



NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR



EVERGLADES NATIONAL PARK | FLORIDA

EVERGLADES NATIONAL PARK

FINAL GENERAL MANAGEMENT PLAN /
EAST EVERGLADES WILDERNESS STUDY /
ENVIRONMENTAL IMPACT STATEMENT

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**Final General Management Plan / East Everglades Wilderness Study /
Environmental Impact Statement
Everglades National Park**

Collier, Miami-Dade, and Monroe Counties, Florida

Lead Agency: National Park Service

Cooperating Agency: South Florida Ecological Services Office, U.S. Fish and Wildlife Service

Everglades National Park was dedicated in 1947 with 460,000 acres. As a result of various boundary additions, the park now encompasses 1,509,000 acres, including the largest legislated wilderness area (1,296,500 acres) east of the Rocky Mountains.

The last comprehensive effort for Everglades National Park was completed in 1979. Much has occurred since then—patterns and types of visitor use have changed, the *Comprehensive Everglades Restoration Plan* was approved, and in 1989 the East Everglades Addition (109,600 acres) was added to restore Northeast Shark River Slough and enhance freshwater flows from the north end of the park to Florida Bay. Recent studies have expanded the knowledge and understanding of the resources, resource threats, and visitor use in the park. This general management plan will provide updated management direction for the entire national park, including the East Everglades Addition.

As part of the planning process for this general management plan, the National Park Service (NPS) has conducted extensive internal and external scoping to identify the planning issues and concerns that need to be addressed by the planning effort. The internal scoping and the issues have been reviewed and evaluated at multiple levels of management. Some of the recent issues identified through this scoping included potential impacts from climate change, storm surge, and sea level rise, and the cost and economic feasibility of new development at Everglades National Park. Alternatives were developed and revised to address these issues as well as remain focused on resource protection, visitor experience, and operational needs long considered part of this plan. The complete discussion of how the issues were identified and the resulting development and refinement of the alternatives is presented in chapters 1 and 2 and appendix B of the document.

The East Everglades Wilderness Study considerations in this plan provide a forum for evaluating lands within the East Everglades Addition for possible recommendation to Congress for inclusion in the national wilderness preservation system. The wilderness study is included because of public interest and because combining the wilderness study with the general management plan saves time and money. Wilderness, which can be designated only by Congress, provides for permanent protection of lands in their natural condition, providing outstanding opportunities for primitive and unconfined recreation.

This document presents and analyzes four alternative ways of managing Everglades National Park for the next 20 or more years—alternative 1 (no action), and three action alternatives, the NPS preferred alternative, alternative 2, and alternative 4. (Alternative 3 was dismissed from detailed analysis as explained later in this document). Alternative 1 (no action) provides a baseline for evaluating changes and impacts of the three action alternatives. No wilderness is proposed for the East Everglades Addition in alternative 1. The NPS preferred alternative would support restoration of natural systems while providing improved opportunities for quality visitor experiences. It proposes about 42,200 acres for designation as wilderness and about 43,100 acres for designation as potential wilderness within the East Everglades Addition. Alternative 2 would strive to maintain and enhance visitor opportunities and protect natural systems while preserving many traditional routes and ways of visitor access. It proposes 39,500 acres for designation as wilderness within the East Everglades Addition. Alternative 4 would provide a high level of support for protecting natural systems while improving opportunities for certain types of visitor activities. Alternative 4 would eliminate commercial airboat tours within the park. It proposes 42,700 acres for designation as wilderness and 59,400 acres for designation as potential wilderness within the East Everglades Addition.

All four alternatives, including the no-action alternative, would enhance Flamingo Concession Services and facilities, but at a reduced level from what was described in the 2008 Commercial Services Plan. All of the action alternatives include construction of the Marjory Stoneman Douglas visitor facility at Gulf Coast, and each of these three alternatives would provide different new visitor opportunities. The four alternatives are described in detail in chapter 2 and summarized in table 5 of that chapter. The key impacts of implementing the four alternatives are described in the following summary, detailed in chapter 5, and summarized in table 6 (chapter 2).

For further information about this management plan please contact Fred Herling, supervisory park planner at Fred_Herling@nps.gov, 305.242.7704, or 40001 State Road 93363, Homestead, FL 33034.

SUMMARY

Everglades National Park (the park) was authorized by Congress in 1934. Through the sustained efforts of many supporters and critical funding provided by the Florida state legislature, the park was eventually established on December 6, 1947, with 460,000 acres. Boundary changes expanded the park to 1.4 million acres by 1958. In 1978, a 1,296,500-acre designated wilderness area that included land, freshwater, and submerged marine areas was established within Everglades National Park. It was renamed the Marjory Stoneman Douglas Wilderness in 1997. The Everglades National Park Protection and Expansion Act of 1989 added the East Everglades Addition (109,506 acres) and brought the Northeast Shark River Slough into the park. This East Everglades Addition (the Addition) has provided the cornerstone of long-range planning to restore more natural hydrologic conditions and revitalize wildlife habitat and ecosystem health. The park now encompasses 1,509,000 acres, including the largest designated wilderness area east of the Rocky Mountains. Many governmental and nongovernmental organizations are working together toward a balanced and sustainable restored south Florida ecosystem. Restoration efforts have raised public awareness of issues within and around the park and changed the framework for discussion of many issues affecting the park.

The approved general management plan will be the basic document for managing Everglades National Park for the next 20 to 30 years. It will define desired resource conditions and visitor experiences to be achieved and provide a framework for decisions on how to best protect resources, how to provide quality visitor opportunities, how to manage visitor use, and what kind of facilities, if any, to develop in or near the park.

This new management plan for Everglades National Park is needed because the last

comprehensive planning effort for the park was completed in 1979. Much has occurred since then—patterns and types of visitor use have changed, the *Comprehensive Everglades Restoration Plan* (CERP) was approved, and the national park boundary was modified in 1989 with the 109,506-acre East Everglades Addition. Also, recent studies have enhanced National Park Service (NPS) understanding of resources, resource threats, and visitor use in the park. Each of these changes has major implications for how visitors access and use the park and the facilities needed to support those uses, for how resources are managed, and for how the National Park Service manages its operations.

This document includes a wilderness study for the East Everglades Addition. The wilderness study evaluates these lands for possible recommendation to Congress for inclusion in the national wilderness preservation system. A study is needed because the Wilderness Act of 1964, Secretarial Order 2920, and NPS *Management Policies 2006* require the National Park Service to study roadless and undeveloped areas within the national park system, including new areas or expanded boundaries, to determine whether they should be designated as wilderness.

Wilderness studies assess the lands to determine if they possess wilderness characteristics and then propose all, some, or none of the eligible lands for designation as wilderness. Chapter 3 of this document discusses the wilderness study and proposal in detail and provides related background information about wilderness at Everglades National Park.

This *Final General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement* presents and analyzes four alternative ways of managing Everglades National Park—alternative 1 (the no-action

alternative), the NPS preferred alternative, alternative 2, and alternative 4. Alternative 3 was dismissed from detailed analysis (see the “Alternatives and Actions Considered but Dismissed from Detailed Evaluation” section in chapter 2 for more information).

Public and internal (NPS) scoping revealed several major issues for the general management plan to address such as effective management of motorboating in shallow marine waters, user capacity, park operations, management of the East Everglades Addition, and whether any areas within the Addition should be proposed for wilderness designation. The main areas of controversy have been management of marine boating, management of private and commercial airboating, and wilderness in East Everglades.

