar, nearby habitats to avoid these disturbances.

Most of the impacts on special status wildlife would occur for a short duration (less than five minutes) but might reoccur throughout the day (for example, as ORVs continue to pass along a trail). While these disturbances might reoccur, they would not be expected to adversely affect the

red-cockaded woodpecker or Eastern indigo snake due to the generally low number of passes. For the Florida panther, opening trails and areas to ORV and visitor use, including camping, can result in changes to a panther's home range, a temporary adverse impact. However, a trend of decreasing ORV use in the preserve and the nocturnal behavior of panthers reduces the overall likelihood of panther disturbance.

No dispersed camping would occur under this alternative, and thus, the potential adverse effects on special status species and their habitat would be reduced as compared to the no-action alternative, resulting in beneficial impacts.

Conclusion. Under alternative 2, the types and duration of adverse impacts on special status species would be similar to those described under the no-action alternative. However, due to the increase in trail mileage and number of destinations relative to the no-action alternative, alternative 2 would slightly increase the amount of habitat disturbed and noise/visual effects for the Florida panther (disturbance to less than 0.1% of suitable habitat) and Eastern indigo snake (disturbance to 0.14% of suitable habitat). Overall, this is a small area of disturbance for the Florida panther and Eastern indigo snake. The extent of impacts on known red-cockaded woodpecker cavity trees would be very slightly more than the no-action alternative. Overall, less than 1% of the total amount of suitable habitat for these species present in the preserve would be affected by this alternative. More than 99% of the suitable habitats for these special status species would not be affected by this alternative.

The elimination of dispersed camping in this alternative reduces the potential for visitors to directly disturb special status species, a permanent beneficial impact.

Based on the above factors, the National Park Service has determined that the project would result in an Endangered Species Act determination of *may affect, not likely to adversely affect* for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake.

4.7.4 Impacts of Alternative 3

Direct and Indirect Impacts. Under alternative 3, the types and duration of adverse impacts on special status species are the same as those discussed in the no-action alternative and alternative 2. The extent of the adverse effects would increase relative to alternatives 1 and 2, but would be smaller than alternatives 4 and 5. Impacts from the realignment of the FNST would be the same as discussed under alternative 2.

The opening and use of motorized and nonmotorized trails (re-alignment of the FNST) and use of destinations under alternative 3 would affect 601 acres or less than 0.1% of habitat suitable for the Florida panther in the preserve, a slightly larger area than alternative 2. However, large expanses of suitable habitat would remain available for panthers and their prey populations in the preserve, and the National Park Service would implement adaptive closures if visitor use interferes with known den sites. Further, the number of annual ORV permits issued for the preserve has been decreasing in recent years, indicating an overall decrease in backcountry use. This overall trend of decreasing ORV use in the backcountry, if it continues, would reduce the likelihood of visitor-panther encounters in the future. On the other hand, the increased recreational opportunities afforded by this alternative could possibly result in increased ORV use on primary and secondary ORV trails. If so, impacts to panthers would be limited because the number of permits sold is capped at 2,000, a number designed to protect panther populations (NPS 2000a).

Alternative 3 would adversely affect 4.3 acres of red-cockaded woodpecker habitat in the preserve, an increase of 4.0 acres as compared to the no-action alternative. However, this adverse effect would be limited, given that no cavity trees would be removed or trimmed as part of trail opening or

maintenance. Further, a decreasing trend in backcountry ORV use would also decrease the likelihood of disturbance to red-cockaded woodpecker habitat and cavity trees.

In alternative 3, there would be a small increase in the impact acreage of habitat suitable for the Eastern indigo snake, resulting in adverse effect to 273 acres. This expanded footprint represents less than 0.2% of the total amount of suitable habitat in the preserve. Similar to the no-action alternative, the likelihood of injury or mortality is low given the small population size, presence of more than 150,000 acres of suitable habitats that would remain undisturbed, and overall decrease in backcountry ORV use.

Most of the impacts on special status wildlife would occur for a short duration (less than five minutes) but might reoccur throughout the day (for example, as ORVs continue to pass along a trail). While these disturbances might reoccur, they would not be expected to adversely affect the red-cockaded woodpecker or Eastern indigo snake due to the generally low number of passes. For the Florida panther, opening trails and areas to ORV and visitor use, including camping, can result in changes to a panther's home range, a temporary adverse impact. However, a trend of decreasing ORV use in the preserve, and the nocturnal behavior of panthers, reduces the overall likelihood of panther disturbance.

Walk-in dispersed camping under alternative 3 would slightly decrease the potential for disturbance of special status species and their habitats relative to the no-action alternative and alternatives 4 and 5, but would substantially increase the potential relative to alternative 2 (in which all camping would be in designated sites).

Conclusion. Under alternative 3, the types of adverse impacts on special status species would be similar to those described under alternatives 1 and 2; however, the scale of these impacts would increase. Because of the increase in trail mileage and number of destinations, relative to alternative 2, alternative 3 would increase the amount of suitable habitat disturbed by 0.08%, 0.17%, and 0.16% for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake, respectively. For all three species, this is a small area of disturbance amounting to less than 1% of the total amount of suitable habitat for these species in the preserve. More than 99% of the suitable habitats for these special status species would not be affected by this alternative.

Walk-in dispersed camping under alternative 3 would slightly decrease the potential for disturbance of special status species and their habitats relative to the no-action alternative and alternatives 4 and 5, but would substantially increase the potential relative to alternative 2 (in which all camping would be in designated sites).

Based on the above factors, the National Park Service has determined that the project would result in an Endangered Species Act determination of *may affect, not likely to adversely affect* for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake.

4.7.5 Impacts of Alternative 4

Direct and Indirect Impacts. Under alternative 4, the types of adverse impacts on special status species are the same as described in the no-action alternative and alternative 3. These include habitat and visual/noise disturbance, which may result in disruption of breeding, foraging, and dispersal behaviors and may affect species home range or displace individuals. Adverse impacts from the realignment of the FNST would be the same as discussed under alternative 2. Because alternative 4 includes additional motorized trails, nonmotorized trails, and destinations, and allows dispersed camping in more areas, the geographic extent of the adverse impacts increases relative to alternatives 1 through 3, but would be smaller than alternative 5.

Opening and use of motorized and nonmotorized trails—including re-alignment of the FNST and other hiking trails—and use of destinations in alternative 4 would affect 2,139 total acres. The opening and use of motorized and nonmotorized trails would affect 0.11% of habitat suitable for the Florida panther in the preserve, an increase from alternative 3. However, large expanses of suitable habitat would remain available for panthers and their prey populations in the preserve, and the National Park Service would implement adaptive closures if visitor use interferes with known den sites. Further, the number of annual ORV permits issued for the preserve has been decreasing in recent years, indicating an overall decrease in backcountry use. This overall trend of decreasing ORV use in the backcountry would reduce the likelihood of visitor-panther encounters in the future. Even if the increased number of trails and destinations under this alternative were to result in an increased number of ORV permits being issued, the number of available permits is capped at 2,000, a number designed to protect panther populations (NPS 2000a).

Alternative 4 would adversely affect 4.3 acres of red-cockaded woodpecker habitat in the preserve, which is no change from alternative 3. This adverse effect would be limited, given that no cavity trees would be removed or trimmed as part of trail opening or maintenance. Further, a decreasing trend in backcountry ORV use would also decrease the likelihood of disturbance to red-cockaded woodpecker habitat and cavity trees.

The motorized trails, nonmotorized trails, and destinations that occur in habitat suitable for the Eastern indigo snake under alternative 4 would result in effects to 1,326 acres, a larger area than alternative 3. The expanded trail footprint represents 0.2% of the estimated amount of total suitable habitat in the preserve; however, the likelihood of injury or mortality continues to be low given the small population size, decreasing trend in ORV use in the preserve, and presence of more than 150,000 acres of suitable habitats that are undisturbed.

Most of the impacts on special status wildlife would occur for a short duration (less than five minutes) but might reoccur throughout the day (for example, as ORVs continue to pass along a trail). While these disturbances might reoccur, they would not be expected to adversely affect the red-cockaded woodpecker or Eastern indigo snake due to the generally low number of passes. For the Florida panther, opening trails and areas to ORV and visitor use, including camping, can result in changes to a panther's home range, a temporary adverse impact. However, a trend of decreasing ORV use in the preserve, and the nocturnal behavior of panthers, reduces the overall likelihood of panther disturbance.

Dispersed camping would be allowed in more areas, particularly in the Bear Island Unit, compared to the no-action alternative. This would increase the geographic extent of adverse impacts relative to alternatives 1 and 3.

Conclusion. Under alternative 4, the types of adverse impacts on special status species would be similar to those described under alternatives 1 through 3; however, the scale of these impacts would be slightly larger than alternatives 1 through 3. Because of an increase in trail mileage and number of destinations, alternative 4 would increase the amount of suitable habitat disturbed to 2,139 total acres for the Florida panther (up from 601 acres in alternative 3). The total amount of suitable habitat disturbed for the Eastern indigo snake would be 1,326 acres (up from 273 acres in alternative 3). The total amount of suitable habitat disturbed for the red-cockaded woodpecker would be 4.3 acres (same as alternative 3). For all three species, this is a small area of disturbance, amounting to less than 1% of the total amount of suitable habitat for these species in the preserve. More than 99% of the suitable habitats for these special status species would not be affected by this alternative.

Most of the impacts on special status wildlife would occur for a short duration (less than five minutes as an ORV or visitor on foot passes by) but might reoccur throughout the day.

Dispersed camping would be allowed in a larger geographic area than alternatives 1 through 3, due to the inclusion of the Bear Island Unit. This would increase the potential area where adverse impacts could occur, relative to alternatives 1 through 3.

Based on the above factors, the National Park Service has determined that the project would result in an Endangered Species Act determination of *may affect, not likely to adversely affect* for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake.

4.7.6 Impacts of Alternative 5: NPS Preferred Alternative

Direct and Indirect Impacts. Under alternative 5, the types of adverse impacts on special status species are the same as described for alternatives 1 through 4. These include habitat and visual/noise disturbance, which may result in disruption of breeding, foraging, and dispersal behaviors and may affect species home range or displace individuals. Because alternative 5 includes additional motorized trails and destinations and allows dispersed camping, the geographic area of the effects is larger than alternatives 1 through 4. The same nonmotorized trails discussed under alternative 4 would also occur under this alternative.

The opening and use of motorized and nonmotorized trails and use of destinations under alternative 5 would occur in 2,654 acres. The opening and use of motorized and nonmotorized trails would affect 0.12% of habitat suitable for the Florida panther in the preserve, a larger area than alternative 4. However, large expanses of suitable habitat would remain available for panthers and their prey populations in the preserve, and the National Park Service would implement adaptive closures if visitor use interferes with known den sites. Further, the number of annual ORV permits issued for the preserve has been decreasing in recent years, indicating an overall decrease in backcountry use. This overall trend of decreasing ORV use in the backcountry would reduce the likelihood of visitor-panther encounters in the future. Even if the increased number of trails and destinations under this alternative were to result in an increased number of ORV permits being issued, the number of available permits is capped at 2,000, a number designed to protect panther populations (NPS 2000a).

Alternative 5 would affect 9.0 acres of red-cockaded woodpecker habitat in the preserve, an increase of 8.80 acres compared to the no-action alternative. The opening and use of motorized and nonmotorized trails would affect 0.23% of habitat suitable for the red-cockaded woodpecker in the preserve, a larger area than alternative 4.However, this adverse effect would be limited, given that no cavity trees would be removed or trimmed as part of trail opening or maintenance. Further, a decreasing trend in backcountry ORV use would also decrease the likelihood of disturbance to red-cockaded woodpecker habitat and cavity trees.

An increase in the impacted acreage of habitat suitable for the Eastern indigo snake under alternative 5 would occur, resulting in effects to 1,664 acres. The expanded trails footprint represents 0.22% of the total amount of suitable habitat in the preserve. Similar to the no-action alternative, the likelihood of injury or mortality is low given the small population size, the presence of more than 150,000 acres of suitable habitats that would remain undisturbed, and an overall decrease in backcountry ORV use.

Dispersed camping would be allowed in more areas, particularly in the Bear Island Unit, compared to the no-action alternative. This would increase the geographic extent of adverse impacts relative to alternatives 1 and 3.

Conclusion. Under alternative 5, the types of adverse impacts on special status species would be similar to those described under alternative 4; however, the scale of these impacts would increase and would affect a larger geographic area than alternatives 1 through 4. Relative to alternative 1, the opening and use of motorized and nonmotorized trails in alternative 5 would increase impacts on

suitable habitat by 0.06%, 0.13%, and 0.10% for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake, respectively. Overall, this is a small area of disturbance, amounting to less than 1% of the total amount of suitable habitat for these species present in the preserve. More than 99% of the suitable habitats for these special status species would not be affected by this alternative. Most of the impacts on special status wildlife would occur for a short duration (less than five minutes as an ORV or visitor on foot passes by) but might reoccur throughout the day.

Based on the above factors, the National Park Service has determined that the project would result in an Endangered Species Act determination of *may affect, not likely to adversely affect* for the Florida panther, red-cockaded woodpecker, and Eastern indigo snake.

4.7.7 Cumulative Impacts

The preserve's GMP (NPS 1991), ORV Management Plan (NPS 2000a), and Addition GMP (NPS 2010) collectively addressed the management of ORV travel in the preserve. Prior to the ORV Management Plan, dispersed ORV use prevailed throughout the preserve and resulted in vegetation removal and soil disturbance. Implementation of the ORV Management Plan minimizes impacts to special status species and their habitats and restricts ORV use to designated primary trails. The Addition GMP provided this same framework for primary trails in the Addition. The implementation of these plans to control ORV travel in the preserve has contributed to beneficial impacts on special status species.

The one reasonably foreseeable future action that has a detectable effect on special status species is oil and gas exploration similar to that recently conducted by Burnett Oil Company. The performance of seismic surveys in the Bear Island, Northeast Addition, and Turner River Units could have adverse impacts on special status species due to habitat removal and degradation and disturbance that may interfere with breeding, foraging, and dispersal/migration associated with heavy equipment and the construction of roads and pads. However, the required mitigation measures reduce the impact of activities to these resources, and habitats for special status species are expected to recover after operations cease. Mineral surveys eventually will come to an end once all likely areas have been explored. Exploration for minerals could be followed by actual development, which would have independent impacts on special status species. These impacts would be mitigated via the permitting process.

The effect of the projects discussed above would likely result in the disturbance of special status species and the addition of a small amount of loss of habitats capable of supporting such species, an adverse impact. Under all of the alternatives in this Plan, special status species populations would be maintained with minimal disturbance of individuals, and the overwhelming majority (greater than 99%) of special status species habitats would remain largely undisturbed. The range of actions contained in the various alternatives would contribute incrementally to the overall cumulative impact. Alternatives 1 through 3 would contribute a smaller overall footprint of impacts, whereas alternatives 4 and 5 would result in a larger overall footprint of impacts due to increases in trail mileage and the number of backcountry camping opportunities.

When the likely effects of implementing the alternatives are added to the effects of other past, present, and reasonably foreseeable actions, there would be a small adverse cumulative impact on special status species in the preserve. Alternatives 1 and 2 would contribute the smallest adverse increment (disturbance to less than 0.1% of habitat suitable for the Florida panther), whereas alternatives 3, 4, and 5 would contribute the largest (disturbance to 0.23% of suitable habitat for the red-cockaded woodpecker) due to increases in trail mileage and backcountry destinations. Despite this habitat disturbance, large expanses (over 99%) of suitable habitat in the preserve remain intact and undisturbed. The actions contained in the various alternatives would not likely result in injury,

mortality, extirpation, or loss of designated critical habitat important to special status species in the preserve.

4.9 VISITOR USE AND EXPERIENCE

This section analyzes the potential effects of the no-action and action alternatives on visitor use and experience in the preserve.

4.9.1 Basis of Analysis

Visitor activities have been grouped into three categories for this analysis: motorized use, nonmotorized use, and camping. Direct and indirect impacts to each of these activity categories are discussed under each alternative.

"Motorized use" refers to ORV travel, including street-legal 4x4, all-terrain vehicle, utility task vehicle, swamp buggy, and airboat use. "Nonmotorized use" refers to hiking, bicycling, canoeing, horseback riding, and other noncamping terrestrial recreational activities that do not involve use of a motorized vehicle. Much of the nonmotorized use in the backcountry centers on the FNST, which receives about 2,850 hikers per year (University of Florida 2011).

In the discussion here, "camping" refers specifically to backcountry camping. Table 4-7 shows the number of backcountry camping permits issued per year in the preserve. Overall, backcountry camping has decreased between 2016 and 2019. The number of campers was highest in 2016, when 2,584 permits were issued. The average for this period is 1,595 permits per year.