Continued scoping and internal review resulted in refinement of the alternatives, which reduced the proposed one-time facility construction improvements and rehabilitation costs, as well as long-term operational commitments while maintaining the park’s focus on enhancing visitor services and opportunities at these important visitor areas.

A discussion of the process and issues identified and how the alternatives were refined is included in chapter 2. Other issues identified in more recent scoping and review such as how to support the resilience of the park to expected impacts from climate change, such as sea level rise, coastal erosion, and higher storm surges, can be found in the mitigation measures section at the end of chapter 2.

Following public review of the *Draft General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement*, the preferred alternative was further refined to address public and agency concerns and comments. Key refinements to the preferred alternative based on public and agency comment on the Draft GMP/EIS include:

- Refinements to zoning of Florida Bay, including development of a new

pole/troll/idle zone, and the establishment of new on-plane access corridors/areas, idle speed corridors, and slow speed corridors, to provide reasonable access to key destinations and across the bay while still maintaining and protecting important resources.

- In the East Everglades Addition access opportunities were improved through refinements to backcountry/ frontcountry zoning as well as refinements to the wilderness proposal to recognize that ongoing ecosystem restoration in the East Everglades Addition would have adverse impacts to the areas wilderness character during the period when restoration activities are occurring.
- The “Alternative Wilderness Waterway” as it was referred to in the *Draft General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement* was re-named the “Everglades Paddling Trail” to more accurately reflect the primary use of the trail. Three segments of the Everglades Paddling Trail were modified to be treated as backcountry (nonmotorized) zones seasonally, during the peak winter and early spring seasons, and a seasonal idle speed segment would be established to provide a variety of possible experiences in this part of the park.

A detailed discussion of changes to the document resulting from substantive comments can be found in “Appendix I: Comment Analysis and Response Report.”

The following portion of this summary is intended to highlight the differences among the alternatives rather than provide a comprehensive summary of what is contained in the alternatives. To understand the full

details and actions proposed in the alternatives, please see chapter 2.

DIFFERENCES BETWEEN ALTERNATIVE 1 (NO ACTION) AND THE ACTION ALTERNATIVES (PREFERRED, ALTERNATIVE 2, AND ALTERNATIVE 4)

There are several programs and processes that would be implemented in the action alternatives (preferred, alternative 2, and alternative 4). These programs are described below.

An **adaptive management program** would be developed to evaluate the success of management actions in achieving desired resource and visitor use conditions and modify management strategies as needed to improve success in achieving desired conditions. Adaptive management strategies may require additional planning and compliance with the National Environmental Policy Act when implemented and would not necessitate revisions to the *Final General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement*. Specific management strategies and their efforts would be determined during later implementation-level planning efforts.

An **Everglades National Park Advisory Committee**, composed of diverse stakeholders would be established to help park managers consider various perspectives on different management issues such as resource protection, visitor use and access (particularly the management of boating in shallow marine waters), zoning refinements, education programs, monitoring, and restoration efforts during adaptive implementation of the approved management plan.

A **user capacity program** would be implemented to assist in managing the levels, types, and patterns of visitor use to preserve park resources and quality of the visitor experience. Components would include: (1)

establish desired conditions for various areas of the park through management zoning, (2) identify indicators to monitor to determine whether desired conditions are being met, (3) identify standards (limits of acceptable change) for the indicators, (4) monitor indicators to determine if there are disturbing trends or if standards are being exceeded, and (5) take management action to maintain or restore desired conditions.

A **comprehensive cultural resource management program** would be established, focusing on efforts to inventory, document, and protect all types of cultural resources; regularly monitor archeological sites and other historic properties to assess resource conditions and inform long-term treatment strategies; interpret selected cultural sites for the public; and better interpret and protect ethnographic resources in consultation with associated American Indian tribes and others traditionally associated with the park.

A **strong natural resource management program** would be developed to support implementation of desired conditions described in this general management plan, implement natural resource components of this plan, and contribute to the adaptive management and user capacity components of this plan.

A **boater education permit program** would be established to promote shared stewardship of marine resources, including shallow sea bottom areas, seagrasses, and wildlife. Operators of motorboats and nonmotorized boats (including paddled craft) would complete a mandatory education program to obtain a permit to operate vessels in the park. Program information would be tailored to the type of craft and/or type of trip and would be widely available at the park; on the Internet; in gateway communities, marinas, hotels; and from guides; etc.

ALTERNATIVE 1 (NO ACTION)

Concept

The no-action alternative (alternative 1), provides a baseline for evaluating changes and impacts of the three action alternatives. This baseline is characterized primarily by conditions at Everglades National Park as of December 2009, with continuation of current management practices into the future (i.e., business as usual). This alternative assumes implementation of some approved and funded facility improvements via the concessioner and other improvements via the National Park Service, as well as currently unfunded improvements at Flamingo such as rebuilding visitor lodging and rehabilitating the visitor center as outlined in the *Flamingo Commercial Services Plan*. It is anticipated that the most financially feasible and viable approach will be defined and implemented via the upcoming 2013 concessions contract for Flamingo.

Otherwise, the built environment would remain at its current level. Existing facilities at the park headquarters area, Royal Palm, Long Pine Key, Key Largo, Shark Valley, and Gulf Coast would be maintained and continue to serve operational needs and visitors—in some cases at less than desired levels.

Management activities would continue to conserve natural resources and processes while accommodating a range of visitor uses and experiences.

Visitors would continue to have access to a wide variety of land- and water-based opportunities and programs, including concessioner trips at Gulf Coast, Shark Valley, and Flamingo, plus self-guided opportunities and guided trips throughout the park.

Parkwide Visitor Experience and Facilities

Boat tours, canoe/kayak rentals, interpretive tours, fishing tours, and paddling tours would continue to be offered in the Gulf Coast and

Ten Thousand Islands area via commercial service providers.

Existing facilities would remain.

Florida Bay

Small areas of idle speed restriction would remain. All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to public use.

East Everglades Addition

The Addition would continue to be managed under the guidance provided in the Expansion Act and the Land Protection Plan.

Commercial airboating would continue at the discretion of owners. Private airboating would also continue.

Operations. There would be no change in existing operations or the full-time equivalent (FTE) employee staffing level of 214 in 2011.

Key Impacts. The most notable impacts of the no-action alternative would be (1) continued long-term, baywide, moderate, adverse impacts on vegetation (primarily seagrass) in Florida Bay from propeller scarring and boat groundings; (2) long-term adverse effects on manatees from boat and propeller strikes and habitat disturbance constituting a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act; (3) continued long-term, moderate, adverse effects on sea turtles from human activities (primarily motor-boating and recreational fishing), resulting in a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act; (4) localized, long-term, minor to moderate, adverse impacts on natural soundscapes resulting from noise associated with human activities (especially those involving motorized vehicles); (5) long-term or permanent, minor to moderate, adverse impacts on museum collections; (6)

long-term, moderate to major, adverse impacts on the character of submerged marine wilderness in Florida Bay; (7) long-term, minor to moderate, adverse impacts as well as long-term, minor to moderate, beneficial impacts on visitor experience and opportunities; and (8) long-term, minor to moderate, adverse impacts as well as long-term, minor to moderate, beneficial impacts on NPS operations at the park.

NPS PREFERRED ALTERNATIVE

Concept

Using management zoning and collaborative techniques such as adaptive management, user education, and a national park advisory committee, the NPS preferred alternative would support restoration of natural systems while providing improved opportunities for quality visitor experiences. This concept is represented in management zoning by establishing pole/troll zones and pole/troll/idle zones over some shallow areas of Florida Bay (submerged marine wilderness) and by managing about 27,300 acres in the northwest portion of the East Everglades Addition as the frontcountry zone, where commercial airboat tours and private airboat use by eligible individuals would continue. Much of the East Everglades Addition (the portion where airboat use would not occur) would be proposed for wilderness and potential wilderness designation.

Parkwide Programs

In addition to the parkwide programs listed earlier in this summary for the action alternatives, a boating safety and resource protection plan would be developed. This plan would address boating in marine waters of Florida Bay, the Gulf Coast, and Ten Thousand Islands in more detail regarding visitor safety and resource protection. The plan would evaluate how to further avoid/minimize the risk of boat on boat collisions, boat on wildlife collisions, groundings, and

other impacts on the sea bottom, which is federally designated wilderness. Because this study would address how to minimize risks to wildlife (including the manatee and other marine endangered species), a separate manatee management plan would be unnecessary. The plan has been identified as a more effective way to protect threatened and endangered species and other important resources in the park, rather than addressing issues in a narrower way through the development of separate management plans for resources. The plan would study in more detail the Florida Bay channel/access routes, shown on the “NPS Preferred Alternative” map and make more detailed decisions about how/if channel/access routes would be marked and accessed. This plan would be developed with public input and would be updated regularly.

Parkwide Visitor Experience and Facilities

As funding permits, Flamingo facilities would be improved or upgraded while preserving the historic integrity of the Mission 66 District as outlined in the *Flamingo Concession Services Plan*. The concession operation at Everglades City would offer expanded opportunities to visit Ten Thousand Islands, Gulf Coast, and Wilderness Waterway through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with more opportunities such as interpretive, fishing, and paddling tours. Additional land-based interpretive programs and activities would link the park and neighboring communities. A cultural heritage interpretive water trail would be established in the Ten Thousand Islands area.

The establishment of a backcountry zone in the East Everglades Addition and pole/troll and pole/troll/idle zones and idle and slow-speed corridors in Florida Bay would change the way visitors access and use these areas.

Chekika, a former state recreation area, would be open at least seasonally as a day use area

with enhanced education and recreation programs.

Visitor experiences at Shark Valley would be improved through the addition of shelters/rest stops along the loop road in addition to on-site parking and traffic flow improvements.

Small facilities would be constructed to provide visitors with orientation information in the Homestead/Florida City area, along Tamiami Trail, and in Key Largo. These facilities would likely be operated in partnership with other agencies/organizations.

New campsites or camping platforms (chickees) would be constructed in Florida Bay, the East Everglades Addition, and along the Gulf Coast.

The collections management center, where museum items and artifacts are stored, would be relocated to a new facility in the park. This new facility would allow the public to view these items, as appropriate.

A new Everglades Paddling Trail would be established to provide enhanced opportunities for a more tranquil backcountry experience that is more consistent with wilderness values. This route would be minimally marked to preserve scenery and minimize maintenance requirements. To provide wilderness paddling experiences, a few segments would seasonally be treated as backcountry (nonmotorized) zones as well as seasonal slow speed zones to provide a variety of possible experiences in this part of the park.

Florida Bay

Approximately 102,800 acres in the shallows of the bay would be managed as a pole/troll zone and approximately 24,600 acres would be managed as pole/troll/idle zones. These zones would be designated to better protect the sea bottom, including wilderness resources, seagrass beds, and important ecological habitats.

Under this alternative, about 26% of Florida Bay waters within the park (392,580 acres) would be in the pole/troll zone and 6% would be within the pole/troll/idle zone. The zones would be traversed by designated channels/access routes. The term “channel/access routes” refers to the traditional, longstanding method that has been used in the park to identify motorboat transit corridors in Florida Bay, the Ten-Thousand Islands and other backcountry marine waters of Everglades National Park for many decades. The channel/access routes identified on the Preferred Alternative map are designed to facilitate boating transit in the park’s marine and estuarine waters, to protect important resources, and to provide safe, high-quality visitor experiences. Routes would include those already marked/maintained by the park and additional historical routes that would allow on-plane, idle speed, or slow speed transit depending on resource, visitor experience and safety considerations.

The park’s designated channel/access routes are marked with wooden 4”x4” posts and pointers or PVC pipe and pointers. The pointers are attached at the top of each marker, and the channel/access routes are often “gated” to indicate how boaters should enter and navigate through the corridor in order to avoid/minimize natural and wilderness resource impacts and ensure safe transit to the maximum extent possible.

An important GMP implementation project, the Boating Safety and Resource Protection Plan (discussed in more detail in the preferred alternative in chapter 2) would occur with additional public involvement and would analyze these and other features on a site-specific basis and recommend modifications over time. For additional details on designated channel/access routes, please see the NPS Preferred Alternative map in Chapter 2.

Portions of the waters along the north shoreline of Florida Bay would be managed as idle speed, no-wake areas. All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and

creeks), except Joe Bay and Snag Bay as discussed below, would remain closed to public use and managed as a special protection zone. Joe Bay includes the smaller area to the east known as Snag Bay; the two areas make up roughly 48% of Crocodile Sanctuary. For simplicity in this plan, the two bays will be referred to collectively as Joe Bay.

Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Additional paddling and boat access would be provided through a new launch point near Long Sound on U.S. 1 (and managed as the boat access zone with idle-speed along shorelines), in partnership with the Florida Department of Transportation and others.

East Everglades Addition

About 27,300 acres in the northwest portion of the East Everglades Addition would be managed as the frontcountry zone, 81,700 acres in the backcountry (nonmotorized) zone, and 600 acres in the developed zone.

Commercial airboating would be operated under concessions contracts, and commercial airboats would operate on designated routes. Private airboating (subject to provisions in the East Everglades Expansion Act) would be allowed on designated routes within the frontcountry zone.

About 24,350 acres were determined to be ineligible for wilderness designation including about 16,400 acres in the frontcountry zone where commercial airboating would operate. About 43,100 acres would be proposed as potential wilderness and about 42,200 acres would be proposed for wilderness designation (please note that acreages are based on small scale maps and are approximate).

Operations. A new East Everglades administration/operations center would be built near but outside the park on land acquired from willing sellers. Everglades National Park has acquired a site close to the park boundary near Chekika, which will be

used to support park administration and operational needs in the East Everglades. The National Park Service would strive to consolidate facilities in a more central location along Tamiami Trail, and the agency would coordinate with other land management agencies to share equipment and resources for improved operational efficiency.

An additional 35 FTE employees throughout the park would be needed to implement this alternative.