Hunting is not analyzed here in detail as a visitor activity, as no changes are being proposed that would affect hunting management in the preserve. However, hunters that camp in the backcountry during hunting season have the potential to be affected by this Plan; therefore, camping during hunting season is discussed in this section. Motorboat use is not analyzed in this chapter, as there are no alternatives that would change the current management of motorboat use in the preserve.

Table 4-7. Number of Backcountry Camping Permits Issued by Year

Year	Number of Permits
2019	1,032
2018	1,292
2017	1,472
2016	2,584
4-Year Average	1,595

Source: BICY

4.9.2 Impacts of Alternative 1

Motorized Use. The no-action alternative would maintain the current management of the preserve. The current 278-mile primary trail network would continue to serve as access for motorized vehicles into the backcountry. Under the no-action alternative, there would be no additional motorized access provided. ORV users would continue to be limited to the existing primary trails network. ORV users would not have opportunities for more solitude and privacy on secondary trails. Although motorized user groups include airboats, no additional airboat trails would be proposed under this alternative. Airboat users would continue to enjoy access to Stairsteps Unit Zones 3 and 4.

ORV permit sales in the preserve have been in decline over recent years, from a high of 2,000 permits sold in 2010 to 1,069 in 2019, a 47% decrease over ten years. From 2016 to 2019 (the most recent years for which data were available), the average number of ORV permits sold annually is 1,050. This reduction in ORV use is a beneficial impact to ORV and nonmotorized visitors as long as it continues, because it reduces competition for sites in the backcountry and the potential for user conflicts. This trend may continue, or may stabilize at the current lower levels, due to an overall decrease in the demand for hunting opportunities in the preserve.

Under this alternative, the current 60-day annual ORV closure would remain in place, which would continue to limit ORV recreation during the closure. This annual 60-day closure occurs during the hot and humid south Florida summer, which corresponds to the preserve's lowest visitation levels. Therefore, the continuance of the annual 60-day closure period would continue to have a slight adverse impact on visitor access to and enjoyment of the preserve.

Nonmotorized Use. Under the no-action alternative, visitors would continue to have access to several nonmotorized trails and could also hike off-trail. Long distance hiking opportunities would continue to be available on 37 miles of the FNST and on primary ORV trails. In many areas, the FNST overlaps with primary ORV trails, and nonmotorized users would likely encounter ORVs, resulting in a small adverse impact for those hikers seeking immersion in nature. This impact would typically last less than five minutes. Motorized and nonmotorized trail overlaps also present a small safety concern, as there is a potential for human and vehicle collision and injury, an adverse impact on visitor experience. The chance of a collision is small (there have been no documented instances of ORV and pedestrian collisions).

Short-distance hiking trails would continue to be available in the preserve, including the 6.5-mile Loop Trail and five short frontcountry trails (Bass Lake, Deep Lake, Fire Prairie, Gator Hook, and Tree Snail Hammock). These trails are designated hiking trails and do not overlap with designated ORV trails, a beneficial impact for ORV and nonmotorized users.

Visitors would continue to access a total of 15 miles of designated canoe trails, including Turner River, Halfway Creek, Halfway Creek Loop, and Lefthand Turner River. Together, these canoe trails result in a beneficial impact on visitor experience.

Camping. The no-action alternative would not change the current camping management strategies of the preserve. Stay limits would continue as 14 days, not to exceed the maximum number of days per year specified in the superintendent's compendium. Free backcountry camping permits are available from any visitor center or trailhead; campers fill out the permits and drop them in the box on the honor system. An average of 1,595 backcountry camping permits were issued annually between 2016 and 2019. Over the preserve's whole 729,000 acres, this averages more than 457 acres available per camper, providing many opportunities for solitude in the backcountry, a beneficial impact to 1,595 backcountry users (based on 2016–2019 average number of permits). The existing system also enhances the user's sense of freedom and choice, which is a beneficial impact.

Under the no-action alternative, dispersed backcountry camping would continue to be allowed throughout the majority of the preserve, with the exception of the Bear Island Unit, and there would continue to be no group size limits for dispersed camping. Dispersed camping increases the visitor's range of camping options, sense of freedom, and opportunities for solitude, all of which are beneficial impacts to visitor experience. Visitors would also have the option of camping at designated sites (2 backcountry campgrounds and 23 designated campsites), and this is a beneficial impact for those seeking more convenience.

There is currently no reservation system in place for reserving backcountry campsites, which are only available on a "first come first served" basis. There may be competition to use some popular campsites, and some users may have to travel to other areas. Uncertainty regarding use of a campsite is an adverse impact on visitors seeking to plan in advance.

This alternative would continue to allow 10-day to 14-day consecutive stay limits for backcountry campers, with an ultimate limit not to exceed the maximum number of days per year specified in the superintendent's compendium. Further, camping equipment could be left in place for the duration of hunting season. This practice would continue to result in a small adverse impact on hunters during hunting season when competition for campsites is highest. Allowing hunters to leave equipment in place for the duration of hunting season is a beneficial impact for hunters who arrive first at popular campsites because of the added convenience, but an adverse impact for all others because one hunter can "hold" a site and deny others use of it for the duration of hunting season.

Conclusion. Under the no-action alternative, the recreational access for all users would continue as it currently exists; 1,050 ORV (2016–2019 average) users would have access to a system of primary trails, but not secondary trails. Restricting motorized use to primary trails would be a small adverse impact on motorized users. Nonmotorized users would continue to have access to a system of short hiking trails, but those seeking longer hiking experiences on maintained routes would need to share primary trails with motorized users, a small adverse impact for all trail users. About 1,595 visitors (average number of backcountry camping permits for 2016–2019) would also continue to have opportunities for dispersed camping and camping in designated sites, both of which are beneficial impacts on the visitor experience. Designated sites would continue to be available on a first come, first served basis, which creates some uncertainty for the visitor, a small adverse impact. There may be limited instances where visitors cannot camp in the exact site they wanted and this would be a small adverse impact.

4.9.3 Impacts of Alternative 2

Motorized Use. The primary trail network would be the same as in the no-action alternative; however, alternative 2 establishes a system of 33 miles of secondary ORV trails. The increase in trail mileage would improve the overall experience of 1,050 ORV users compared to the no-action alternative by giving ORV users access to a larger geographic area, providing more opportunities for solitude, and improving their sense of freedom and self-reliance.

Under alternative 2, the annual 60-day closure would be the same as described under alternative 1 (no-action alternative) and would continue to have a slight adverse impact on access for the 1,050 ORV users.

Nonmotorized Use. Under alternative 2, the FNST would be realigned to a new route 44 miles long that minimizes overlap with motorized trails. This new alignment would provide a better long-distance hiking opportunity in the preserve, improve the experience of about 2,853 long-distance hikers (annually) and ORV users by mostly separating the two user groups, and reduce the potential for conflict and accidents between them. This would be a beneficial impact for nonmotorized and motorized users. The installation of pitcher pumps at campsites along the FNST would also result in a beneficial impact by improving hiker safety and access to water for camp activities.

Camping. Under alternative 2, a total of 46 new backcountry destinations would be designated, nearly doubling the number of campsites currently available. These 46 sites would expand choices for campers, a beneficial impact, and would also allow preserve staff to monitor sites for trash and safety hazards, also a beneficial impact for visitors. A reservation system for campsites would also be implemented. This system would provide more certainty for visitors, but would require advanced

planning (for example, visitors would need to go to a visitor center or website to reserve a campsite). Dispersed camping would be eliminated. This would reduce freedom of choice, sense of adventure, and opportunities for solitude for campers. When combined, these factors would result in an adverse impact on the visitor experience because 1,595 annual backcountry users would have to compete for 69 designated sites and space in two backcountry campgrounds.

Without dispersed camping opportunities, crowding and competition for designated sites would increase, especially during hunting season when backcountry camping is most popular in the preserve. For example, during the 2019–2020 hunting season, there were 6,041 days of hunting pressure (total number of days of hunting for all hunters) in the preserve. Increased competition for sites would cause an adverse impact on backcountry campers.

In this alternative, stay limits would be established to help increase destination turnover rate. Camping or occupancy at a destination or backcountry campground would be limited to no more than 14 consecutive days in a 30-day period, and no more than 120 days in a calendar year. This 14-day stay limit would also apply to camping equipment. This would increase destination turnover rate and prevent hunters from "holding" campsites for all of hunting season, resulting in a small beneficial impact for campers in general, especially during hunting season.

Conclusion. The opening of 33 miles of secondary trails would improve the experience of 1,050 ORV users in the preserve, relative to the no-action alternative. The realignment of the FNST would also improve the experience for about 2,853 visitors seeking long-distance hiking opportunities (by reducing their encounters with ORVs), compared to the no-action alternative. Regarding camping, there would be 69 total designated sites and two developed backcountry campgrounds, an increase from the no-action alternative. These sites would be managed through a reservation system, which would reduce uncertainty for visitors. However, the elimination of the dispersed camping would increase competition for designated sites, especially during hunting season, and some visitors may not be able to camp in the areas they desire or find an available campsite at all. This would result in an adverse impact for campers.

4.9.4 Impacts of Alternative 3

Motorized Use. The primary trail network would be the same as in the no-action alternative. However, alternative 3 would offer 88 miles of secondary ORV trails, nearly triple the miles of secondary trails presented in alternative 2. The increase in secondary trail mileage would result in a beneficial impact for ORV users by giving them access to a larger geographic area, providing more opportunities for solitude, and improving their sense of freedom and self-reliance. The additional secondary trails would also reduce the likelihood of ORV user conflicts along trails by allowing more dispersion.

Under alternative 3, the annual 60-day closure would remain in place, and the resulting effects would be the same as described in the no-action alternative.

Nonmotorized Use. Under alternative 3, the FNST would be realigned to the same route described in alternative 2. The resulting effects would be the same as described in alternative 2.

Camping. Under alternative 3, a total of 111 backcountry destinations would be designated—an increase from alternative 2, and a nearly five-fold increase from the no-action alternative. The types of beneficial impacts on visitor experience from these additional destinations would be the same as those described in alternative 2.

The reservation system for these 111 destinations and two backcountry campgrounds would be the same as those described in alternative 2. The resulting effects of the reservation system on visitor experience would be the same as alternative 2.

To provide additional camping opportunities beyond designated backcountry destinations and campgrounds, walk-in camping would be permitted in areas at least 0.25 mile from any designated campsite or ORV trail and 0.5 mile off any developed area or road. In contrast with alternative 2, which prohibits dispersed camping throughout the preserve, alternative 3 would permit dispersed camping in all units of the preserve except the Bear Island Unit. The allowance of dispersed camping, in conjunction with additional designated sites, would create a beneficial impact for 1,595 backcountry campers (average for 2016–2019) because they would have a broader range of camping choices, and competition for individual sites would be greatly reduced.

Stay limits would be the same as alternative 2. The impacts would also be the same.

Conclusion. The opening of 88 miles of secondary trails would improve the experience of 1,050 ORV users in the preserve, relative to the no-action alternative and alternative 2. The realignment of the FNST would also improve the experience for visitors seeking long-distance hiking opportunities (by reducing their encounters with ORVs), compared to the no-action alternative. Regarding camping, there would be 111 total designated sites and two developed backcountry campgrounds, an increase from alternatives 1 and 2. These designated sites and campgrounds would be managed through a reservation system, which would reduce uncertainty for visitors. The allowance of dispersed camping, in conjunction with additional designated sites, would create a beneficial impact for 1,595 backcountry campers (average for 2016–2019) because they would have a broader range of camping choices, and competition for individual sites would be greatly reduced.

4.9.5 Impacts of Alternative 4

Motorized Use. Alternative 4 would offer an additional 59 miles of designated primary ORV trails as compared to existing conditions (a 19% increase) and 100 miles of secondary ORV trails (a 15% increase as compared to alternative 3). These additional trails would result in the same types of beneficial impacts as described in alternatives 2 and 3, but the impacts would be further enhanced because 1,050 ORV users would be able to access a much larger geographic area. Greater dispersion would reduce the likelihood of competition for sites and would provide a greater sense of freedom and self-reliance and more opportunities for solitude.

Under this alternative, the annual 60-day closure to ORV use would be removed. Instead, targeted closures would be implemented when warranted by conditions. Visitors would be able to use ORVs during June and July. This would have a slight beneficial impact on visitor experience by providing year-round access, but it is unlikely to substantially increase the number of users since June and July are some of the hottest months of the year, and traditionally, backcountry use is lowest during those months.

Nonmotorized Use. Under alternative 4, there would be a substantial expansion in the number of hiking trails. This includes an additional 51 miles of hiking trails as compared to alternatives 1 through 3, for a total of 78 miles (not including the FNST). The realignment of the FNST and installation of pitcher pumps for non-potable water would be the same as discussed under alternatives 2 and 3, resulting in the same beneficial impacts.

In terms of specific hiking trails, alternative 4 includes the 41-mile Cross Preserve Trail, three moderate (approximately 3 miles) hikes, and two additional short (approximately 1 mile) trails. Together, these new hiking trails would result in a beneficial impact for nonmotorized users by increasing their choices in route, environment, and range of experiences, and by creating greater

dispersion among hikers (thus reducing the potential for user conflict). These beneficial impacts for nonmotorized users would be more substantial than the beneficial impacts described in alternatives 1 through 3.

Camping. Under alternative 4, an additional 136 backcountry campsites would be designated, as compared to existing conditions—almost six times the amount available under the no-action alternative and 23% more than under alternative 3. The majority of the newly designated camping opportunities (90%) would be available in Turner River and Corn Dance Units—two of the larger management units in the preserve. No new backcountry campgrounds would be developed in the Northeast Addition, at either Panther (a.k.a. Jones Grade) or Nobles Grade. These sites would continue to be designated backcountry campsites where camping would be encouraged. Overall, this alternative provides a substantial beneficial impact for 1,595 backcountry campers by largely expanding their choices in designated sites.

Dispersed camping would also be allowed and would be expanded in comparison to alternative 3. Specifically, visitors would be allowed to camp on primary ORV trails and dispersed camp in the Bear Island Unit. The allowance of dispersed camping in more areas, in conjunction with additional designated sites, would create a substantial beneficial impact for 1,595 backcountry campers (average for 2016–2019), compared to alternative 3 because they would have a broader range of camping choices, and competition for individual sites would be greatly reduced.

No reservation system for destinations and backcountry campgrounds would be implemented, and visitors would continue to draw camping permits as described in the no-action alternative. In alternative 4, it is unlikely that a reservation system would have any beneficial impact on visitor experience due to the large increase in camping choices.

Camping stay limits would be the same as alternative 2. The impacts would also be the same.

Conclusion. The opening of 59 miles of primary trails and 100 miles of secondary trails would improve the experience of 1,050 ORV users in the preserve, relative to alternatives 1 through 3, by further expanding their geographic access, sense of freedom, and opportunities for solitude. ORV users would also have year-round access with the lifting of the annual 60-day ORV closure, a small beneficial impact compared to current conditions.

The realignment of the FNST would also improve the experience of 2,863 visitors seeking long-distance hiking opportunities (by reducing their encounters with ORVs), compared to the no-action alternative. Additional hiking trails would further enhance the nonmotorized experience compared to alternative 3, by offering visitors a greater range in trail experiences and choices and further reducing the potential for user conflict. The overall result would be a beneficial impact for nonmotorized users compared to current conditions.

Regarding camping, there would be 159 total designated sites and two developed backcountry campgrounds, representing an increase in choices for visitors—a beneficial impact when compared to alternatives 1 through 3. Overall, the allowance of dispersed camping, in conjunction with additional designated sites, would create a beneficial impact for 1,595 backcountry campers (average for 2016–2019) because they would have a broader range of camping choices, and competition for individual sites would be greatly reduced compared to alternatives 1 through 3.

4.9.6 Impacts of Alternative 5: NPS Preferred Alternative

Motorized Use. Alternative 5 would provide an additional 66 miles of primary ORV trails, for a total of 344 miles of primary trail—an almost 24% increase from existing conditions and a 2% increase from alternative 4. Motorized backcountry access in the preserve in the secondary trail network

would be increased by 154 miles, a 54% increase from alternative 4. These additional trails would result in the same types of beneficial impacts as described in alternative 4, but the impacts would be further enhanced because 1,050 ORV users would be able to access a much larger geographic area. Hence, greater dispersion would result in even less likelihood of competition for sites, greater sense of freedom and self-reliance, and more opportunities for solitude.

Under alternative 5, the annual 60-day ORV closure would be removed. The impacts would be the same as described in alternative 4.

Nonmotorized Use. Under alternative 5, the system of nonmotorized trails and use would be the same as in alternative 4 and would result in the same beneficial impacts described in alternative 4.

Camping. Under alternative 5, an additional 203 backcountry destinations would be designated, totaling 226, over nine times the number currently designated under existing conditions and a more than 66% increase from alternative 4. All other camping aspects, including dispersed camping, would be the same as in alternative 4. The types of beneficial impacts associated with expanded camping options are the same as described in alternative 4. Overall, alternative 5's system of destinations, campgrounds, and dispersed camping would provide the greatest beneficial impact for the 1,595 annual backcountry campers in the preserve compared to alternatives 1 through 4, because campers would have access to the greatest variety of camping choices and experiences.

Camping stay limits would be the same as alternative 2, with the same effects.

Conclusion. Alternative 5 would result in the opening and use of more primary trails and secondary trails than alternatives 1 through 4 and would also allow for year-round access other than resource closures. This would improve the experience of 1,050 annual ORV users, compared to alternatives 1 through 4, by providing them the greatest variety of experiences and choices.

The realignment of the FNST would be the same as in alternatives 2 through 4. The result would be an improved experience for about 2,853 visitors seeking long-distance hiking opportunities because encounters with ORVs would be reduced. Additional hiking trails would be the same as in alternative 4, resulting in the same beneficial impacts for hikers, including a greater range of trail experiences and choices and reduced potential for user conflict. The overall result would be a beneficial impact for nonmotorized users.

Regarding camping, there would be a larger number of designated sites than in alternatives 1 through 4, four developed backcountry campgrounds, dispersed camping (the same system described in alternative 4), and no reservation system for camping. It is unlikely that a reservation system would have any beneficial impact on the visitor experience given the large increase in camping choices in alternative 5. Overall, the allowance of dispersed camping, in conjunction with additional designated sites, would create a beneficial impact for 1,595 backcountry campers because they would have a broader range of camping choices, and competition for individual sites would be greatly reduced. The result would be a greater beneficial impact to campers than alternatives 1 through 4.

4.9.7 Cumulative Impacts

The previous plans identified in section 4.2 collectively addressed the management of ORV and nonmotorized use in the preserve (in the original preserve and in the Addition). With implementation of these plans, the most substantial changes have been on ORV users who were once allowed to travel off-trail in the preserve. Today, there are more restrictions on ORV users than there were 30 years ago, and their choices in routes and access are more limited.

When the likely effects of implementing the four action alternatives are added to the effects of other past, present, and reasonably foreseeable actions, the result would be an incremental beneficial cumulative impact for preserve visitors. The benefits of alternatives 2 through 5 would be greatest for ORV users, who would have a more robust primary and secondary trail system than what currently exists (alternative 2 represents the smallest expansion of the system, while alternative 5 represents the largest expansion of the system). Access and experiences for nonmotorized users would be most improved under alternatives 4 and 5, which propose realignments to the FNST, as well as additional hiking trails. Access and experiences for campers would be most improved under alternatives 3, 4, and 5, which allow dispersed camping and expand the number of destinations (alternative 3 has the fewest and alternative 5 has the most).

When the likely effects of implementing the no-action alternative are added to the effects of other past, present, and reasonably foreseeable actions, the result would be an incremental adverse cumulative impact because ORV and nonmotorized opportunities would not be improved or expanded from current conditions.

4.10 NATURAL SOUNDSCAPES

This section discusses the direct, indirect, and cumulative impacts on natural soundscapes.

4.10.1 Basis of Analysis

The primary sources of human-caused noise in the preserve are ORV noise; airboat travel; and vehicular traffic along US 41, I-75, and other roadways. There are no changes proposed by any of the alternatives that would alter the natural soundscapes near US 41 or I-75, or result in significant changes to airboat travel. Vehicular traffic would continue to affect the soundscape adjacent to these roadways. Airboat noise can travel for a longer distance than ORV noise, but would continue to be contained in the Stairsteps Unit Zones 3 and 4, where there are sustained water levels for airboat use. The proposed action alternatives would primarily affect natural soundscapes by allowing additional motorized vehicle access on primary and secondary ORV trails.

Impact from ORV use on the natural soundscape is best described using the *audibility* criterion—the sound level at which an ORV can be discerned from the background by the listener or the minimum level at which it is detectable. The *audibility distance* for ORV noise is generally 0.5 to 2 miles depending on background noise levels, vegetation cover, and type of ORV used (NPS 2010).

To ensure that ORV impacts to existing noise levels are kept to a minimum, the National Park Service requires ORV users to abide by certain vehicle specifications, as well as permitting and operational policies. Pursuant to the specifications of the ORV Management Plan (NPS 2000a), motorized vehicles (i.e., swamp buggies, ORVs, all-terrain vehicles, street-legal 4x4s, and utility task vehicles) in the preserve must be equipped with a muffler that is in "good working condition" to minimize noise and they must not exceed 60 dBA at 50 feet unless specially authorized by a permit. To minimize noise, all airboats are required to have one or more exhaust headers or manifolds attached to a flex pipe and routed to the rear of the boat.

Sound pressure levels generally attenuate at a rate of 6 dBA for every doubling of the distance. For example, a motorized vehicle that measures 60 dBA at 50 feet would measure 54 dBA at 100 feet. The impact analysis below uses the permitted noise requirements, the rate of sound pressure level attenuation, and the ambient sound level found in the preserve (24 to 40 dBA; average of 32 dBA). Depending on a variety of factors such as background levels, topography, vegetation, and type of

ORV used, sound levels generally attenuate to 30 dBA approximately 1,600 feet (0.3 mile) from motorized vehicles. Therefore, a 1,600-foot buffer was applied to the various alternatives to quantify the acreage of natural soundscapes potentially affected by motorized vehicle use (table 4-8).

Table 4-8. Acreage of Natural Soundscape Impacted within 1,600 Feet of the Motorized Trail Network

Trail System	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Primary ORV Trails	95,718	95,718	95,718	116,494	119,039
Secondary ORV Trails	0	7,116	21,325	27,924	40,757
Total Acreage[1]	95,718	102,834	117,043	144,418	159,796

Note:
[1] Calculations in the columns are additive. Overlapping buffers around primary and secondary trails have been dissolved to provide an accurate accounting of the impacts.

To provide spatial perspective and understanding of how the soundscape may change relative to the entire preserve, the percentages of cover of the calculated natural soundscape impacts are provided in table 4-9. The table shows that effects to the natural soundscape generally increase from alternative 1 to alternative 5, which corresponds with increased miles of primary and secondary ORV trails. Overall, alternatives 4 and 5 would affect the greatest amount of the preserve's natural soundscape, at 20% and 22%, respectively.

Table 4-9. Percentage of Natural Soundscape Affected in the Preserve

Trail System	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Primary ORV Trails	13	13	13	16	18
Secondary ORV Trails	—	1	3	4	6
Total Natural Soundscapes Impacted	13	14	16	20	22
Increase Relative to Alternative 1[1]	—	1	3	7	9

Note:
[1] Calculated by subtracting the amount under the no-action alternative (alternative 1) from the amounts for alternatives 2, 3, 4, and 5.

Noise would occur as a result of ORV use on the proposed primary and secondary trail system. However, the frequency and duration of the alteration are taken into account, and user differences in perception relative to the alteration of the soundscape are considered. Generally, noise generated from motorized vehicles is viewed as undesirable among nonmotorized users that enjoy hiking, bike riding, camping, or bird watching. Noise may be audible over great distances, but may not always directly affect the user. In general, noise produced by motorized vehicles would be temporary. For example, for a terrestrial ORV traveling along a designated trail at the posted speed limit of 15 miles per hour, sound pressure levels would attenuate to 30 dBA in three minutes. Furthermore, based on the 1,069 ORV permits issued in 2019, ORV use is not expected to be ongoing or continuous throughout the areas identified in table 4.9, but instead reflects the total area of natural soundscapes that would be affected regardless of the location of the user. The frequency is not expected to be high because in the unlikely event that all 1,069 permitted ORV users would be present on any given day, they would, at most, affect the natural soundscape of 22% of the preserve with alternative 5. Natural soundscapes would generally continue to be affected more often, and on a wider scale, during the hunting season and on weekends when visitor use is the highest.

Users enjoying nonmotorized recreational activities would have a high likelihood of encountering potentially unwelcome noise from ORVs, airboats, and roadway noise throughout the preserve, unless traveling on the designated trails or in the backcountry more than 1,600 feet (0.3 mile) from

primary or secondary ORV trails. While there is a high likelihood of experiencing unwanted noise, these noises are largely contained within the designated areas of the preserve (an ORV trail, an airboat trail, or a road), are short in duration (less than three minutes required for a terrestrial vehicle to pass through the area), and are not widespread or constant.

Table 4-10 provides the extent of natural soundscapes in nonmotorized trails that occur within 1,600 feet (0.3 mile) of primary and/or secondary trails. This calculation provides an analysis of potential natural soundscape effects experienced by users in nonmotorized trails.

Table 4-10. Summary of Nonmotorized Trails within 1,600 Feet of Primary and/or Secondary Trails

Natural Soundscapes Affected	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Nonmotorized Trail Affected (miles)	9	12	13	20	20
Total Length of Nonmotorized Trail (Affected and Not Affected; miles)	64	71	71	122	122
Percentage of Nonmotorized Trails Affected	14	17	18	16	16
Percentage Increase Relative to Alternative 1[1]	—	3	4	2	2
Percentage Increase Relative to Previous Alternative[2]	—	3	1	-2	0

Notes:
[1] Calculated by subtracting the percentage of Nonmotorized Trails Affected under the no-action alternative (alternative 1) from the percentages for alternatives 2, 3, 4, and 5.
[2] Calculated by subtracting: Alt. 2 minus Alt. 1; Alt. 3 minus Alt. 2; Alt. 4 minus Alt. 3; and Alt. 5 minus Alt. 4.

4.10.2 Impacts of Alternative 1

Direct and Indirect Impacts. Under the no-action alternative, the current condition of natural soundscapes would continue. Opportunities to enjoy natural soundscapes would remain along hiking trails; however, the 37-mile FNST would continue to be aligned closely with the primary ORV trails and users would continue to experience unwanted sounds. Users on 9 miles of the existing nonmotorized trail network would continue to experience unwanted soundscapes generated from nearby motorized trails.

As a whole, the current 278 miles of primary ORV trails would continue to affect natural soundscapes within 95,718 acres (or roughly 13% of the preserve). Dispersed camping would continue to provide users with opportunities to enjoy natural soundscapes in a primitive soundscape for 10 to 14 consecutive days, assuming users travel more than 1,600 feet from primary ORV trails.

Conclusion. Under alternative 1, impacts to natural soundscapes would remain the same and would continue to affect users along the FNST. For those visitors seeking solitude and natural soundscapes, other hiking and canoe trails, as well as dispersed camping, would continue to be available. An estimated 95,718 acres of natural soundscapes would continue to be affected by ORV use/noise. This noise would be a small adverse impact for animals and visitors that is short in duration (i.e., a passing vehicle can be heard for only a few minutes from a given point on the ground). Nonmotorized users would continue to encounter motor vehicle noise on 14% of nonmotorized trails, a small adverse impact.

4.10.3 Impacts of Alternative 2

Direct and Indirect Impacts. Soundscape disturbances resulting from the primary trails would be the same as with alternative 1. The reopening of 33 miles of secondary trails, and the resulting ORV and visitor use, would increase the area of disturbed natural soundscapes by 7,116 acres (total of 102,834 acres), resulting in a small adverse impact to visitors and animals. These adverse impacts would affect 14% of the overall preserve. Relative to the no-action alternative, this represents a 1% increase over

existing conditions. Assuming motorized and nonmotorized visitor usage remains the same, the additional miles of motorized and nonmotorized trails would likely lead to increased dispersion among visitors, and a decrease in the frequency of unwanted soundscapes for nonmotorized users. The duration of these unwanted sounds would continue to be less than three minutes (the time a terrestrial vehicle is audible from a given point on the ground).

Under alternative 2, the FNST would be realigned, creating distance between the primary ORV trail and nonmotorized users, which would increase the ability for visitors to experience desirable natural soundscapes. However, the increase in secondary trails results in approximately 12 miles of adverse soundscape impacts on users of nonmotorized trails. This results in an increase in impacts on nonmotorized trails of less than 3% relative to the no-action alternative. However, opportunities for users to find solitude and seek primitive natural soundscapes would be restricted, since dispersed camping would be discontinued.

Conclusion. ORV noise would affect natural soundscapes along 33 miles of secondary trail, a small adverse impact for visitors and animals. The total area adversely impacted would be 102,834 acres, an increase of 1% from alternative 1 (14% of the preserve). In most cases, ORV noise would last no more than three minutes (the time a terrestrial vehicle is audible from a given point on the ground). Along some popular primary and secondary trails, the frequency of soundscape disturbance might be higher due to more traffic. In addition, this alternative would eliminate dispersed camping. This would increase the likelihood that users would encounter ORV noise at their campsites, as well as other disruptions to the natural soundscape.

The realignment of the FNST would separate nonmotorized and motorized trail users in most areas. This separation would decrease the frequency and intensity of motor vehicle noise encountered by 2,853 hikers on the FNST, a small beneficial impact.

4.10.4 Impacts of Alternative 3

Direct and Indirect Impacts. Under this alternative, types of impacts associated with primary and secondary ORV trails would be the same, although the quantity of land that may experience unnatural sounds would increase. The additional 88 miles of secondary ORV trails, relative to alternative 1, would increase the effects on natural soundscapes by 14,209 acres (total of 117,043 acres). These impacts would affect 16% of the preserve. Relative to the no-action alternative, this would represent an increase of 3% over the existing conditions.

For users of nonmotorized trails, 13 miles (approximately 0.5 mile more than alternative 2) would be potentially subjected to unwanted soundscapes generated from adjacent ORV use on primary and secondary trails. Overall, this is a 1% increase when compared with alternative 2, and a 4% increase relative to existing conditions.

The same benefits associated with realignment of the FNST described in alternative 2 would also apply to alternative 3. Assuming motorized and nonmotorized visitor usage remains the same, the additional miles of motorized and nonmotorized trails would likely lead to increased dispersion among visitors, and a decrease in the frequency of unwanted soundscapes for nonmotorized users. The duration of these unwanted soundscapes would continue to be less than three minutes (the time a terrestrial vehicle is audible from a given point on the ground).

Regarding dispersed camping, alternative 3 would provide opportunities for users to experience primitive and natural soundscapes within the preserve in all management units except Bear Island. Dispersed campers near motorized trails may experience unwanted sounds, but overall, dispersed campers would have a higher likelihood of enjoying natural soundscapes as compared to campers in alternative 2, which eliminates dispersed camping.

Conclusion. ORV noise would affect natural soundscapes along primary trails and 88 miles of reestablished secondary trails, an adverse impact to visitors and animals greater than alternative 2. The total area impacted would be 117,043 acres, and would be 2% higher than alternative 2, totaling 16% of the preserve. In most cases, ORV noise would last no more than three minutes (the time a terrestrial vehicle is audible from a given point on the ground). Along some popular primary and secondary trails, the frequency of soundscape disturbance may be higher due to more traffic.

Relative to alternative 2, this alternative would provide more benefits for users seeking natural soundscapes by providing dispersed camping throughout the preserve except from areas in proximity to existing trails and roads and the Bear Island Unit.

The benefits resulting from realignment of the FNST would be the same as under alternative 2.

4.10.5 Impacts of Alternative 4

Direct and Indirect Impacts. Under this alternative, the types of adverse impacts associated with opening and use of primary and secondary trails would be the same, although there would be an increase in the total amount of land subject to unnatural sounds. This alternative also increases the amount of airboat trails in Stairsteps Unit Zones 3 and 4. The total area affected would be 144,418 acres, a 7% increase from the no-action alternative. This would result in an adverse impact for animals and visitors greater than alternatives 1 through 3.

An additional 51 miles of nonmotorized trails would provide users with opportunities for greater access and exposure to desirable natural soundscapes (by reducing the potential for encounters with ORV and airboat noise), a beneficial impact to visitors greater than alternatives 1 through 3. About 20 miles (16%) of nonmotorized trails would be located within 1,600 feet (0.3 mile) of primary and secondary trails. In comparison with the no-action alternative, this would result in a 2% increase in unwanted soundscapes within nonmotorized trails, but relative to alternative 3, the overall percentage of nonmotorized trails affected is 2% less. Assuming motorized and nonmotorized visitor usage remains the same, the additional miles of motorized and nonmotorized trails would likely lead to increased dispersion among visitors and a decrease in the frequency of unwanted soundscapes for nonmotorized users.

Alternative 4 would allow dispersed camping in all units of the preserve, including Bear Island. This would provide users with increased opportunities to experience natural soundscapes, a greater beneficial impact relative to alternatives 1 through 3. Dispersed campers would also have to leave their ORVs next to trails, so this would limit any soundscape disturbance for animals.

Conclusion. Intermittent ORV and airboat noise would affect natural soundscapes along 155 miles of reestablished primary and secondary motorized trails, resulting in a small adverse impact for visitors and animals. The total area impacted would be 144,418 acres (20% of the original preserve) and the percentage of nonmotorized trails affected would be 2% less than alternative 3. In most cases, ORV noise would last no more than three minutes (the time a terrestrial vehicle is audible from a given point on the ground). Along some popular primary and secondary trails, the frequency of soundscape disturbance may be higher due to more traffic.