Key Impacts. The most notable impacts of implementing the NPS preferred alternative would be (1) long-term, baywide, moderate to major, beneficial impacts on vegetation (primarily seagrass) in Florida Bay from new programs and changes in management of recreational boating in Florida Bay; (2) reduced propeller scaring and boat grounding, decreased underwater noise from motorboats, improved habitat, and minor benefits to manatees from new programs and changes in management of recreational boating in Florida Bay, constituting a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act; (3) reduced impacts on sea turtles and their habitats, resulting in long-term minor benefits and long-term moderate adverse impacts (primarily due to motorboating and recreational fishing) and a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act; (4) long-term, local, minor to moderate, adverse, as well as minor to moderate beneficial impacts on natural soundscapes at the park from noise associated with human activities (especially those involving motorized vehicles); (5) long-term beneficial and short-term, negligible to minor, adverse impacts on museum collections; (6) long-term moderate beneficial impacts on the character of submerged marine wilderness in Florida Bay; (7) long-term, major, beneficial impacts on the wilderness character of the East Everglades Addition; (8) long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts on visitor experience and opportunities; and (9) short- and long-term,

negligible to minor, adverse impacts and long-term, moderate to major, beneficial impacts on park operations.

ALTERNATIVE 2

Concept

Alternative 2 would strive to maintain and enhance visitor opportunities and protect natural systems while preserving many traditional routes and visitor access. This concept is represented in management zoning by the boat access zone in Florida Bay and a large (56,000 acres) frontcountry zone in the East Everglades Addition. This alternative would rely more on boater education and enhanced ranger patrols to provide some measure of increased protection for seagrass beds, banks, and other submerged marine wilderness values. Like the NPS preferred alternative, alternative 2 would continue visitor opportunities for commercial airboat tours. A modest portion of the East Everglades Addition (the southern portion, where airboat use would not occur) would be proposed for wilderness designation.

Parkwide Programs

In addition to the parkwide programs listed earlier in this summary for the action alternatives, a manatee management plan would be developed to identify ways to improve manatee protection within the national park while maintaining as many existing recreational boating opportunities as possible. This effort would include staff participation of partner agencies having manatee management responsibilities. Protection measures would be implemented using management tools that are as flexible as possible such as the Superintendent's Compendium.

Parkwide Visitor Experience and Facilities

As funding permits, Flamingo facilities would be improved or upgraded as outlined in the *Flamingo Concession Services Plan*.

The concession operation at Everglades City would offer expanded opportunities to visit Ten Thousand Islands, the Gulf Coast, and Everglades Paddling Trail through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with more opportunities such as interpretive, fishing, and paddling tours. Additional land-based interpretive programs and activities would link the park and neighboring communities. (This is the same as in the NPS preferred alternative, except that the cultural heritage trail would not be developed.)

The southern portion of the East Everglades Addition would be managed as the backcountry (nonmotorized) zone.

Chekika would be open, at least seasonally, as a day use area and for primitive camping.

New campsites or camping platforms (chickees) would be constructed in Florida Bay, the East Everglades Addition, and along the Gulf Coast.

The collections management center, where museum items and artifacts are stored, would be relocated to a new facility in the park. This new facility would allow the public to view these items, as appropriate.

A new Everglades Paddling Trail would be established to provide enhanced opportunities for a quieter, more tranquil experience that is more consistent with wilderness values. The Everglades Paddling Trail would be unmarked. Also, except for existing idle speed, no-wake areas, the entire Everglades Paddling Trail would be in the boat access zone.

Florida Bay

Small areas of idle speed restriction would remain. All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would be open to the public for limited use.

East Everglades Addition

About 56,000 acres in the northern portion of the East Everglades Addition would be managed as the frontcountry zone. The remainder would be managed as the backcountry (nonmotorized) zone less about 600 acres in the developed zone at Chekika.

Commercial airboating would be operated under concessions contracts, and commercial airboats would operate on designated routes. Private airboating (subject to provisions in the East Everglades Expansion Act) would be allowed in the frontcountry zone on designated routes.

About 39,500 acres would be proposed as wilderness; there would be no proposed potential wilderness.

Operations. A new East Everglades administration/operations center would be built near but outside the park on land acquired from willing sellers. Everglades National Park has acquired a site close to the park boundary near Chekika, which will be used to support park administration and operational needs in the East Everglades. The National Park Service would strive to consolidate facilities in a more central location along Tamiami Trail. The agency would coordinate with other land management agencies to share equipment and resources for improved operational efficiency.

An additional 26 FTE employees throughout the park would be needed to implement this alternative.

Key Impacts. The most notable impacts of implementing alternative 2 would be: (1) long-

term, baywide, moderate, adverse impacts on vegetation (primarily seagrass) in Florida Bay from propeller scarring and boat groundings; (2) continued long-term, moderate, adverse effects on the manatee from boat and propeller strikes and habitat disturbance, but also minor benefits from new programs, constituting a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act; (3) benefits to sea turtles from habitat protection and new programs and some continued, long-term, moderate, adverse effects from human activities (primarily motorboating and recreational fishing), which would result in a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act; (4) long-term, local, minor to moderate, adverse as well as negligible to minor, beneficial impacts on natural soundscapes at the park from noise associated with human activities (especially those involving motorized vehicles); (5) long-term beneficial and short-term, negligible to minor, adverse impacts on museum collections; (6) long-term minor to moderate beneficial impacts on the character of submerged marine wilderness in Florida Bay; (7) long-term, major, beneficial impacts on the wilderness character of the East Everglades Addition; (8) long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts on visitor experience and opportunities; (9) short- and long-term, negligible to minor, adverse impacts and long-term, moderate to major, beneficial impacts on park operations.

ALTERNATIVE 3

Alternative 3 was created during an early phase of alternatives development, but was dropped from detailed consideration in this plan. See the “Alternatives and Actions Considered but Dismissed from Detailed Evaluation” section in chapter 2 for more information.

ALTERNATIVE 4

Concept

Alternative 4 would provide a high level of support for protecting natural systems while improving opportunities for certain types of visitor activities. This concept is represented in management zoning by establishing pole/troll zones over shallow areas of Florida Bay and managing 21,600 acres in the northwest portion of the East Everglades Addition as the frontcountry zone (where private airboating by eligible individuals would continue). Commercial airboat tours in the national park would be discontinued in this alternative. Nearly all of the East Everglades Addition would be proposed for eventual wilderness designation.

Parkwide Programs

In addition to the parkwide programs listed earlier in this summary for the action alternatives, a manatee management plan would be developed to identify ways to improve manatee protection within the national park while maintaining as many existing recreational boating opportunities as possible (as in alternative 2).

Parkwide Visitor Experience and Facilities

As funding permits, Flamingo facilities would be improved or upgraded as outlined in the *Flamingo Concession Services Plan*.

As in the NPS preferred alternative, the concession operation at Everglades City would offer expanded opportunities to visit Ten Thousand Islands, the Gulf Coast, and Wilderness Waterway through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with more opportunities such as interpretive, fishing, and paddling tours. Additional land-based interpretive programs and activities

would link the park and neighboring communities. A cultural heritage interpretive water trail would be established in the Ten Thousand Islands area.

Management of backcountry zones in the East Everglades Addition and pole/troll zones and idle speed, no-wake zones in Florida Bay would change the way visitor's access and use these areas.

Chekika would be open, at least seasonally, as a day use area and as an environmental education venue.

Small facilities would be constructed to provide visitors with orientation information in the Homestead/Florida City area, in Key Largo, and along Tamiami Trail. These facilities would likely be operated in partnership with other agencies/organizations.

New campsites or camping platforms (chickees) would be constructed in Florida Bay, the East Everglades Addition, and along the Gulf Coast.