The realignment of the FNST and the resulting benefits would be the same as described in alternative 2. An additional 51 miles of nonmotorized trails would provide visitors with greater access and exposure to natural soundscapes (by reducing the potential for encounters with ORVs and other types of vehicular noise). These additional trails would result in a larger beneficial impact to visitors compared to alternatives 1 through 3.

Relative to alternative 3, this alternative would provide more opportunities for experiencing natural soundscapes by allowing dispersed camping throughout the preserve, including the Bear Island Unit.

4.10.6 Impacts of Alternative 5: NPS Preferred Alternative

Direct and Indirect Impacts. Under this alternative, the types of adverse impacts associated with opening and use of primary and secondary trails would be the same as alternative 4, although there would be an increase in the total area subject to unnatural sounds because more primary trails, secondary trails, and destinations would be opened. This alternative has the same amount of airboat trails in Stairsteps Unit Zones 3 and 4 as alternative 4. The total area affected would be 159,796 acres, a 9% increase from the no-action alternative. This would result in an adverse impact for animals and visitors greater than alternatives 1 through 4.

An additional 51 miles of nonmotorized trails would allow users greater access and exposure to desirable natural soundscapes (by reducing the potential for encounters with ORV and airboat noise). About 20 miles (16%) of nonmotorized trails would be within 1,600 feet (0.3 mile) of primary and secondary trails. However, the additional miles of motorized and nonmotorized trails would likely lead to increased dispersion among visitors, and a decrease in the frequency of unwanted soundscapes for nonmotorized users, a beneficial impact.

Dispersed camping would be the same as in alternative 4; therefore, the beneficial impacts of dispersed camping in alternative 5 would be the essentially the same as alternative 4.

Conclusion. ORV and airboat noise would affect natural soundscapes along 216 miles of reestablished primary and secondary trails, resulting in an adverse impact for visitors and wildlife. The total area impacted would be 159,796 acres (16% of the preserve). The percentage of nonmotorized trails affected (16%) would be the same as alternative 4. In most cases, ORV noise would last no more than three minutes (the time a terrestrial vehicle is audible from a given point on the ground). Along some popular primary and secondary trails, the frequency of soundscape disturbance might be higher due to more traffic.

The realignment of the FNST and the resulting benefits would be the same as described in alternative 2. An additional 51 miles of nonmotorized trails would provide visitors with greater access and exposure to desirable natural soundscapes (by reducing the potential for encounters with ORVs and other types of vehicular noise). However, in this alternative the likelihood of encountering unwanted noise is further reduced from alternatives 1 through 4 given the extensive additions of both motorized and nonmotorized trails.

Dispersed camping would be the same as in alternative 4; therefore, the beneficial impacts of dispersed camping in alternative 5 would be the essentially the same as alternative 4.

4.10.7 Cumulative Impacts

The plans identified in section 4.3, Cumulative Impact Analysis, addressed ORV travel in the preserve. Once dispersed throughout the preserve, ORV use is currently contained in the primary trail network. Visitors seeking natural soundscapes can travel a short distance (0.3 mile or more) on foot to areas away from the primary network of trails to experience a soundscape free of unwanted noise from vehicular, airboat, or ORVs. Prior to the implementation of the ORV Management Plan, there was dispersed ORV use throughout the preserve and opportunities to experience natural soundscapes were more limited. Users seeking natural soundscapes prior to implementation of that plan could not reliably travel away from unwanted noise, as motor noise could be encountered anywhere. The overall effect of the ORV Management Plan has been an improvement in the preserve's natural soundscape.

When the likely effects of implementing the alternatives are added to the effects of other past, present, and reasonably foreseeable actions, there would be an incremental adverse cumulative impact on soundscape resources in the preserve. Under all of the alternatives, natural soundscapes would be preserved on a majority (76%–87%) of the preserve. The range of actions contained in the various alternatives would contribute to a 1% to 10% increase to the overall cumulative impact. In the preserve, alternatives 1 through 3 would result in a less than 5% adverse increment, whereas alternatives 4 and 5 would result in increments between 5% and 10% due to increases in ORV trail mileage. Each action alternative also includes expansion of the nonmotorized trails where visitors can enjoy natural soundscapes and reduces the incremental adverse impacts.

4.11 ETHNOGRAPHIC AND ARCHEOLOGICAL RESOURCES

This section addresses the potential impacts on cultural resources, including archeological and ethnographic resources from actions proposed in each alternative.

4.11.1 Basis of Analysis

The impacts on cultural resources are described in terms of the potential to diminish or protect a resource's ability to yield information important in prehistory or history. The impacts on ethnographic resources are described in terms of the potential to diminish or protect the integrity of and access to resources and places having particular importance and value to traditionally associated tribes and groups (e.g., American Indian ceremonial sites). This impact analysis was conducted using geographic information system data layers identifying the known locations of archeological resources and Indian ceremonial sites (i.e., Indian Trust Resources) in the preserve in addition to the best professional judgment of NPS resource specialists and tribal consultants and studies of similar actions and impacts, as applicable.

Continued visitor use in the preserve presents a potential for adverse impacts to cultural resources (both archeological and ethnographic resources) as a result of ground disturbance and trampling, which in turn can result from off-trail ORV use, dispersed camping, and vandalism/looting. The intensity of impacts on cultural resources would depend on the potential of the resource to yield important information or provide importance to an ongoing cultural tradition, as well as the extent of the physical disturbance, damage, or degradation.

Although known archeological and American Indian ceremonial sites were avoided when siting the proposed trail and destination locations, it remains possible that unidentified sites could be encountered and subsequently impacted unintentionally. Unauthorized off-trail ORV use could result in erosion and displacement of soils in an archeological resource area. Nonmotorized uses such as hiking and canoeing are not expected to impact cultural resources. However, archeological sites such as middens would be especially attractive to users due to their higher, raised nature. Generally, such cultural resources are more commonly found in dry hammocks, which are typically located at higher elevations than other habitat types in the preserve.

Some culturally significant sites contain visible structures that may be recognizable to visitors. These sites would be the most vulnerable to visitor impacts. Impacts with the potential to occur would include looting, trampling, or vandalism as a result of visitor use. Unauthorized off-trail ORV travel could result in impacts from soil erosion and displacement in an archeological resource area. These types of impacts would have the potential to be permanent. Continued ranger law enforcement patrol and emphasis on visitor education would minimize the potential for impacts.

As noted in the Resource Management Plan (NPS 2001), a perceptible threat to the integrity of many archeological sites in the preserve is the stratification of subsurface resources due to rooting of exotic vegetation, including Brazilian pepper and Australian pine. These exotics are currently being managed by the preserve's exotic species management program, which provides ongoing beneficial impacts to cultural resources that are expected to last in perpetuity.

Since most cultural resources are nonrenewable, impacts to cultural resources would persist. Only natural elements of cultural landscapes, such as vegetation, are renewable and would be expected to recover to pre-disturbance conditions naturally due to south Florida's year-round growing season.

In all the alternatives, the opening and maintenance of primary trails, secondary trails, and destinations would involve minimal ground disturbance. There would be no "trail construction" per se because the trails shown in all the alternatives are already disturbed from previous use. Actions required to open and maintain trails (and destinations) would mainly include vegetation trimming, removing obstacles like fallen trees, and emplacing trail signs and markers. Some primary trails may require stabilization to be made passable. An archeological survey would be conducted prior to any ground disturbance by heavy equipment and work would be adjusted to avoid or mitigate impacts to any identified sensitive resources. If post-survey construction work were to reveal previously unidentified archeological resources, work would be stopped immediately, and state and tribal authorities would be contacted in order to develop a coordinated response. See section 2.11.7.

4.11.2 Impacts of Alternative 1

Direct and Indirect Impacts. Under the no-action alternative, ORV use along primary trails would continue to provide users access to 0.06% of the preserve's backcountry. The currently designated 23 backcountry destinations would continue to be available for camping. Both the ORV trails and the backcountry destinations would continue to protect cultural resources in the preserve because they are sited away from these resources. Many backcountry campers prefer to disperse camp in nondesignated areas during hunting season. This is due to a number of factors, including family preferences, competition, and the need to camp away from areas that are likely to receive foot traffic. Dispersed camping is currently allowed throughout the preserve (with the exception of the Bear Island Unit). This practice has the potential to be detrimental to cultural resources because dispersed campers seek high dry hardwood hammocks that tend to stay dry throughout the year. These areas also often contain unmarked cultural resources. Recreational use would continue to result in small amounts of soil erosion, ground disturbance, vegetation trampling, and potentially, direct damage to archeological resources. Lack of past incidences shows the chance of this occurring is quite low.

Conclusion. Under the no-action alternative, dispersed camping would increase the potential for adverse direct impacts to cultural resources across a larger geographic footprint. However, the overall likelihood of adverse impacts to cultural resources would be quite small, given the history of incidences. The slight potential for direct and indirect impacts to cultural resources in the no-action alternative would continue as long as these policies are in place.

Section 106 Summary — After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects)*, the National Park Service concludes that implementation of this alternative would result in a finding of *no adverse effect* on cultural resources.

4.11.3 Impacts of Alternative 2

Direct and Indirect Impacts. The types of adverse impacts to cultural resources would be similar under this alternative to those described in the no-action alternative; however, reopening secondary trails would increase access to the preserve backcountry, increasing the potential for visitors to encounter and potentially affect cultural resources.

Alternative 2 would double the number of backcountry destinations over the no-action alternative, thereby directing campers to locations that would reduce the potential to encounter and affect cultural resources. Under alternative 2, dispersed camping would be prohibited, decreasing the risk of inadvertent damage to cultural resources from visitor use.

Conclusion. Under alternative 2, the potential for direct adverse impacts on cultural resources would be reduced compared to the no-action alternative, as the newly designated trails and destinations were sited to avoid known cultural resources, including archeological sites and American Indian ceremonial sites. In addition, this alternative would prohibit dispersed camping, thereby decreasing the risk of inadvertent damage to cultural resources from visitor use throughout the preserve.

Section 106 Summary — After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects)*, the National Park Service is making an initial determination that implementation of this alternative would result in a finding of *no adverse effect* on cultural resources. This determination will be further analyzed in the preserve's cultural resources assessment and through consultation with the interested federally-recognized tribes and the SHPO.

4.11.4 Impacts of Alternative 3

Direct and Indirect Impacts. The types of adverse impacts to cultural and ethnographic resources are the same under this alternative as the no-action alternative and alternative 2; however, the increase in secondary trail mileage would increase visitor access to the backcountry, increasing the potential to encounter and adversely impact cultural resources along secondary trails compared to the no-action alternative.

Alternative 3 includes a 91% increase in the number of backcountry destinations from alternative 2. Use of these backcountry destinations would decrease the risk of inadvertent damage to cultural resources from visitor use because areas of known cultural resources were avoided when siting the backcountry destinations. However, in this alternative, visitors would also be able to camp at dispersed locations. This practice has the potential to adversely affect cultural resources because dispersed campers seek high dry hardwood hammocks that tend to stay dry throughout the year. These areas also often contain unmarked cultural resources. Recreational use of these sites would result in small amounts of soil erosion, ground disturbance, vegetation trampling, and potentially, direct damage to archeological items. Lack of past incidences shows the chance of this occurring is quite low.

Conclusion. Under alternative 3, the potential for direct adverse impacts on cultural resources would be slightly higher than alternative 1, due largely to the allowance of dispersed camping. However, dozens of new destinations would be provided for backcountry camping, and these destinations were sited to avoid adverse impacts to cultural resources.

Section 106 Summary — After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects)*, the National Park Service is making an initial determination that implementation of this alternative would result in a finding of *no adverse*

effect on cultural resources. This determination will be further analyzed in the preserve's cultural resources assessment and through consultation with the interested federally-recognized tribes and the SHPO.

4.11.5 Impacts of Alternative 4

Direct and Indirect Impacts. The types of adverse impacts to cultural resources would be similar under this alternative to those described in the no-action alternative; however, there would be an increase in the number of primary and secondary trails compared to alternatives 1 through 3. This increase in trails would increase the potential for visitors to encounter and adversely affect cultural resources along trails.

Alternative 4 includes a 55% increase in the number of backcountry destinations compared to alternative 3 and almost six times the number of destinations that currently exist. Providing these destinations to visitors would decrease the risk of inadvertent damage to cultural resources because these destinations were sited to avoid cultural resources. However, in this alternative, visitors would also be able to camp at dispersed locations, including the Bear Island Unit. This practice has the potential to adversely affect cultural resources because dispersed campers seek high dry hardwood hammocks that tend to stay dry throughout the year. These areas can contain unmarked cultural resources. Recreational use of these sites would result in small amounts of soil erosion, ground disturbance, vegetation trampling, and potentially, direct damage to archeological items. Lack of past incidences shows the chance of this occurring is quite low.

Conclusion. Under alternative 4, the potential for direct adverse impacts on cultural resources would be slightly higher than alternative 3, due largely to the allowance of dispersed camping in more areas and additional primary and secondary trails. However, 136 destinations would be provided for backcountry camping, and these destinations were cited to avoid adverse impacts to cultural resources, thus decreasing the risk of adverse impacts to cultural resources.

Section 106 Summary — After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects)*, the National Park Service is making an initial determination that implementation of this alternative would result in a finding of *no adverse effect* on cultural resources. This determination will be further analyzed in the preserve's cultural resources assessment and through consultation with the interested federally-recognized tribes and the SHPO.

4.11.6 Impacts of Alternative 5: NPS Preferred Alternative

Direct and Indirect Impacts. The types of adverse impacts to cultural resources would be similar under this alternative to those described in the no-action alternative; however, there would be an increase in the number of primary and secondary trails compared to alternatives 1 through 4. This increase in trails would increase the potential for visitors to encounter and adversely affect cultural resources along trails.

Alternative 5 includes a 49% increase in the number of proposed backcountry destinations (as compared to alternative 4), which is about nine times the number that currently exist. Providing these destinations to visitors would decrease the risk of inadvertent damage to cultural resources because these destinations were sited to avoid cultural resources. However, in this alternative, visitors would also be able to camp at dispersed locations, including the Bear Island Unit. This practice has the potential to adversely affect cultural resources because dispersed campers seek high dry hardwood hammocks that tend to stay dry throughout the year. These areas can contain

unmarked cultural resources. Recreational use of these sites would result in small amounts of soil erosion, ground disturbance, vegetation trampling, and potentially, direct damage to archeological items. Lack of past incidences shows the chance of this occurring is quite low.

Conclusion. Under alternative 5, the potential for direct adverse impacts on cultural resources would be slightly higher than alternative 4, due largely to the allowance of dispersed camping in more areas and additional primary and secondary trails. However, more than 200 destinations would be provided for backcountry camping, and these destinations were cited to avoid adverse impacts to cultural resources, thus decreasing the risk of adverse impacts to cultural resources.

Section 106 Summary — After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects)*, the National Park Service is making an initial determination that implementation of this alternative would result in a finding of *no adverse effect* on cultural resources. This determination will be further analyzed in the preserve's cultural resources assessment and through consultation with the interested federally-recognized tribes and the SHPO.

4.11.7 Cumulative Impacts

Projects in the vicinity of the proposed action that have the potential to affect cultural resources (including archeological and ethnographic resources) include those identified in the Resource Management Plan (NPS 2001), the 2000 Recreational ORV Management Plan (NPS 2000a), and the Addition GMP (NPS 2010). The Burnett Oil Company seismic survey (NPS 2016a) has been completed; future oil and gas activities would likely result in mitigation measures similar to those required previously in order to reduce the potential for adverse impacts to cultural resources. Actions that could have a cumulative effect in conjunction with measures that would be implemented in this Plan were identified in section 4.3, "Cumulative Impacts Analysis."

The NPS Resource Management Plan (NPS 2001) would have longer lasting beneficial impacts because it included management actions that would protect cultural resources from degradation, including increased education opportunities, eradication of exotic species, inclusion of eligible sites in the National Register of Historic Places, and additional training for law enforcement staff in cultural resource management laws. The recognition of challenges facing protection of resources (e.g., vandalism, exotic species, animal burrows), and implementation of the framework to alleviate those challenges would have an ongoing beneficial effect on the protection of cultural resources in the preserve, and would be expected to persist.

The 2000 Recreational ORV Management Plan (NPS 2000a) established criteria for developing the designated ORV trail system and access points, including criteria for resource protection. The criteria sought to "protect important environmental and cultural areas, restore heavily impacted and environmentally sensitive areas, and direct use to areas of suitable substrate." These criteria were designed to entirely avoid archeological sites (NPS 2000a). This plan also resulted in the discontinuation of dispersed ORV use in the preserve, directing ORV use away from sensitive cultural resources and onto designated trails where users would be much less likely to cause an impact through tire rutting, trampling, or vandalism of a cultural resource, either intentionally or unintentionally. Maintaining ORV use in the designated trail network of the preserve has resulted in beneficial impacts to cultural resources in the preserve that have lasted since the ORV Management Plan was first implemented in 2000, more than 17 years ago.