The collections management center would be relocated to a new facility outside the park, possibly in partnership with another entity. This new facility would allow the public to view these items, as appropriate.

A new Everglades Paddling Trail would be established to provide enhanced opportunities for a quieter, more tranquil experience that is more consistent with wilderness values. This route would be minimally marked to preserve scenery and minimize maintenance requirements. To provide wilderness paddling experiences, some segments would be designated idle speed, no-wake areas or backcountry (nonmotorized) zones. Some segments of the Everglades Paddling Trail would be in the boat access zone.

Florida Bay

Approximately 159,564 acres in shallow areas of the bay would be managed as pole/troll zones to better protect the sea bottom. These zones would cover about 41% of Florida Bay waters within the park. The zones would be traversed by marked channel/access routes. The waters from Middle Cape to East Cape would be managed as an idle speed, no-wake area. All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to public use and managed as the special protection zone.

East Everglades Addition

About 21,600 acres in the northwest portion of the Addition would be managed as the frontcountry zone. The remainder would be managed as the backcountry (nonmotorized) zone less about 600 acres in the developed zone at Chekika.

Commercial airboating would be discontinued. Private airboating (subject to provisions in the East Everglades Expansion Act) would continue in the frontcountry zone on designated routes.

About 42,700 acres would be proposed for wilderness designation and about 59,400 acres would be proposed as potential wilderness.

Operations. A new East Everglades administration/operations center would be built near but outside the park on land acquired from willing sellers. Everglades National Park has acquired a site close to the park boundary near Chekika, which will be used to support park administration and operational needs in the East Everglades. The National Park Service would coordinate with other land management agencies along Tamiami Trail to pursue cooperative projects for improved operational efficiency.

An additional 37 FTE employees throughout the park would be needed to implement this alternative.

Key Impacts. The most notable impacts of implementing alternative 4 would be (1) long-term, baywide, moderate to major, beneficial impacts on vegetation (primarily seagrass) in Florida Bay from new programs and changes in management of recreational boating in Florida Bay; (2) reduced boat strikes, decreased underwater noise from motor-boats, improved habitat, and moderate benefits to manatees from new programs and changes in management of recreational boating in Florida Bay and along the Everglades Paddling Trail, a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act; (3) reduced impacts on sea turtles and their habitats, resulting in localized, long-term, minor benefits and long-term moderate adverse impacts (primarily due to motorboating and recreational fishing) and a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act; (4) long-term, local, minor to moderate, adverse as well as minor to moderate, beneficial impacts on the natural soundscape at the park resulting from noise associated with human activities (especially those involving motorized vehicles); (5) long-term beneficial and short-term, negligible to minor, adverse impacts on museum collections; (6) long-term, major, beneficial impacts on the character of the East Everglades Addition; (7) long-term, moderate to major, adverse as well as long-term, moderate to major, beneficial impacts on visitor experience and opportunities; and (8) short- and long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts on park operations.

The following table summarizes major differences among the alternatives.

TABLE OF MAJOR DIFFERENCES BETWEEN ALTERNATIVES

	Alternative 1 (No Action)	Preferred Alternative	Alternative 2	Alternative 4
Florida Bay Management	Small areas of idle speed restriction would remain.	About 127,400 acres in the shallows of the bay would be managed as pole/troll and pole/troll/ idle zones to better protect the sea bottom. These zones would be traversed by designated channels/access routes.	Small areas of idle speed restriction would remain.	About 159,564 acres in shallow areas of the bay would be managed as pole/troll zones to better protect the sea bottom. These zones would be traversed by marked channel/access routes.
	N/A	Portions of the waters along the north shoreline would be managed as idle and slow-speed corridors.	N/A	The waters from Middle Cape to East Cape would be managed as an idle speed, no-wake area.
	All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to the public.	All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks), except Joe Bay and Snag Bay, would remain closed to the public (managed as the special protection zone). Joe Bay would be reopened for paddling use only (managed as the backcountry zone).	All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would be open to the public for certain types of use.	All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to the public (managed as the special protection zone).
East Everglades Addition Management Zones and Airboating	There would be no new management zones.	A moderate amount of the East Everglades Addition would be managed as the frontcountry zone—about 27,300 acres in the northwest portion. The remainder would be managed as the backcountry (nonmotorized) zone.	A large amount of the East Everglades Addition would be managed as the frontcountry zone—about 56,000 acres in the northern portion. The remainder would be managed as the backcountry (nonmotorized) zone.	A moderate amount of the East Everglades Addition would be managed as the frontcountry zone—about 21,600 acres in the northwest portion.

TABLE OF MAJOR DIFFERENCES BETWEEN ALTERNATIVES

	Alternative 1 (No Action)	Preferred Alternative	Alternative 2	Alternative 4
East Everglades Addition Management Zones and Airboating (cont.)	Commercial airboating would continue at the discretion of owners.	Commercial airboating would be operated under concessions contracts, and commercial airboats would operate on designated routes.	Commercial airboating would be operated under concessions contracts, and commercial airboats would operate on designated routes.	Commercial airboating would be discontinued.
	Private airboating would continue.	Private airboating (subject to provisions in the East Everglades Expansion Act) would be allowed in the frontcountry zone on designated routes.	Private airboating (subject to provisions in the East Everglades Expansion Act) would be allowed in the frontcountry zone on designated routes.	Private airboating (subject to provisions in the East Everglades Expansion Act) would be allowed in the frontcountry zone on designated routes.
East Everglades Addition Wilderness Proposal	None.	<p>About 42,200 acres would be proposed as designated wilderness.</p> <p>About 43,100 acres would be proposed as potential wilderness.</p>	<p>About 39,500 acres would be proposed as designated wilderness.</p> <p>No potential wilderness would be proposed.</p>	<p>About 42,700 acres would be proposed as designated wilderness.</p> <p>About 59,400 acres would be proposed as potential wilderness.</p>
Everglades Paddling Trail	None.	This route would be minimally marked. To provide wilderness paddling experiences, a few segments would seasonally be treated as backcountry (nonmotorized) zones as well as seasonal slow speed zones to provide a variety of possible experiences in this part of the park.	The route would be unmarked. Except for existing idle speed, no-wake areas, the entire Everglades Paddling Trail would be in the boat access zone.	This route would be minimally marked. To provide wilderness paddling experiences, some segments would be designated idle speed, no-wake areas or backcountry (nonmotorized) zones. Some segments of the waterway would be in the boat access zone.

NEXT STEPS

Following distribution of the *Final General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement* and a 30-day no-action period, a “Record of Decision” approving a final plan will be

prepared for signature by the NPS regional director. The “Record of Decision” will document the NPS selection of an alternative for implementation. With the signing of the “Record of Decision,” the plan can be implemented.

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INTRODUCTION

1



Ernest Coe Visitor Center - interpretive display



The rare Atala Hairstreak butterfly

A GUIDE TO THIS DOCUMENT

This *Final General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement* is organized in accordance with Council on Environmental Quality (CEQ) implementing regulations for the National Environmental Policy Act of 1969, as amended (NEPA), the National Park Service (NPS) Program Standards for Park Planning, and NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*.

Chapter 1: Introduction sets the framework for the plan and wilderness study. It describes why the plan and wilderness study are being prepared and what they must address. It gives guidance for the alternatives that are being considered, which are based on the legislated purpose of the park, the significance of its resources, special mandates, and servicewide laws and policies.