The Addition GMP (NPS 2010) provided for the implementation of visitor use amenities in the Addition, including parking areas, bathrooms, trailheads, and trails. This plan provided for the archeological survey of areas sited for construction prior to the commencement of ground-disturbing activities. Mitigation and management measures were established for ranger monitoring of visitor use areas and for visitor education in an effort to reduce the potential for visitor use-related impacts to cultural resources. The plan also evaluated possible areas for wilderness designation in the Northeast Addition, ultimately proposing more than 47,000 acres of wilderness in the Mullet Slough area.

When the likely effects of implementing the alternatives are added to the effects of other past, present, and reasonably foreseeable actions, there would be an incremental adverse cumulative impact on cultural resources in the preserve. Alternative 1 has some potential for adverse impacts due to dispersed camping throughout the preserve. Alternative 2 would eliminate dispersed camping, allowing camping only in destinations; hence, this alternative minimizes the potential for adverse impacts. Alternatives 3 through 5 have higher chances of causing adverse impacts because they expand the system of ORV trails and allow dispersed camping.

The four action alternatives propose a motorized trail network that spans anywhere from 0.06% to 0.11% of the preserve's 729,000 acres. There are very large expanses of the preserve (more than 99% of the entire preserve) that essentially remain undisturbed by visitors.

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Chapter 5

Consultation, Coordination, and Public Participation

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CHAPTER 5: CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

This chapter summarizes the process undertaken by the National Park Service to contact individuals, agencies, and organizations for information that assisted in identifying important issues or analyzing impacts, or that would review and comment on the Plan. Throughout the planning process, the NPS staff encouraged other federal agencies; state, tribal, and local governments; culturally associated American Indian tribes and groups; organizations; and individuals who may be interested or affected to participate in this planning effort, as summarized below.

5.1 THE SCOPING PROCESS

Scoping is an "early and open process for determining the scope of issues to be addressed and for identifying significant issues related to the proposed action" (40 CFR 1501.7). The scoping process determines the scope (extent and nature) of issues and alternatives that should be considered during a NEPA review. It includes both internal and external (other agency and public) elements; NPS subject matter experts; and consultation with all interested parties, agencies, and the public. Director's Order 12 requires the National Park Service to make "diligent" efforts to involve, analyze, and consider the interested and affected public in the NEPA process. The public scoping process helps ensure that people have been given an opportunity to comment and contribute early in the decision-making process.

5.1.1 Public Scoping

Public Scoping Newsletter. The National Park Service first initiated public scoping for the Plan in fall 2013 through press releases issued to several media outlets, posts on the preserve's website, and an announcement on the NPS Planning, Environment, and Public Comment (PEPC) website. The preserve also released a Public Scoping Newsletter that invited the public, agencies, and stakeholders to submit comments, engage in the planning process, and generate input relevant to the preparation of this Environmental Impact Statement. The Public Scoping Newsletter was mailed to interested parties, including local, state, and federal government agencies; special interest groups; academic institutions; businesses; and individuals. In addition, the scoping letter was mailed to three affiliated American Indian tribes. The public input was gathered via the NPS PEPC website, http://parkplanning.nps.gov/bicy. The public scoping comment period opened on November 19, 2013.

As directed by NEPA, public scoping for an Environmental Impact Statement typically takes place over a 30-day period. Because of overlap with the holiday season and requests from the public to extend the initial scoping period, the preserve chose to receive public comments for 102 days following the initial press releases in fall 2013 (November 18, 2013 to February 28, 2014). On March 11, 2014, a notice of intent was published in the *Federal Register* (79 FR 13670). This formally initiated the scoping period.

Public Scoping Open House Events. The National Park Service held public scoping open house events in spring 2014 (April 7 and 8, 2014) to receive input and to inform the public on the development of draft alternatives. These meetings provided information on the planning process and an opportunity to interact with staff, ask questions, and submit comments and suggestions. These open house events served to outline the objectives of the Plan and assist in the preparation of the initial draft of the alternatives that were later presented to the public.

Approximately 70 people attended two public open house events held on April 7 and April 8, 2014, in Weston, Florida, and at the Big Cypress Swamp Welcome Center in Ochopee, Florida, respectively. The dates and locations of the public scoping meetings were sent to an extensive e-mail list that included several local and regional publications. To inform the public of the scoping process, the Public Scoping Newsletter was available in hardcopy at the public open house events. This newsletter provided a general overview of the planning schedule, background on issues anticipated to be addressed in the plan, overview maps of the preserve's trail network, and a description of the foundational elements that would guide planning and management.

Public Scoping Comments. During the open house events, approximately 57 comments on maps and 6 comment cards were received. Comment cards were transcribed and entered into PEPC, and map markup comments were entered into the project geographic information system.

Overall, during the public scoping period, a total of 232 individual correspondences were received. Of these, 123 were submitted directly to the PEPC website. The remainder included comments e-mailed to staff at the preserve, mailed letters, trail request forms submitted to the preserve, or map markups from the public scoping open house. These correspondences were entered into PEPC.

The National Park Service collected public comments during this scoping phase of the planning process to understand the public's perspectives on key issues and management options related to the preserve's backcountry. During the public scoping period, the National Park Service received letters from official representatives of the following agencies and organizations:

Big Cypress Sportsmen's Alliance, Center for Biological Diversity, The Everglades Coordinating Council, Florida Division of Historic Resources and State Historic Preservation Officer, Florida Trail Association, Florida Wildlife Federation, National Parks Conservation Association, Sierra Club, South Florida Wildlands Association, WildEarth Guardians, US Forest Service

Members of the following organizations also submitted comments:

Alligator Amblers Chapter of Florida Trail Association; Broward County Airboat, Halftrack and Conservation Club; Caloosa Jeepers of Southwest Florida, Inc.; Collier Sportsmen's and Conservation Club; Florida Trail Happy Hoofers; Off-Road Vehicle Advisory Committee; Onita M. Larkins Family Trust; Recreational Aviation Foundation

After public scoping ended, the National Park Service analyzed ideas, comments, and concerns submitted by the public, federally recognized tribes, traditionally associated groups, and affected agencies as topics to be addressed in the Plan. Public scoping comments, as well as input received from other sources (i.e., agency and internal scoping) were used to help develop alternatives that were evaluated further in this Environmental Impact Statement.

Agency Scoping. As part of the scoping process, the preserve invited the participation of federal, state, and local agencies to identify issues of concern early on in the process. The preserve sent scoping letters to the US Fish and Wildlife Service, Florida Department of Environmental Protection, Florida SHPO, the Miccosukee Tribe of Indians, Seminole Nation of Oklahoma, and the Seminole Tribe of Florida, in October 2013. The agencies that provided feedback are summarized below.

- As administrators of the FNST, the US Forest Service, National Forests in Florida provided a letter to the preserve on February 28, 2014, that included recommendations regarding the FNST.

- The Florida Department of State, Division of Historical Resources, provided a letter to the preserve on May 1, 2014, encouraging coordination with the SHPO pursuant to 36 CFR Part 800.8 and section 106 of the National Historic Preservation Act.
- The US Fish and Wildlife Service provided comments to the preserve on August 8, 2014, regarding the impact of secondary trails on the endangered Florida panther, as well as any amenities associated with the backcountry access plan.

5.1.2 Internal Scoping

Internal scoping involved discussions among NPS personnel regarding the purpose of and need for management actions, issues, management alternatives, mitigation measures, the analysis boundary, appropriate level of documentation, available references and guidance, and other related topics. Internal scoping was conducted with an IDT of environmental resources, visitor use, and trail maintenance specialists from the preserve. The IDT members met on March 9 and 10, 2015, for a Foundation Workshop to discuss the values and significance of the preserve and what types of planning needs should be addressed in the Plan. The purpose of the workshop was to develop a Foundation Document that serves as the underlying guidance for preserve planning and management. The Foundation Document describes the preserve's core mission by identifying its purpose, significance, fundamental and other important resources and values, and interpretive themes. It also assesses planning and data needs, identifies the preserve's special mandates and administrative commitments, and notes the unit's setting in a regional context. The preserve's Foundation Document was finalized in December 2016. Additionally, some IDT members conducted site visits to the proposed project area prior to the internal scoping meeting.

5.2 PRELIMINARY ALTERNATIVE DEVELOPMENT

5.2.1 Public Preliminary Alternative Development Workshops

After the internal and public scoping meetings, suggestions and ideas for alternatives for backcountry access were gathered and compiled into an extensive list of preliminary alternative elements. To inform the public about the proposed action alternatives and upcoming open house events, a Preliminary Alternatives Newsletter describing the Plan was finalized in January 2016; it was posted to the PEPC website and made available in hardcopy at the public workshop events. This newsletter provided an overview of the project's purpose, need, and objectives and described each of the five preliminary alternatives in table summary and map form. In addition, it provided the methodology used to establish the trails in each alternative, and draft management objectives and desired future conditions. The newsletter concluded with an overview of the next steps in the planning process and a schedule.

Feedback was solicited on the preliminary alternatives from January 11, 2016 to March 11, 2016, as a way to gather information from the public and gain support for the plan. Because of a planned outage of the NPS PEPC website planned for March 11 and 12, 2016, the comment period was extended until midnight March 13, 2016. Therefore, the public had 62 days to provide comments on the preliminary alternatives.

Open house events were held on Wednesday, February 10, 2016, at Tree Tops Park in Davie, Florida, and on Thursday, February 11, 2016, at the Big Cypress Swamp Welcome Center in Ochopee, Florida. There were 40 attendees at the meeting in Davie and 66 people attended the meeting at the preserve. The purpose of the workshop was to present the draft alternatives and solicit public feedback on draft management objectives, desired future conditions, and the preliminary alternatives. During the comment period, 190 individual correspondences were received.

The National Park Service received letters from official representatives of the following agencies and organizations:

- Broward Airboat Club
- Center for Biological Diversity, Sierra Club, South Florida Wildlands Association, Friends of the Everglades, and Matthew Schwartz (individual) (via Meyer Glitzenstein & Eubanks LLP)
- Coalition to Protect America's National Parks
- Collier County Sportsman and Conservation Club
- Council of the Original Miccosukee Simanolee Nation of Aboriginal Peoples
- Everglades Coordinating Council
- Florida Fish and Wildlife Conservation Commission
- Florida Trail Association
- Florida Wildlife Federation
- Fulltrack Conservation Club of Dade County
- Jetport Hunt Club
- National Parks Conservation Association
- National Parks Conservation Association (via Arnold & Porter LLP)
- National Rifle Association
- National Wild Turkey Federation
- Broward Airboat Club, Palm Beach Airboat Club, Dade Airboat Club
- Roofer Head "Fennell Camp"
- Safari Club International
- US Department of Agriculture

Members of the following organizations also submitted comments:

- Big Cypress National Preserve Off-Road Vehicle Advisory Committee
- Collier County Sportsman and Conservation Club
- Dade County Full Track Club
- Everglades Conservation and Sportsman Club
- Florida Native Plant Society
- National Rifle Association

After the close of the alternatives newsletter comment period, all public comments were compiled and analyzed in order to assess the needs and values of the public.

5.2.3 Preferred Alternative Workshop

From June 27 through July 1, 2016, the National Park Service held a Preferred Alternative Workshop at the preserve headquarters at 33100 Tamami Trail East, Ochopee, Florida 34141. The purpose of the workshop was to develop a recommendation for a preferred alternative for the Plan.

To develop a recommendation for a preferred alternative for the Plan, participants conducted a detailed review of the trails and destinations, management actions, and indicators and thresholds included in the preliminary alternatives, and considered comments received during the public scoping process, including comments on the preliminary alternatives generated by public open house events held in February 2016. The five-day roundtable review included staff from the preserve, NPS Denver Service Center, the Southeast Regional Office, and preserve partners. In addition to the evaluation of trails and destinations, the IDT discussed alternative management strategies for camping, maximum length of stay, and closures. The IDT applied their knowledge of preserve operations, resources, management, maintenance, and user groups, and considered public comments in order to develop an initial recommendation for the NPS preferred alternative. The preferred alternative identified in this Plan represents a further refinement of the initial IDT recommendation based on additional review and deliberation by NPS staff.

5.3 LIST OF RECIPIENTS OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The National Park Service posted the Draft Environmental Impact Statement on the PEPC site for public comment. In addition, it was provided to the agencies, elected officials, organizations, and businesses listed below.

Department of Agriculture

- Forest Service
- Natural Resources Conservation Service

Department of Defense

- Army Corps of Engineers

Department of the Interior

- Bureau of Indian Affairs
- National Park Service
- Everglades National Park
- Biscayne National Park
- Southeastern Archeological Center

Fish and Wildlife Service

- South Florida Ecological Services Office
- Florida Panther National Wildlife Refuge

Geological Survey

- South Florida Ecosystem Restoration Task Force

Environmental Protection Agency

STATE OF FLORIDA

Department of Community Affairs

Department of Environmental Protection

- Office of the Secretary
- South District Office
- Fakahatchee Strand Preserve State Park

Department of Transportation

- District One Office

Fish and Wildlife Conservation Commission

Office of the Governor

South Florida Water Management District

- Executive Director
- Lower West Coast Service Center
- Big Cypress Basin

State Historic Preservation Office

COUNTY/LOCAL GOVERNMENT

Collier County

- Manager
- Commission
- Sheriff

Everglades City

- Mayor
- Council

Miami-Dade County Commissioner, José "Pepe" Diaz (District 12)

Southwest Florida Regional Planning Council

AMERICAN INDIAN TRIBES

Seminole Tribe of Florida

Seminole Nation of Oklahoma

Miccosukee Tribe of Indians of Florida

FLORIDA CONGRESSIONAL DELEGATION

U.S. House of Representatives

Mario Diaz-Balart (25th Congressional District)

U.S. Senate

Bill Nelson

Marco Rubio

FLORIDA STATE LEGISLATURE

Florida House of Representatives

Carlos Trujillo - District Office – District 105

Holly Raschein - District Office – District 120

Byron Donalds - District Office – District 80

Florida Senate

Kathleen Passidomo - District 28 Office

ORGANIZATIONS AND BUSINESSES

Allied Sportsmen's Associations of Florida

Audubon of Florida and Collier County

Big Cypress Sportsmen's Alliance

BreitBurn Energy Partners L.P.

Collier Resources Company

Collier Sportsmen & Conservation Club

Conservancy of Southwest Florida

Council of the Original Miccosukee Simanolee Nation, Aboriginal People

Defenders of Wildlife

Everglades Coordinating Council

Florida Biodiversity Project

Florida Outdoor Alliance

Florida Trail Association

Florida Wildlife Federation

Fort Myers News-Press

Independent Traditional Seminole Nation of Florida

Jetport Conservation & Recreation Club

Miami Herald

Naples Daily News

National Audubon Society

National Parks Conservation Association
National Wild Turkey Federation – Everglades Longbeards Chapter
National Wild Turkey Federation – Florida State Chapter
North American Butterfly Association – Miami Blue Chapter
Pegasus Foundation
Public Employees for Environmental Responsibility
Safari Club International
Sierra Club
South Florida Sun-Sentinel
The Humane Society of the United States
The Future of Hunting in Florida, Inc.
The Wilderness Society
Tropical Audubon Society
Wildlands CPR

Appendixes

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APPENDIX A: ACRONYMS

asl	above sea level
CAA	Clean Air Act
CWA	Clean Water Act
CFR	Code of Federal Regulations
FE	Federally Endangered
FNST	Florida National Scenic Trail
FR	Federal Register
FT	Federally Threatened
FTE	Full-Time Employee
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
GMP	General Management Plan
IDT	Interdisciplinary Team
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act of 1969, as amended
NPS	National Park Service
NRHP	National Register of Historic Places
ORV	Off-Road Vehicle
PEPC	Planning, Environment, and Public Comment
PL	Public Law
RCW	Red-cockaded woodpecker
SHPO	State Historic Preservation Office(r)
SR	State Road
ST	State Threatened
USC	United States Code
USFWS	US Fish and Wildlife Service
WSOF	Wetland Statement of Findings

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APPENDIX B: IMPACT TOPICS RETAINED FOR AND DISMISSED FROM DETAILED ANALYSIS

RETAINED TOPICS

Soils

The soils in the preserve are important for maintaining ecological integrity. The preserve contains more than 205,600 acres of sensitive prairie habitat with soils that could be damaged from ORV and human disturbance. Most of the soils in the preserve are simple geological and biological products that have not had sufficient time or environmental conditions for evolution into true soils. Marl, sand, organic matter, and rock are the four substrate types in the preserve.

Recreational use associated with the designation of backcountry trails and destinations could result in impacts on soils. The extent to which ORV operation affects soils within the preserve was analyzed in detail in the 2000 Recreational ORV Management Plan (NPS 2000a), which reported that impacts on soils as a result of ORV use vary based on soil depth, soil composition, plant cover, and frequency of use. Impacts are easily observable and range from exposed bedrock, rutting and ridging of soils, and water channelization, to lateral expansion of trail network by users as they avoid areas that are excessively muddy or rutted. The actions in the Plan would have varying impacts on soils. Therefore, this Environmental Impact Statement provides a detailed analysis of environmental impacts related to soils in order to make a reasoned choice between alternatives.

Vegetation and Habitat

Within the preserve, there is a mosaic of habitat types that include: (1) cypress domes, strands, and prairies, (2) mixed-hardwood swamps, (3) prairies, (4) hammock, (5) marshes, (6) mangrove forests, and (7) pinelands. The proposed secondary trail network and backcountry destinations extend throughout the preserve and through these different habitat types, all of which vary in their characteristics, including vegetation and habitat composition and suitability for implementation of trails and destinations.

Given the limited range of elevation in the preserve, minor changes in elevation (i.e., just a few inches) bring about vastly different plant communities. Recreational use associated with the designation of backcountry trails and destinations could potentially result in trampling, removal, or diminished value of the many types of vegetation and habitat present in the preserve. These impacts can be differentiated between the alternatives based on suitability of the vegetation and habitat for ORV use. Therefore, this Environmental Impact Statement provides a detailed analysis of environmental impacts related to vegetation and habitat in order to make a reasoned choice between alternatives.

Wetlands

The majority of the preserve is classified as wetlands. The preserve includes an extensive amount of wetlands, with each action alternative having the potential to result in different intensities of wetland degradation. Depending on the types of wetland present (i.e., herbaceous or forested), the effects of the alternatives would vary. Trails or destinations in prairies and marsh wetland are most susceptible to adverse effects from ORV use, whereas cypress domes and mixed hardwood forest discourage effects due to the presence of trees and/or depths of water inundation. Some activities, including ORV-related facilities and trail stabilization would require authorization under the Clean Water Act.

Specifically, proposed trails and destinations occur in or near cypress, mixed-hardwood swamp, prairie, marsh, and mangrove habitats. Wetlands are protected by section 4.6.5 of NPS *Management Policies 2006* (NPS 2006a); Executive Order (EO) 11990; Directors Order 77-1; and the Clean Water Act (1972). Specifically, Directors Order 77-1, the *National Park Service Procedural Manual #77-1: Wetland Protection* (NPS 2016c), provides specific procedures and requirements that must be addressed when an NPS-proposed action will have new adverse impacts on wetlands. The manual requires preparation and publication of a Wetland Statement of Findings (WSOF) as part of the NEPA process and requires wetland "compensation" for wetland degradation or loss at a minimum 1:1 ratio. For this Plan, the NPS intends to prepare the WSOF after receiving comment from the public and after a final preferred alternative is selected. The WSOF will be prepared and released for public comment when NPS has completed the detailed design of the trail system and has specific trail-siting locations to propose. Therefore, this Environmental Impact Statement provides a detailed analysis of environmental impacts related to wetlands in order to make a reasoned choice between alternatives.

Special Status Species

Rare, threatened, and endangered species in the preserve are governed by several laws and policies, primarily the National Park Service Organic Act and the Endangered Species Act, as well as state law. 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 federal agencies protect listed species and preserve their habitats. NPS *Management Policies 2006* (NPS 2006a) also provide specific guidance for management of threatened or endangered plants and animals. These policies dictate that the National Park Service survey for, protect, and strive to recover 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.

Thirty-one 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 endangered or threatened under the Endangered Species Act. Recreational use associated with the designation of backcountry trails and destinations could potentially result in impacts on listed species present in the preserve. The potential effects on federally listed species would require NPS consultation with the US Fish and Wildlife Service. Activities affecting those species that are listed by the State of Florida or are otherwise identified as special status species may require authorization from regulatory agencies. The nature and degree of potential impacts on special status species are likely to be a major source of controversy among certain members of the public. Therefore, this impact topic is analyzed in detail in this Environmental Impact Statement.

Visitor Use and Experience

NPS *Management Policies 2006* (NPS 2006a) address "enjoyment of park resources and values by the people of the United States" as "part of the fundamental purpose of all parks." The National Park Service 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).

Decisions involving backcountry camping and the preserve's trail system are central to the proposed action and of critical importance. The proposed alternatives would have a direct effect on visitor recreation opportunities in the preserve. Therefore, this impact topic is analyzed in detail in this Environmental Impact Statement.

Natural Soundscapes

In accordance with NPS *Management Policies 2006* (NPS 2006a) and Director's Order 47: Sound Preservation and Noise Management (NPS 2000b), an important part of the NPS mission is preservation of natural soundscapes in national park units. Natural soundscapes exist in the absence of human-caused sound.

Intrusive sounds are of concern to the National Park Service and visitors because they can degrade the visitor experience and influence the distribution and behavior of animals. Furthermore, visitor use and experience, including natural soundscapes, are central to the Plan and of critical importance. Noise that is considered excessive and out of place has the potential to be a source of conflict among visitors in national park units. Research shows that noise can also affect an animal's physiology and behavior, and if it becomes chronic, can injure an animal's energy budget, reproductive success, and long-term survival (Radle 2007). 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. The opportunity to experience an unimpaired natural soundscape is an important part of the overall visitor experience, especially because it contributes to the solitude and wilderness experience that is integral to much of the preserve.

Recreational use associated with the designation of backcountry trails and destinations could potentially result in impacts to the natural soundscape within the preserve and is central to the backcountry access plan. Therefore, this impact topic is analyzed in detail in this Environmental Impact Statement.

Ethnographic and Archeological Resources

As defined by the NPS *Management Policies 2006* (NPS 2006a), ethnographic resources are the cultural and natural features of the preserve that are of traditional significance to 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.

The Antiquities Act of 1906 protects historic and prehistoric sites on federal lands and prohibits excavation or destruction of such antiquities unless a permit is obtained. The Archaeological Resources Protection Act of 1979 protects prehistoric and historic archeological data. The Native American Graves Protection and Repatriation Act of 1990 assigns ownership and control of American Indian cultural items, human remains, and associated funerary objects to American Indians; it also establishes requirements for the treatment of American Indian human remains and sacred or cultural objects found on federal land. The American Indian Religious Freedom Act of 1978 affirms the right of American Indians to have access to their sacred places. The Department of the Interior is also legally obligated to ensure that American Indian resources and lands are properly managed, protected, and conserved. The Department of the Interior, as trustee for the tribes, has an affirmative duty to protect tribal health and safety, to fulfill all treaty and statutory obligations, and to exercise utmost good faith in all dealings with the tribes. *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995) provides additional standards for preservation of historic properties.

Regarding traditional uses in the preserve by traditionally associated peoples, the enabling legislation (16 *United States Code* [USC] § 698(j)) 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 ceremonials.*

Recreational use associated with the designation of backcountry trails and destinations could potentially result in impacts to ethnographic and archeological resources. The potential effects associated with the ethnographic and archeological resources require consultation under section 106 of the National Historic Preservation Act of 1966, as amended, in consultation with the Florida State Historic Preservation Officer (SHPO) and, as necessary, the Advisory Council on Historic Preservation and other concerned parties, including American Indian tribes. Therefore, this impact topic is analyzed in detail in the Environmental Impact Statement.

DISMISSED TOPICS

Air Quality

The legal authority for federal programs regarding air pollution control is based on the 1990 Clean Air Act (CAA) Amendments. These are the latest in a series of amendments made to the CAA. 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 CAA of 1963 was the first federal legislation regarding air pollution control. The Air Quality Act of 1967 expanded studies of air pollutant emission inventories, ambient monitoring techniques, and control techniques. The preserve has been designated a class II area under the CAA. 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 Environmental Impact Statement, NPS has determined that the contribution of pollutants resulting from implementation of any of the proposed alternatives would be similar to current levels and would not result in exceeding criteria established for pollutants, and the differences between the alternatives would not be noticeable. Exhaust emissions could be produced by an increase in visitor use and subsequent vehicle (including ORV) use in the preserve; however, these activities would not be expected to cause national ambient air quality standards to be exceeded because the increases would be relatively minor. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Floodplains

The preserve's floodplains are protected under the Organic Act; NPS *Management Policies 2006* (NPS 2006a); Executive Order 11988, "Floodplain Management"; and Director's Order 77-2: *Floodplain Management* (NPS 2003). Floodplains provide a variety of important functions, including flood protection, improved water quality, habitat for wildlife, groundwater recharge, and cycling of nutrients important for food web and agricultural production. Upon review of these laws and policies and the proposed alternatives associated with this Environmental Impact Statement, NPS has determined that none of the proposed alternatives would have any impacts on the preserve's floodplains. In all of the proposed alternatives analyzed in this Environmental Impact Statement, the National Park Service would continue to protect and conserve the preserve's floodplains as required

under the Organic Act, NPS *Management Policies 2006*, Executive Order 11988, and Director's Order 77-2. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Hydrology and Water Quality

Both water quality and hydrologic functions are important issues at the preserve. NPS policies require protection of water resources in a manner consistent with the Clean Water Act (CWA) (NPS 2006a). Human waste associated with backcountry use has the potential to affect water quality. However, the preserve encourages all users to practice Leave No Trace principles and distributes educational materials to backcountry campers. Therefore, no impacts to water quality are anticipated.

The watershed within the preserve is largely rain-driven (NPS 2000a); water quantities vary greatly between the wet and dry seasons. During the wet season (typically June through November), the preserve is inundated by water ranging from a few inches to several feet in depth (Klein et al. 1970). In general, during the wet season the water table can be found at the surface. The seasonal high water occurs in late summer. Through the winter and spring months of the dry season (typically December through May), there is typically standing water only in the deepest portions of the wetlands; water levels usually recede to cypress dome areas and soils become dry and firm. During the dry season, the water table is generally only a few feet below the ground surface.

Within the preserve, the land is generally flat and slopes to the south and southeast on average less than 1 foot per mile. Surface flows are influenced by both upstream management practices and internal barriers to water flows. Surface water generally moves through the shallow sloughs, constructed ditches, and channels, as sheet flow is controlled by the surface topography. Under the relatively flat conditions, surface water typically flows through channels rather than into adjacent wetlands (Duever et al. 1981; Pernas et al. 1995). Trails rutting and channelization have the potential to impact hydrology and water quality through their potential for diversion of surface and groundwater water flows. Trail rutting was explored in depth in the 2000 Recreational ORV Management Plan and led to the formation of the primary trail network and proposed secondary trail network expansion.

For the alternatives considered in this Environmental Impact Statement, each proposed trail (both ORV trails and nonmotorized trails) and each destination was individually analyzed against several different criteria and preferred conditions, including substrate suitability. Trails evaluated for inclusion within the various alternatives either have been opened previously as part of the secondary ORV trail network, or already exist as a present, stable, linear feature. No new trail construction is being proposed. Limiting the trails to those already in existence precludes the need to create new trails and potentially create a water flow diversion. Destinations were evaluated in terms of providing backcountry, primitive camping opportunities and are generally located within upland hammock areas that also contain stable and suitable substrate. No additional impervious surface area is being proposed as part of this Plan; therefore, no trail or destination included as part of this Plan would create a barrier to surface water flow or groundwater recharge potential.

To ensure compliance with the CWA, indicators and thresholds were developed in order to implement an adaptive management strategy should deep rutting and channelization impacts to trails as a result of ORV use become an issue. As discussed, both tread width and rut depth have been identified as indicators and would be monitored by preserve staff throughout the trail network. If either the rut depth or the tread width indicator exceeds the maximum allowable limits, then the trail

would be temporarily closed until conditions have restored to allowable limits. Utilizing this management strategy, the excessive, historical, rut depths described in the 2000 Recreational ORV Management Plan would no longer have an opportunity to occur.

Since ORV traffic would be constrained to the trail network, the trails and destinations would be located generally within suitable substrate, and the indicators and thresholds would be actively managed by preserve staff, the likelihood of impacts to surface water flows and groundwater recharge are greatly reduced to near negligible levels. The preferred alternative does not propose to add any new impervious surface areas within the preserve, and since the trails and destinations would mostly use the most stable substrates, it is unlikely that hydrology or water quality would be affected. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Other Wildlife and Protected Plant Species

In addition to special status species (discussed above), other wildlife live in the preserve. However, the nine federally listed species are good indicators for other wildlife species due to the interrelations and inter-dependence of the various flora and fauna in the preserve. Together, the federally listed species adequately reflect overall ecosystem health. Therefore, the effects on other wildlife species are not analyzed in detail as a separate topic in this Environmental Impact Statement.

Three federally listed plant species are known to occur within the preserve; however, all alternatives would avoid potential impacts to these species by siting proposed trails and destinations in areas that do not contain this plant species. Accordingly, impacts on special status plant species are not analyzed in detail as a separate topic in this Environmental Impact Statement.

Night Sky/Lightscapes

Lighting is not a direct component of any of the proposed alternatives, and no measurable impacts to night sky would occur. Some indirect increases to lighting would occur from increased ORV use and camping, but the increased lighting would not be measurable in the night sky. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Wilderness Character

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

There is currently no designated wilderness in the preserve, but lands have been identified as eligible for designation, and some eligible lands in the Addition have been proposed for designation. None of the alternatives calls for siting ORV trails in areas eligible or proposed for designation. As a result, the siting of new ORV trails would have no direct impacts to wilderness character. Recreational use associated with the designation of backcountry ORV trails and destinations would have minimal and indirect impacts to wilderness character. These impacts would primarily take the form of impacts to solitude or primitive and unconfined recreation and would result from the sights and sounds of ORVs in adjacent non-wilderness areas. These sights and sounds would be small due to the large size of the wilderness polygons at the preserve, the width of the non-wilderness ORV trail corridors, and the limited number of permits issued for ORV use. Therefore, this impact topic is not analyzed in detail in this Environmental Impact Statement.

Prime or Unique Farmlands

The Farmland Protection Policy Act (7 USC § 4201 et seq.) and the US Department of the Interior Environmental Statement Memorandum 94-7 – 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 US Department of Agriculture Natural Resources Conservation Service. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Environmental Justice

Any proposed federal project must comply with the provisions of Title VI of the Civil Rights Act of 1964, as amended by Title VIII of the Civil Rights Act of 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 a program of the federal, state, or local government. Title VIII of the 1968 Civil Rights Act guarantees each person equal opportunity in housing. Additionally, Executive Order 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 Environmental Impact Statement, no person would be excluded from or discriminated against in the proposed alternatives considered in this Environmental Impact Statement. Additionally, minority or low-income populations would be treated the same way as other groups under the alternatives considered in this Plan and the proposed alternatives would not have a disproportionately high or adverse effect on a minority or low-income population or community. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Energy Resources / Energy Efficiency and Conservation Potential

The alternatives being considered would not result in the extraction of energy resources from the preserve, and the proposed alternatives would not result in a measurable change in energy consumption compared to current conditions. Additionally, the proposed alternatives would not affect ongoing oil and gas operations in the preserve. Therefore, this impact topic is not analyzed in detail as a separate topic in this Environmental Impact Statement.

Greenhouse Gas Emissions

Under the proposed alternatives discussed in this Environmental Impact Statement, no construction would occur and no permanent facilities would be established; existing vehicle traffic would continue to occur. The potential for an increase in visitor use and subsequent vehicle use (including the use of ORVs) in the preserve could produce an increase in greenhouse gas emissions. However, any increase in visitor activities would be relatively minor compared to baseline conditions and is not expected to result in a measurable contribution to greenhouse gas emissions or climate change. Therefore, this impact topic is not analyzed in detail in this Environmental Impact Statement.

Land Use / Adjacent Land Uses and Policies

Land use plans (outside the preserve boundaries) would not be affected by actions proposed under any of the alternatives. In addition, recreational activities described in the proposed alternatives would not induce 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 Environmental Impact Statement.