This chapter also details the planning issues that were raised during scoping and initial planning; the alternatives in the next chapter address these issues and concerns to varying degrees.

Chapter 2: Alternatives, Including the Preferred Alternative, begins with introductory sections and then describes the management zones that will be used to guide management of the national park in the future. Next, four management alternatives are described: alternative 1 (the no-action or "business as usual" alternative), the NPS preferred alternative, alternative 2, and alternative 4. The alternatives are followed by sections on user capacity and mitigation measures for minimizing or eliminating the impacts of some proposed actions. Next are the evaluation of the environmentally preferred alternative and a discussion of

alternatives or actions that were dismissed from detailed evaluation. The chapter concludes with summary tables of the alternatives and the environmental consequences of implementing those alternatives.

Chapter 3: East Everglades Wilderness Study and Proposal provides background information about wilderness, describes the wilderness options analyzed in this wilderness study (including the preferred option), and briefly describes the implications of managing lands that are proposed for wilderness.

Chapter 4: Affected Environment describes those areas and resources that would be affected by implementing actions in the various alternatives; natural resources, cultural resources, visitor use and experience, park operations, and the socioeconomic environment are included. This chapter also lists topics that were eliminated from detailed analysis in the document.

Chapter 5: Environmental Consequences analyzes the impacts of implementing the alternatives. Methods that were used for assessing the intensity, type, and duration of impacts are outlined at the beginning of the chapter.

Chapter 6: Consultation and Coordination describes the history of public and agency coordination during the planning effort; it also lists agencies and organizations that will receive copies of the document.

The **Appendixes** present supporting information for the document along with references and a list of the planning team and other consultants.

BACKGROUND

This *Final General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement* presents and analyzes four alternative ways of managing Everglades National Park (or the park), including alternative 1 (the no-action alternative) and the National Park Service's (NPS) preferred alternative. The potential environmental impacts of each alternative have been identified and assessed.

General management plans (GMPs) are intended to be long-term documents that establish and articulate a management philosophy and framework for decision making and problem solving in national park system units. The general management plan for Everglades National Park will likely provide guidance for a 20- to 30-year time frame. Decisions about how specific programs and projects are implemented will be addressed during more detailed planning efforts that follow this general management plan.

Approval of this plan will not guarantee that the funding and staff needed to implement the plan will be forthcoming. However, projects identified in an approved general management plan carry more weight during NPS decision making and funding allocations. Full implementation of the approved plan could take many years. Implementation of the approved plan could also be affected by factors other than funding and staffing. Once the general management plan has been approved, additional feasibility studies and more detailed planning and environmental documentation will be conducted, as necessary, before proposed actions are implemented.

BRIEF HISTORY AND DESCRIPTION OF THE PARK

Everglades National Park was authorized by Congress in 1934. A fundamental purpose for the park's establishment was provided in the enabling legislation (also see appendix A):

The said area or areas shall be permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in this area.

Because park lands could be acquired only through public or private donation, land acquisition proceeded slowly over the ensuing years. Through the sustained efforts of many supporters, and critical funding provided by the state of Florida, the park was eventually established 13 years later. President Harry S. Truman dedicated the park on December 6, 1947, in Everglades City.

From the original 460,000 acres at the time of the park's establishment in 1947, boundary changes expanded the park to 1.4 million acres by 1958. The Everglades National Park Protection and Expansion Act of 1989 added the East Everglades (109,506 acres) portion of the park, bringing the Northeast Shark River Slough within the park boundaries (see "Region/Vicinity" map). This East Everglades Addition (or the Addition) has provided the cornerstone of long-range planning to restore more natural hydrologic conditions and revitalize wildlife habitat and ecosystem health. The 1989 act also authorized modifications to the Central and Southern Florida Project to restore, to the extent practicable, more natural flows of water into

the park, and included flood protection provisions for adjacent agricultural and residential areas. The State of Florida subsequently donated some 44,000 acres to the park in a series of transfers in 1991, 1993, and 2003, including the Chekika State Recreation Area and over 40% of lands that comprise the East Everglades Addition. The park now encompasses 1,509,000 acres, including the largest legislated wilderness area (1,296,500 acres) east of the Rocky Mountains.

The park preserves a large portion of the remaining portion of the Everglades, a vast “River of Grass” that originally extended from Lake Okeechobee to the Gulf of Mexico and Florida Bay. The park has received international recognition as a World Heritage Site, an International Biosphere Reserve, and a Wetland of International Importance. In 1978, Congress designated almost 1.3 million acres of wilderness in Everglades National Park under the terms of the Wilderness Act. This wilderness was designated the Marjory Stoneman Douglas Wilderness Area in 1997.

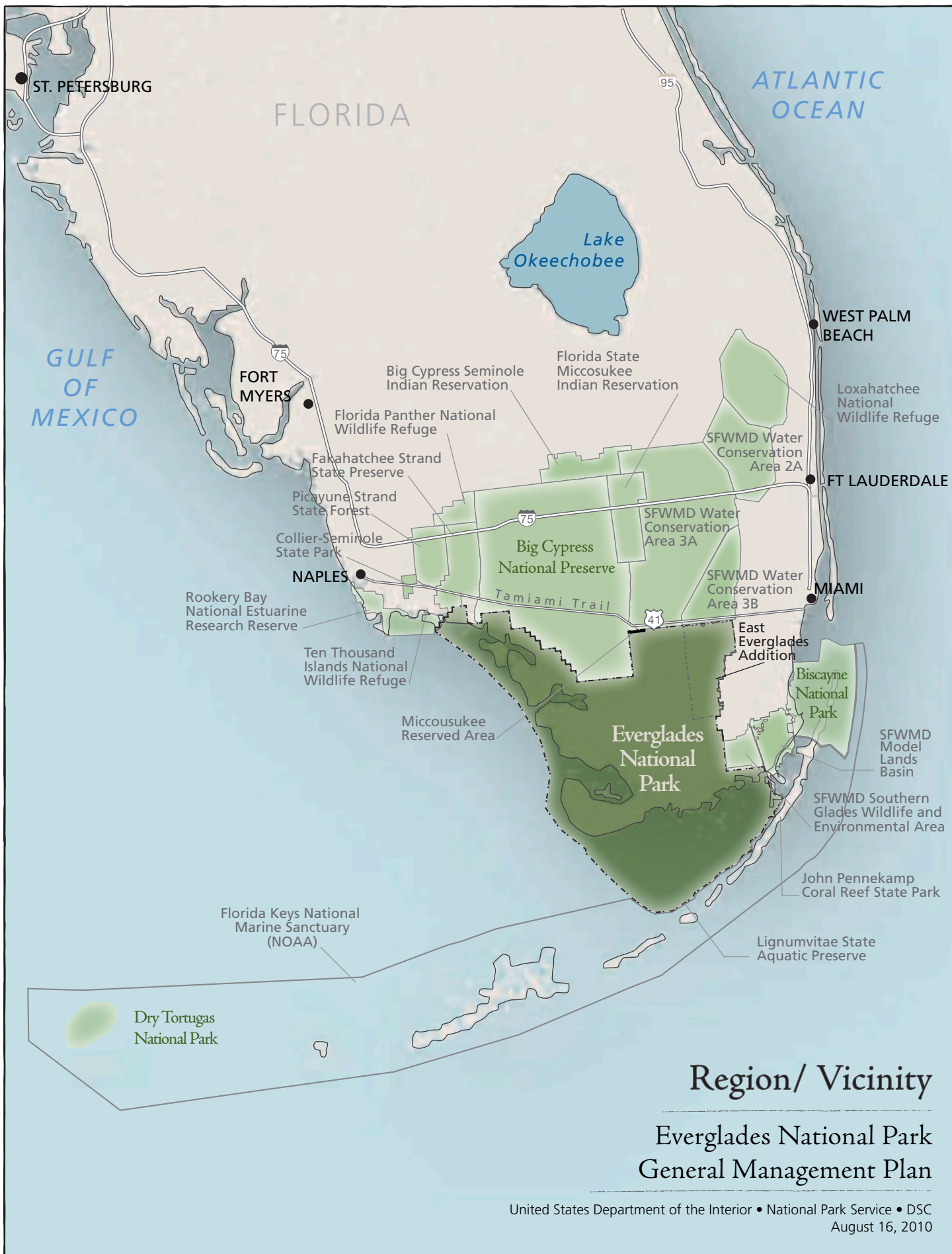
Ongoing public concern regarding regional development and ecosystem degradation have galvanized efforts among various governmental and nongovernmental organizations to work toward a balanced and sustainable south Florida ecosystem. Among these efforts, the South Florida Ecosystem Restoration Task Force, a consortium of federal and state agencies, local governments, and tribal representatives, was established by Congress in 1996. In 2000, the Comprehensive Everglades Restoration Plan (CERP) was approved, resulting in unprecedented focus on Everglades National Park and the south Florida region. Numerous CERP projects scheduled for implementation over the next 30 years will affect hydrology, natural habitats, infrastructure, land ownership, cultural resources, and relationships in and around Everglades National Park. Restoration efforts have raised public awareness of issues within and around the park and changed the context for discussion of many issues affecting the park.

Everglades National Park was the first national park in the United States set aside solely for its biological resources rather than its scenic or historic values. The park was established as a permanent wilderness, preserving essential primitive conditions, including the natural abundance, diversity, behavior, and ecological integrity of unique flora and fauna. More than 60 years later, protection of the park’s natural resources and of the ecosystem remains a primary focus of park management.

The most meaningful and effective way to understand and appreciate Everglades National Park is through exploration, education, and recreation within the vast subtropical wilderness. A wide variety of recreational opportunities is available to visitors. Popular activities include wildlife viewing, nature hikes, fishing, camping, bicycling, motorboating, and canoeing. The 99-mile-long Wilderness Waterway that runs through the western portion of the park offers outstanding backcountry boating and camping experiences. This water trail is used by canoers, kayakers, and powerboaters and terminates at Flamingo. Most paddlers allow at least eight days to complete the trip. Other attractions include a tram tour and wildlife viewing at Shark Valley and participation in ranger-led interpretive programs.

From initial settlement by American Indian tribes about 6,000 years ago to more recent use of Everglades resources throughout the 20th century, the complete story of Everglades National Park includes links between natural resources and human use (including historic and prehistoric use) of the area.

Protection of the park’s cultural resources (archeological sites, landscapes, structures, ethnographic resources) and the stories of connecting people, places, and events are also an important part of the park mission. Park managers seek to protect these resources and tell the stories so that all who visit Everglades National Park can better understand it in its full context.



PURPOSE AND NEED FOR THE GENERAL MANAGEMENT PLAN AND WILDERNESS STUDY

PURPOSE AND NEED FOR THE GENERAL MANAGEMENT PLAN

The approved general management plan will be the basic document for guiding the management of Everglades National Park for the next 20 to 30 years. The purposes of this general management plan are as follows:

- Confirm the purpose, significance, and special mandates of Everglades National Park.
- Clearly define resource conditions and visitor uses and experiences to be achieved in the national park.
- Provide a framework for park managers to use when making decisions about how to best protect resources, how to provide quality visitor opportunities, how to manage visitor use, and what kinds of facilities, if any, to develop in/near the national park.
- Ensure that this foundation for decision making has been developed in consultation with interested stakeholders and adopted by NPS leadership after an adequate analysis of the benefits, impacts, and economic costs of alternative courses of action.

Legislation establishing the National Park Service as an agency and governing its management provides the fundamental direction for the administration of Everglades National Park (and other units and programs of the national park system). The alternatives in this general management plan address the desired future conditions that apply relevant law, regulation, and policy in the park and that must be determined through a planning process.

The general management plan does not describe how particular programs or projects should be implemented. Those decisions will be addressed in future, more detailed planning efforts. All future plans will tier from the approved general management plan.

This new management plan for Everglades National Park is needed because the last comprehensive planning effort for the park was completed in 1979. Much has occurred since then—patterns and types of visitor use have changed, the *Comprehensive Everglades Restoration Plan* was approved, and the national park boundary was increased in 1989 with the 109,506-acre East Everglades Addition. Recent studies have enhanced NPS understanding of resources (including identification of several significant historic structures and cultural landscapes), resource threats, and visitor use in the national park. Each of these changes has major implications for how visitors access and use the park and the facilities needed to support those uses, how resources are managed, and how the National Park Service manages its operations.

A general management plan is also needed to meet the requirements of the National Parks and Recreation Act of 1978 and NPS policy, which mandate updated general management plans for each unit in the national park system.

PURPOSE AND NEED FOR THE WILDERNESS STUDY

This document includes a wilderness study for the 109,506-acre East Everglades Addition, which was added to the park in 1989. The wilderness study evaluates these lands for possible recommendation to Congress for inclusion in the national wilderness preservation system. A study is needed because the Wilderness Act of 1964,

Secretarial Order 2920, and NPS *Management Policies 2006* require the National Park Service to study roadless and undeveloped areas within the national park system, including new areas or expanded boundaries, to determine whether they should be designated as wilderness. The East Ever-glades Addition is the only area of the national park that has not been the subject of a wilderness study.

Wilderness studies assess the lands to determine if they possess wilderness characteristics and then propose all, some, or none of the eligible lands for designation as wilderness. Chapter 3 of this document explains what wilderness is, discusses the wilderness study and proposal in detail, and

provides related background information about wilderness at Everglades National Park.

THE NEXT STEPS

Following distribution of the *Final General Management Plan / Environmental Impact Statement* and a 30-day no-action period, a “Record of Decision” approving a final plan will be prepared for signature by the NPS regional director. The “Record of Decision” will document the NPS selection of an alternative for implementation. With the signing of the “Record of Decision,” the plan can be implemented.

PLANNING ISSUES AND CONCERNS

INTRODUCTION

NPS staff; representatives from county, state, and other federal agencies and organizations; American Indian tribes; and members of the general public identified various issues and concerns during scoping (early information gathering) for this general management plan. Here, an issue is defined as an opportunity, conflict, or problem regarding the use or management of public lands. Comments were solicited at public meetings, through GMP newsletters, and on the park's website (see "Chapter 6: Consultation and Coordination").

Comments received during scoping demonstrated that there is much that the public likes about the park—its management, use, and facilities. The issues and concerns generally involve determining the appropriate visitor use, types, and levels of facilities, services, and activities while remaining compatible with desired resource conditions. The GMP alternatives provide strategies for addressing the issues within the context of the park's purpose, significance, and special mandates.