APPENDIX C: COMPARISON OF ALTERNATIVES

Component	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5 (NPS Preferred)
Concept	This alternative represents the continuation of current management practices related to backcountry access within the preserve. No secondary or new primary ORV trails would be opened.	This alternative offers visitors slightly increased access to a number of backcountry destinations. The designated ORV secondary trail system would only include those trails that were previously open and that traverse highly resilient substrate types.	Alternative 3 would increase ORV access while balancing impacts to resources. ORV users would have the option to access a broader range of areas as compared to alternative 2 via trails traversing resilient as well as highly resilient substrate types.	Alternative 4 further expands the number of hiking trails, secondary trails, and destinations. Additional primary trails would be opened in the Bear Island Unit and the Stairsteps Unit. Dispersed camping would also be allowed in all management zones.	This alternative allows the greatest visitor access through expansion of both the primary and secondary ORV trail systems, as well as the hiking trail system. Dispersed camping would be allowed in all management zones.
Primary ORV Trails	The primary ORV trail system, 278 miles, would remain unchanged.	The primary ORV trail system, 278 miles, would remain unchanged.	The primary ORV trail system, 278 miles, would remain unchanged.	The primary ORV trail system would be expanded to 337 total miles.	The primary ORV trail system would be expanded to 344 total miles.
Secondary ORV Trails	No secondary trails would be opened.	Thirty-three miles of secondary trails would be opened in highly resilient substrate types.	Eighty-eight miles of secondary trails would be opened in resilient and highly resilient substrate types.	One hundred one miles of secondary trails would be opened, primarily on highly resilient to resilient substrates. These trails would all be in previously disturbed areas/routes.	One hundred fifty-four miles of trail would be opened, primarily on highly resilient to resilient substrates. More miles of trail would traverse least resilient to unsuitable substrates under this alternative than under alternative 4. Segments of trails may traverse small portions of prairie habitat.

Component	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5 (NPS Preferred)
Hiking and Canoe Trails	There would be no change to the existing system of 42 miles of hiking and canoe trails. The current 37-mile route of the FNST would remain open. No re-route of the FNST would occur; therefore, sections of the FNST would continue to be closely aligned with the primary ORV trail network.	The FNST would be realigned to a previously used trail, resulting in a new route 44 miles long to improve the backcountry experience of hikers by separating ORV and hiking use and reducing the potential for ORV/hiker conflict and accidents. All other hiking and canoeing opportunities would be the same as in the no-action alternative.	The hiking trail system would remain the same as in alternative 2.	The FNST would be rerouted as described in alternative 2. Fifty-one miles of additional hiking trails would be opened in the preserve, including the Cross Preserve Trail.	Same as alternative 4.
Camping	Dispersed camping would continue to be allowed in all areas of the preserve except in the Bear Island Unit. There would continue to be no group size limits for dispersed camping. The existing backcountry campgrounds, hike-in campsites and airboat campsites would continue to remain open. All backcountry camping would continue to require a free permit.	All dispersed camping would be discontinued. Camping opportunities would be provided at destinations, existing backcountry campsites in the Stairsteps Unit and along the FNST, as well as within the two backcountry campgrounds in the Bear Island Unit. Camping permits and reservations would be required and limitations on group size would be established.	Camping opportunities would be provided at destinations, existing backcountry campsites in the Stairsteps Unit, and along the FNST, as well as within the two backcountry campgrounds in the Bear Island Unit. Walk-in dispersed camping would be permitted, but only in areas at least 0.25 mile from any designated campsite or ORV trail and 0.5 mile from any developed area or road. Dispersed camping would still be prohibited in the Bear Island Unit.	Camping opportunities would be provided at destinations, existing backcountry campsites in the Stairsteps Unit, and along the FNST, as well as within the two backcountry campgrounds in the Bear Island Unit. Walk-in dispersed camping would be permitted throughout the preserve (including Bear Island) on sites at least 0.25 mile from any destination, designated campsite, or campground, or 0.5 mile from any developed area or road. Visitors would be permitted to camp anywhere along primary ORV trails as long as the ORVs remained on the designated trail and did not block travel.	Camping would remain the same as alternative 4, with the exception of the construction of two additional backcountry campgrounds.

Component	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4	Alternative 5 (NPS Preferred)
Camping Reservations	There would be no change to the existing system - visitors would continue to obtain permits at established locations before entering the backcountry to camp.	Using an online or in-person reservation system, visitors would be required to reserve a space at destinations, designated backcountry campsites, and backcountry campgrounds. The details of the reservation system would be developed separately from this planning effort, with input from the public.	The same reservation system described in alternative 2 would be implemented. It would not apply to dispersed camping.	There would be no reservation system for backcountry camping. Visitors would continue to obtain permits at established locations before entering the backcountry to camp.	There would be no reservation system for backcountry camping. Visitors would continue to obtain permits at established locations before entering the backcountry to camp.
Stay Limits	This alternative would continue to allow for 10 to 14 consecutive-days stay limits for backcountry camping, with an ultimate limit not to exceed the maximum number of days per year specified in the superintendent's compendium.	Stay limits would be established to help increase the campsite turnover rate. Camping or occupancy of a designated backcountry campsite or backcountry campground would be limited to 14 consecutive days. This stay limit would also apply to camping equipment. Camping within the preserve by the same person or group could not occur again for 14 consecutive days thereafter and could not exceed 120 days in a calendar year.	Stay limits would be the same as those described in alternative 2. Camping in the preserve by the same person or group could not occur again for 14 consecutive days thereafter and could not exceed 120 days in a calendar year.	Stay limits would be the same as those described in alternative 2. Camping in the preserve by the same person or group could not occur again for 14 consecutive days thereafter and could not exceed 120 days in a calendar year.	Stay limits would be the same as those described in alternative 2. Camping in the preserve by the same person or group could not occur again for 14 consecutive days thereafter and could not exceed 120 days in a calendar year.
60-day closure	The current annual 60-day ORV closure would remain in place.	The current annual 60-day closure would remain in place.	The current annual 60-day closure would remain in place.	The annual 60-day closure would be removed.	The annual 60-day closure would be removed.

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APPENDIX D: VISITOR CAPACITY DETERMINATION

OVERVIEW

This appendix provides information about the visitor capacity determination. Capacities for off-road vehicles (ORV) have been identified as part of the preserve's 2000 Recreational ORV Management Plan and 2010 Addition GMP. This Plan does not change those determinations (2,000 annual permits in the original preserve and 600 annual permits in the Addition lands). This Plan also addresses nonmotorized backcountry uses (namely, hiking, camping, and canoeing).

Visitor capacity is the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established (Interagency Visitor Use Management Council 2016).

PROCESS FOR DETERMINING VISITOR CAPACITIES

The process for determining visitor capacity consists of four steps: (1) determine the analysis area, (2) review existing direction and knowledge, (3) identify the limiting attribute(s), and (4) identify capacity. Where future research, monitoring, and management experience further inform visitor use management needs, new or additional information may be used to adjust the visitor capacity determination, if necessary.

ANALYSIS AREA

This capacity determination analyzes use types and levels for all preserve backcountry areas, including those in the original preserve and the Addition.

EXISTING CONDITIONS

Prior guidance from the 2000 Recreational ORV Management Plan includes a maximum visitor capacity determination for primary ORV trail use of 2,000 annual permits in the original preserve. This determination was based on a ratio of number of vehicles to the maximum number of primary trail miles envisioned in the original preserve (2,000 permits for up to 400 miles; or 5 permits for every 1 mile of trail). The same ratio was used to determine permits issued in the Addition: up to 600 permits annually.

ORV use is considered the main backcountry use in the preserve; however, additional nonmotorized uses such as horseback riding, camping, hiking, and canoeing also occur. These types of uses are considered to occur at relatively low levels by park managers and have not been observed to result in significant impacts to resources or visitor experiences, except in rare circumstances. See the affected environment discussion in chapter 3 for more details on visitor use and related conditions in the preserve.

Existing Conditions for Analysis Area

According to park use statistics, backcountry use is highest from September to March, with the number of campers varying from month to month (NPS 2007). Backcountry use tends to peak during hunting season. Backcountry campers are most likely to be hunters and recreationists using primary ORV trails and to a lesser extent nonmotorized recreationists such as equestrians, hikers, and canoeists or kayakers. The current ORV permit levels in the original preserve have helped the

National Park Service protect desired conditions, and generally, the preserve's resources are in much better condition today than before the 2000 Recreational ORV Management Plan was implemented.

According to preserve records, an average of 1,050 ORV permits were issued in between 2016 and 2019 for the original preserve, substantially less than the 2,000 permits issued in 2010. This trend, well below the annual cap of 2,000 permits, also shows that demand for ORV use in the preserve is decreasing. When the average group size in the preserve (2.5 people) is taken into consideration, this represents approximately 2,625 people a year using the current ORV trail system.

For this capacity determination, the number of ORVs is more pertinent than the number of individual users that may be traveling on one ORV. The ORV itself causes the most serious impacts to resources, regardless of how many people are traveling on it. Based on the preserve's assessment, the current capacity and management program for ORV use has been a success, so it is practical to extend this method to other backcountry users (ratio of 5 trail miles to 1 backcountry user). Using the 5 to 1 ratio with nonmotorized users would help maintain desired conditions for resources and visitor experience in the preserve's backcountry areas.

LIMITING ATTRIBUTES

The most limiting attributes related to levels of visitor use in the preserve are resource impacts caused by ORVs. Many of the indicators and associated thresholds selected as part of this Plan seek to protect and help assess impacts to resources. They include trail braiding, trail depth or rutting, incidents of off-trail travel by motorized vehicles, natural resource impacts at destinations, disturbance of special status species, and observations of disturbances to cultural sites. Protecting water quality, wildlife, soils, and vegetation are key to maintaining the ecological integrity of the backcountry.

As noted above, the current approach for managing ORV use levels, with a cap of 2,000 annual permits in the original preserve, has helped the National Park Service protect resource conditions. This cap also provides opportunities for high-quality visitor experiences by limiting competition and conflict among backcountry users, as well as offering users a sense of solitude, self-reliance, and discovery.

VISITOR CAPACITY DETERMINATION

There are currently 278 miles of primary ORV trails in the preserve. The 2000 Recreational ORV Management Plan set a cap of 400 miles of primary trails. Some alternatives in this Plan propose an increase in ORV trail miles. However, additional trail mileage for both primary and secondary ORV trails would be managed under the current system of 2,000 annual permits in the original preserve and 600 annual permits in the Addition.

Maintaining the existing ORV permit levels, while expanding the primary and secondary trail network, would better disperse users, expand their choices for destinations, and reduce the intensity of natural resource impacts by dispersing use.

The visitor capacity determinations below first discuss primary and secondary ORV trails under the current permit systems and then discuss nonmotorized trail use. Specific determinations for camping have not been included, as the ORV trail users are most frequently also campsite users.

Nonmotorized use in the preserve generally results in fewer adverse resource impacts than motorized use. In addition, nonmotorized use in the preserve backcountry is quite low, given the total acreage available, and tends to center on the FNST. It is therefore anticipated that nonmotorized use levels could grow substantially without any significant impacts to experiences or

resources. The visitor capacities for nonmotorized use are expressed below in terms of people per day due to the low impact nature of this use and likely use patterns (half-day hikes or less).

The ratio of five nonmotorized users per mile was included in the determinations below. This approach would be assessed with additional monitoring and research if the preserve sees more than a 10% growth in backcountry nonmotorized use, or when monitoring of indicators and thresholds demonstrates that impacts are occurring specifically from this use type.

Alternative 2

The primary ORV trail system would remain the same as the current conditions described in the no-action alternative, at 278 miles. Under alternative 2, 33 miles of secondary ORV trails would be opened. The visitor capacity for ORV use would remain at 2,000 permits a year in the original preserve and 600 permits in the Addition.

The FNST trail would be rerouted to an alignment totaling 44 miles. This nonmotorized use is combined with existing trails listed in the no-action alternative (27 miles of hiking trails and 15 miles of canoe trails), for a total of 86 miles of nonmotorized trails. Following the 5 to 1 ratio, this results in 295 nonmotorized users per day. When combined, the visitor capacity for backcountry use under alternative 2 would be 2,000 ORV permits a year in the original preserve, 600 ORV permits in the Addition, and 295 nonmotorized users a day in the original preserve and Addition.

Alternative 3

The primary ORV trail system would remain the same as the current conditions described in the no-action alternative, at 278 miles. Under alternative 3, 88 miles of secondary ORV trails would be opened. The visitor capacity for ORV use would remain at 2,000 permits a year in the original preserve and 600 permits in the Addition.

The FNST trail would be rerouted to an alignment totaling 44 miles. This nonmotorized use is combined with existing trails listed in the no-action alternative (27 miles of hiking trails and 15 miles of canoe trails), for a total of 86 miles of nonmotorized trails. Following the 5 to 1 ratio, this results in 295 nonmotorized users per day. When combined, the visitor capacity for backcountry use under alternative 3 is 2,000 ORV permits a year in the original preserve, 600 ORV permits in the Addition, and 295 nonmotorized users a day in the original preserve and Addition.

Alternative 4

Alternative 4 would expand the current primary ORV trail system by 59 miles to 337 total miles. Under this alternative, the secondary ORV trail system would include 100 total miles. The visitor capacity for ORV use would remain at 2,000 permits a year in the original preserve and 600 in the Addition.

Alternative 4 would establish an additional 51 miles of hiking trails. When combined with the FNST reroute (44 miles) and existing nonmotorized trails (27 miles of hiking trails and 15 miles of canoe trails), a total of 137 miles of nonmotorized trails would be opened, resulting in a visitor capacity of 685 people per day on nonmotorized trails. When combined, the visitor capacity for backcountry use under alternative 4 is 2,000 ORV permits a year in the original preserve, 600 ORV permits in the Addition, and 685 nonmotorized users a day in the original preserve and Addition.

Alternative 5: NPS Preferred Alternative

Alternative 5 would expand the current primary ORV trail system by 66 miles, for a total of approximately 344 miles. The secondary ORV trail system would include 154 total miles. The visitor capacity for all ORV trails would remain at 2,000 permits a year in the original preserve and 600 permits in the Addition.

Alternative 5 would expand nonmotorized trails in the same way as alternative 4, for a total of 137 miles of nonmotorized trails and a visitor capacity of 685 people per day. When combined, the visitor capacity for backcountry use under alternative 5 is 2,000 ORV permits a year in the original preserve, 600 ORV permits in the Addition, and 685 nonmotorized users a day in the original preserve and Addition.

REFERENCES

National Park Service (NPS)

2007 *Big Cypress National Preserve: Monthly Public Use Report*. Available at: https://irma.nps.gov/Stats/Reports/Park/BICY.

Interagency Visitor Use Management Council

2016 Visitor Use Management Framework*: A guide to providing sustainable outdoor recreation*. June 2016. Edition 1. Available at: https://visitorusemanagement.nps.gov/VUM/Framework.

APPENDIX E: AFFECTED ENVIRONMENT REFERENCE MAPS

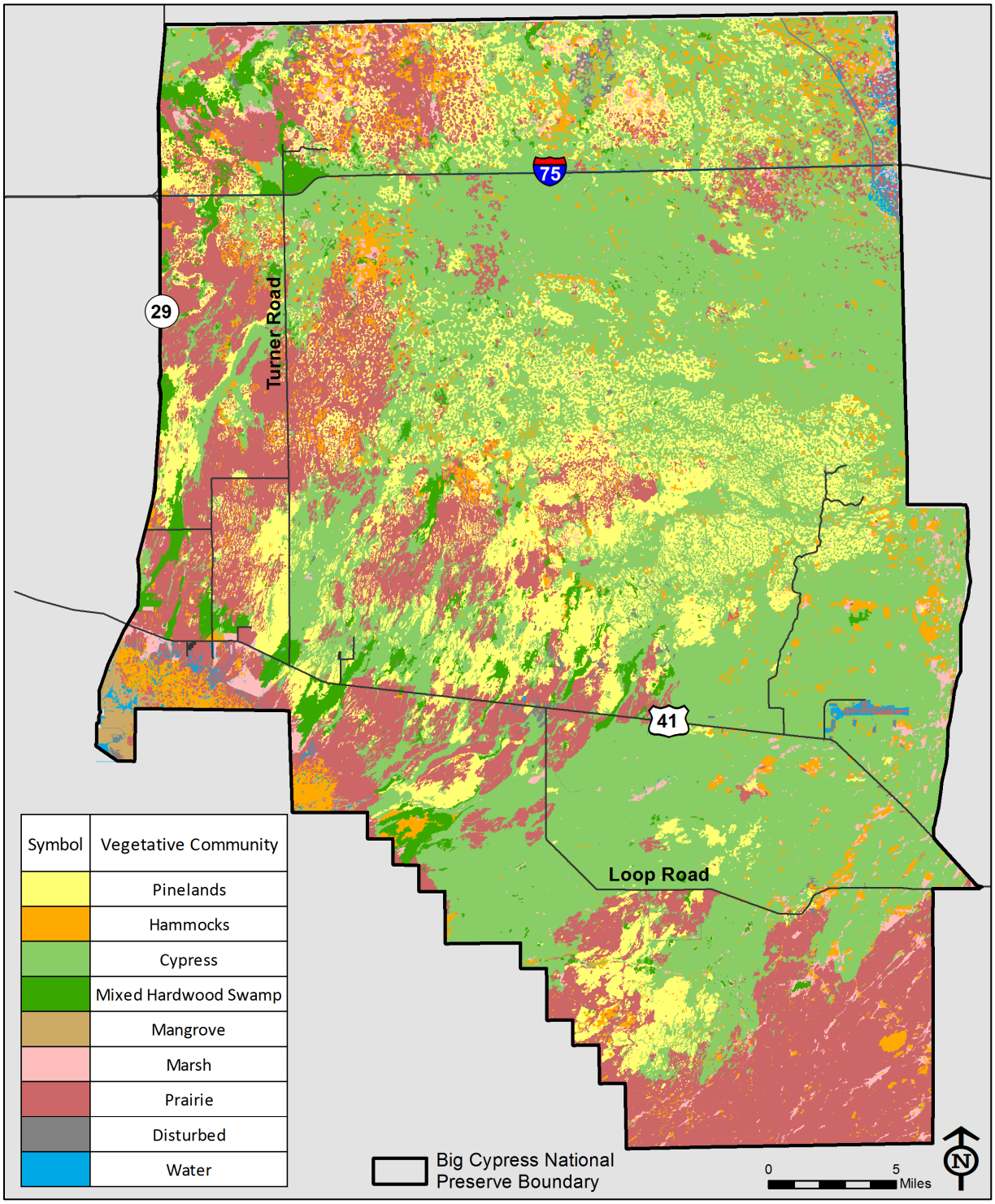

FIGURE 1. VEGETATION COMMUNITIES WITHIN THE PRESERVE

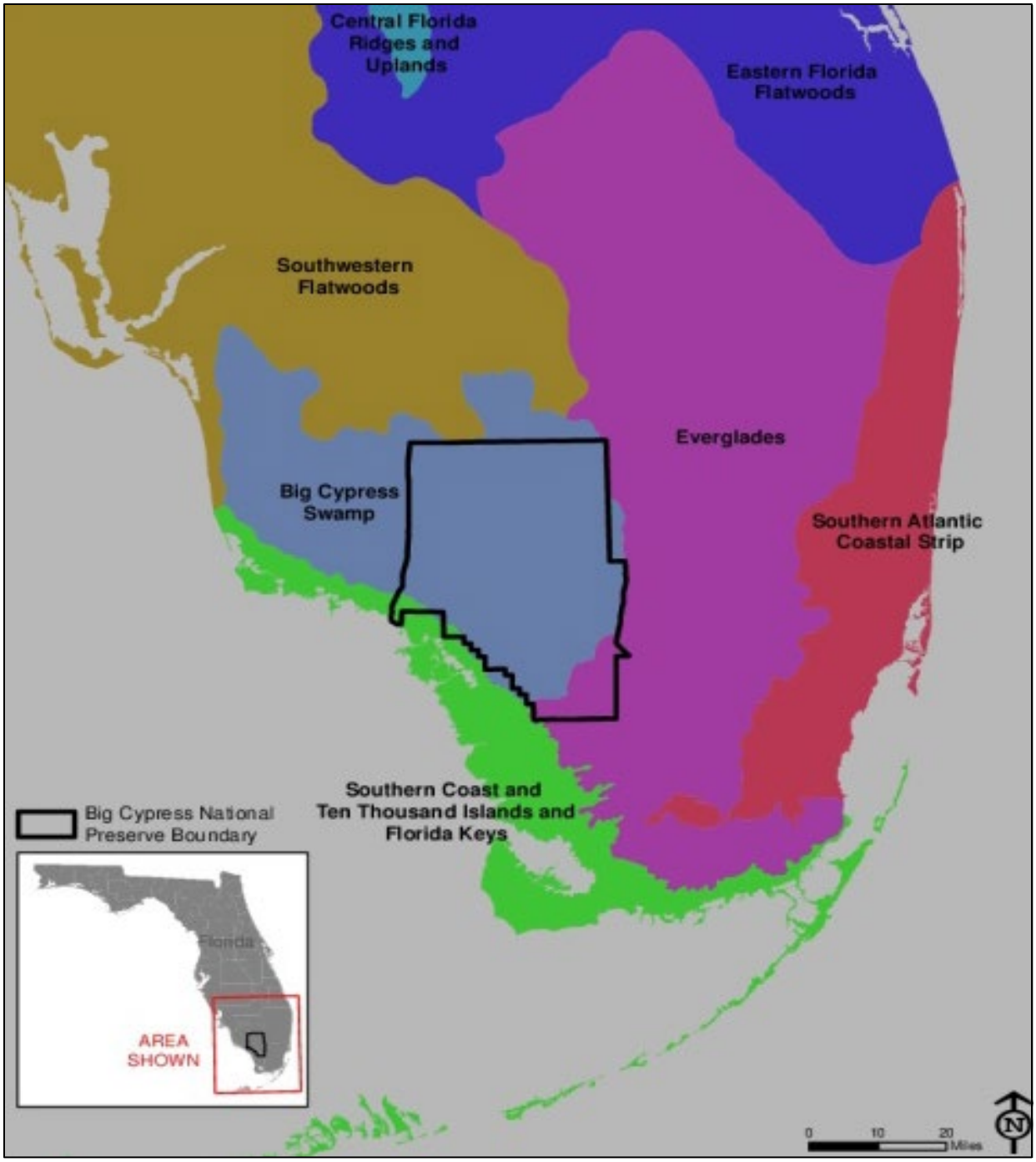

FIGURE 2. PHYSIOGRAPHIC SUBPROVINCES OF SOUTH FLORIDA

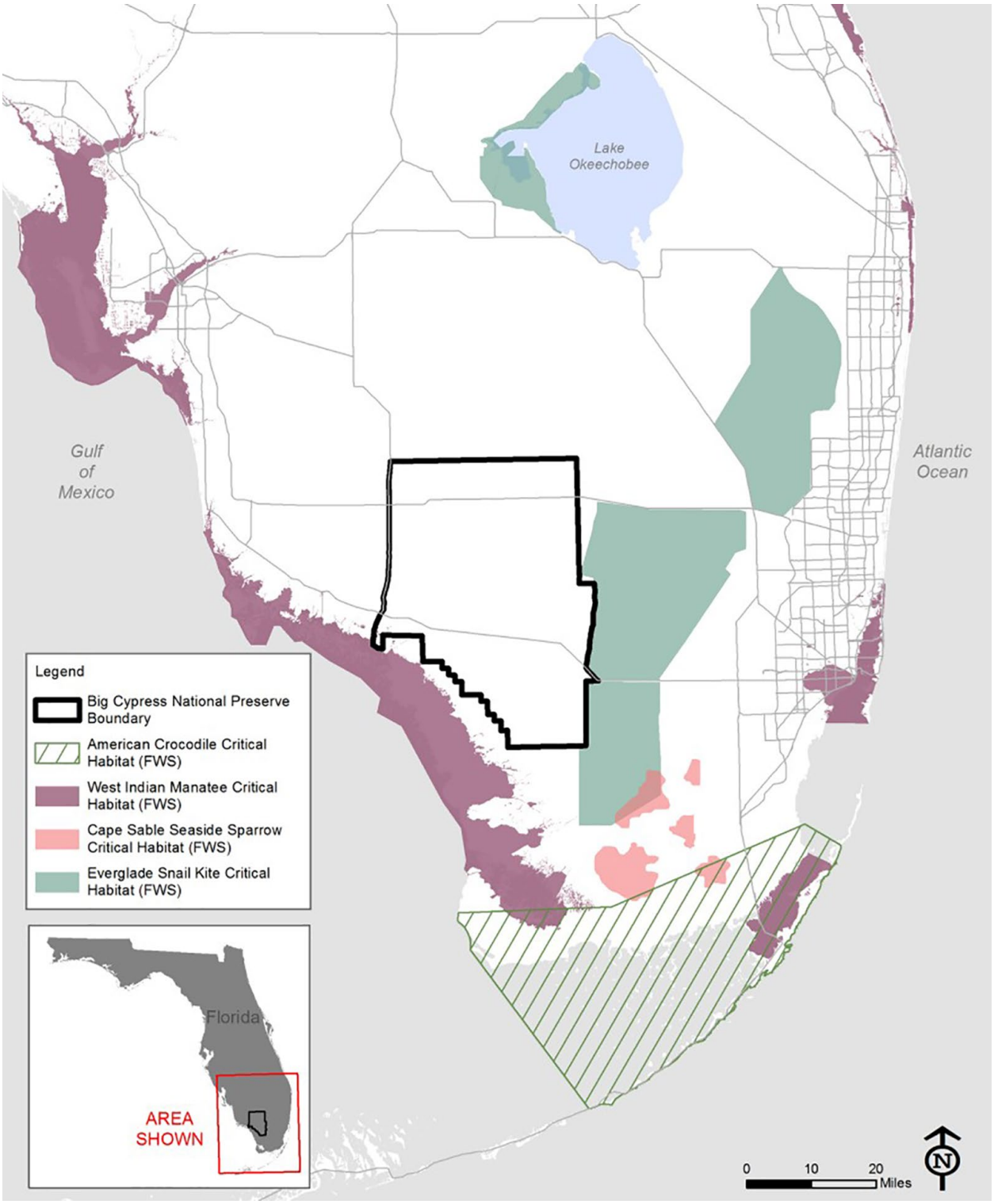

FIGURE 3. USFWS MAPPED CRITICAL HABITAT ADJACENT TO THE PRESERVE

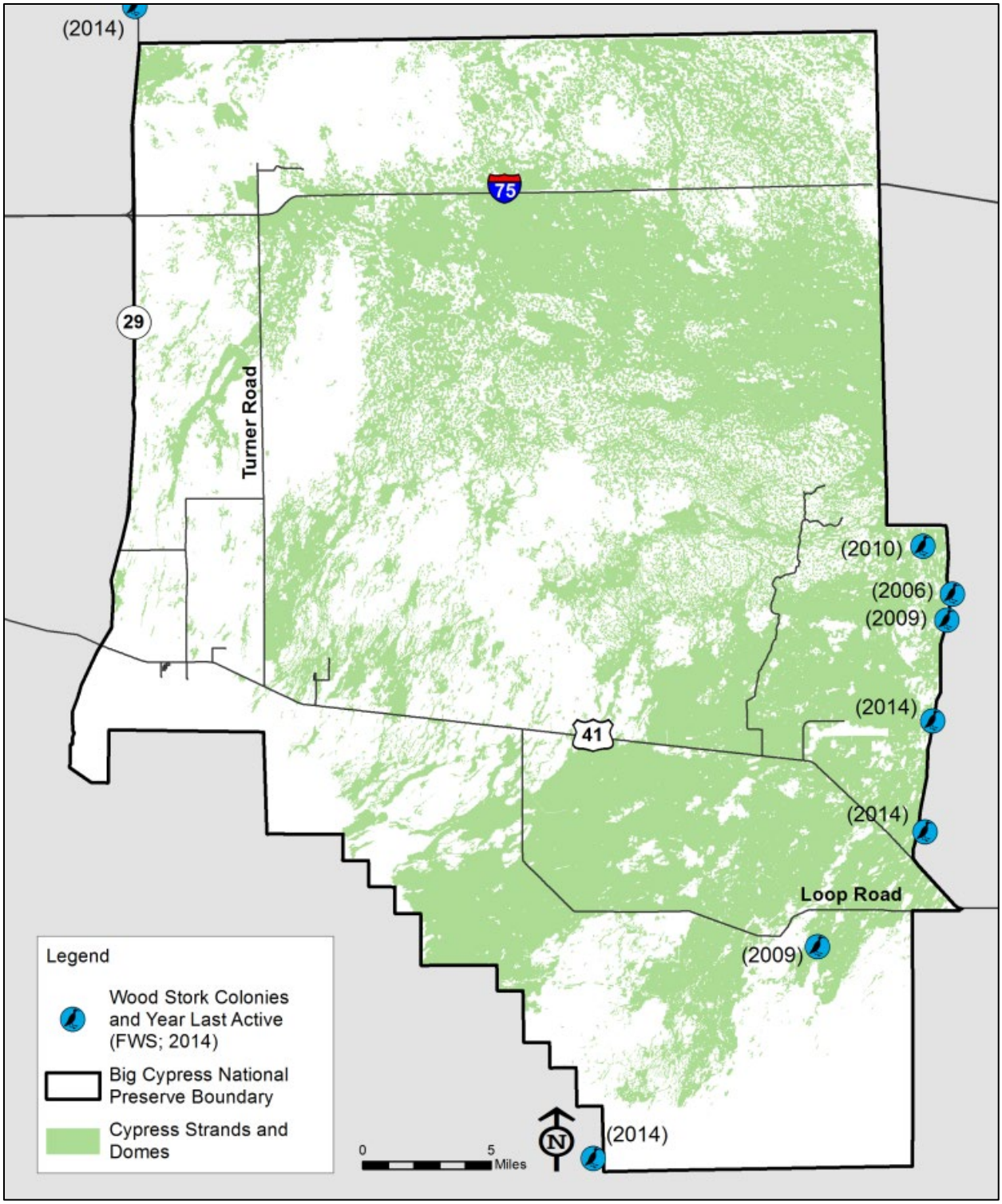

FIGURE 4. WOOD STORK COLONIES IN AND ADJACENT TO THE PRESERVE

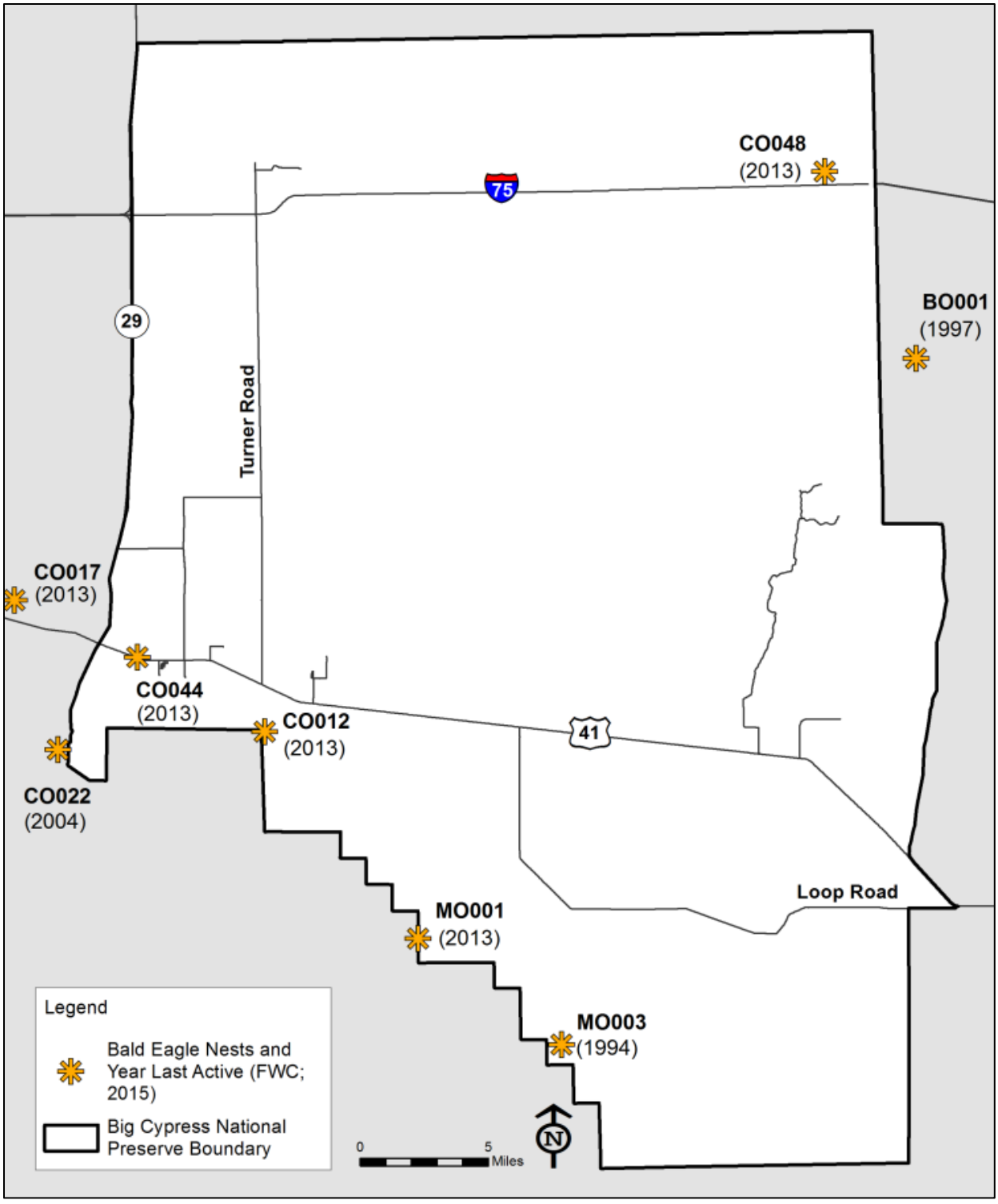

FIGURE 5. BALD EAGLE NESTS IN AND DIRECTLY ADJACENT TO THE PRESERVE

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APPENDIX G: LITERATURE CITATIONS

Audubon Society

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