ISSUES

The major issues that were raised regarding the general management plan, discussed below in no particular order, include management of new park lands; wilderness; boating; appropriate type and level of visitor facilities; park stewardship for both natural and cultural resources, partnerships, and constituents; efficient and effective park operations; and climate change.

Management of New Park Lands (East Everglades Addition)

Although acquisition of the East Everglades Addition was authorized by Congress in 1989, it has taken many years for land parcels in this area to be acquired by the National Park Service. This plan needs to provide management direction, in the context of Everglades National Park as a whole, for resource protection, visitor enjoyment, facilities, and NPS operations in the Addition. This includes decisions, consistent with the Everglades National Park Protection and Expansion Act of 1989, about whether commercial airboat tours should continue and where private airboating should be allowed within the East Everglades Addition.

Wilderness

Everglades National Park includes vast areas of designated wilderness, including submerged marine wilderness. Lands added to the park by the Everglades National Park Protection and Expansion Act of 1989 have not been previously considered for wilderness designation. The National Park Service needs to determine (a) the general direction of wilderness management for existing wilderness, and (b) through a formal wilderness study, whether any areas within the East Everglades Addition should be proposed for wilderness.

Boating

This issue focuses on how Everglades National Park can provide opportunities for high-quality boating experiences (motorized and nonmotorized) while protecting and ensuring long-term sustainability of natural and cultural resources. The general management plan needs to consider and

decide on ways to balance the desires of some users for unconstrained access to all marine waters with the need to accommodate user groups who value different kinds of experiences—all while protecting the resources for which the park was established (including submerged marine wilderness).

Appropriate Type and Level of Visitor Facilities

This issue addresses the question of the appropriate balance of visitor facilities that should be provided. What general types and intensities of development (visitor contact stations, backcountry campsites, etc.) are needed to provide for public enjoyment of the park? Some people support additional facilities in some areas to improve the quality of the visitor experience, as well as supporting additional visitation. Others are concerned that such facilities would change visitor experience, increase impacts on the resources, and increase NPS costs and operational requirements. Where and what type of facilities are needed to permit visitors of varying abilities, experience levels and interests, and amounts of time to learn about and experience the Everglades?

Park Stewardship and Partnerships

It is to the national park's long-term benefit to build and strengthen people's stewardship of the park and its resources. This issue focuses on what opportunities exist to increase the diversity of park visitors to better reflect the diversity of the region and nation, how the park can involve those who know and care about the park in management decisions that affect them, and what opportunities exist to use partnerships to help address budget and staffing constraints and to meet mutual goals.

Effective and Efficient Park Operations

This issue focuses on whether existing administrative, operational, and visitor service facilities are functioning effectively and efficiently, meeting the needs of both park staff and visitors. The fact that Everglades National Park encompasses more than 2,300 square miles poses great challenges for park rangers, interpreters, maintenance staff, and resource managers. This issue also addresses what facility improvements are needed, if any, to make park operations and visitor services more efficient, effective, and sustainable.

Crowding and User Capacity

Some visitor facilities and areas of the national park (e.g., Shark Valley) are crowded and congested during certain times of the year (peak winter months). Crowding and congestion affects visitor services, strains park infrastructure, and may harm natural and cultural resources. A general management plan must deal with issues of crowding and provide general direction for addressing user capacity at locations throughout the national park.

Climate Change

The National Park Service recognizes that the major drivers of climate change are outside the control of the agency. However, climate change is a phenomenon whose impacts throughout the national park system cannot be discounted. The National Park Service has identified climate change as one of the major threats to natural resources within park units, and has developed a Climate Change Response Strategy (NPS 2010b) that focuses on science, adaptation, mitigation, and communication.

The effects of climate change on national parks are beginning to emerge as both science and impacts become clearer. Climate change is included in this document to recognize its role

in the changing environment of the national park. Although climate change is a global phenomenon, it manifests differently depending on regional and local factors. Climate change is expected to result in many changes to the Atlantic coast, including the Gulf Coast of the United States, including warming ocean waters, hotter summer temperatures, sea level rise, and more intense hurricane activity. Vulnerability of the Everglades area to sea level rise is rated moderate to high, based on the U.S. Geological Survey Coastal Vulnerability Index (USGS 1999). In addition, climate change is expected to affect the park's weather, resources (e.g., shorelines, vegetation, wildlife, historic sites, and archeological resources), and visitor use patterns. These changes will have direct implications on resource management, park operations, construction of new maintenance facilities and on visitor use and experience.

Some of these impacts are already occurring or are expected in Everglades National Park in the time frame of this management plan. There are two main issues to consider with respect to climate change in this plan: (1) the contribution of the proposed project to climate change such as greenhouse gas emissions and the carbon footprint; and (2) the anticipated effects of climate change on park resources and facilities that are impacted

by the management alternatives. Because the contribution of the proposed project to climate change is negligible under any alternative, the former issue has been dismissed as an impact topic and discussed in the mitigation measures portion of chapter 2 of the plan.

ISSUES NOT ADDRESSED IN THIS PLAN

Ecosystem Restoration

In order not to be redundant with other major ecosystem efforts, this plan does not specifically analyze ecosystem restoration projects underway or anticipated. Rather, this entire plan was developed considering large-scale restoration efforts that are underway for the Everglades ecosystem. This plan complements projects and activities that are focused on this critical aspect of improving the health and natural functions of the park and other south Florida ecosystem resources. See the section of this chapter titled "Relationship of the General Management Plan to Other Planning Efforts" for a discussion of Everglades ecosystem restoration efforts. More detailed information is available on the park's website.

GUIDANCE FOR THE PLANNING EFFORT

The direction for the alternatives considered in this plan is based on the park's purpose and significance, special mandates, and servicewide laws and policies. The purpose statements describe why the Everglades were established as a national park. The significance section describes the qualities that make the national park special. Special mandates and servicewide laws and policies help to further define the sideboards for the plan.

PARK PURPOSE

The purpose statement conveys the reasons that the area was set aside as a national park. Grounded in an analysis of park legislation and legislative history, purpose statements also provide primary criteria against which the appropriateness of plan recommendations, operational decisions, and actions are tested.

The purpose of Everglades National Park is as follows:

Everglades National Park is a public park for the benefit and enjoyment of the people. It is set apart as a permanent wilderness preserving essential primitive conditions, including the natural abundance, diversity, behavior, and ecological integrity of the unique flora and fauna.

PARK SIGNIFICANCE

Significance statements capture the essence of the national park system unit's importance to the nation's natural and cultural heritage. They describe the unit's distinctiveness and describe why an area is important within regional, national, and global contexts. These statements help managers focus their efforts

and limited funding on protection and enjoyment of attributes that are directly related to the purpose of the park unit.

Everglades National Park is nationally and internationally significant because

- It is a unique subtropical wetland that is the hydrologic connection between central Florida's freshwater ecosystem and the marine systems of Florida Bay and the Gulf of Mexico. It is the only place in the United States jointly designated an Inter-national Biosphere Reserve, a World Heritage Site, and a Wetland of International Importance.
- It comprises the largest subtropical wilderness reserve in North America. The park contains vast ecosystems, including freshwater marshes, tropical hardwood, pine rockland, extensive mangrove estuaries, and seagrasses, which support a diverse mix of tropical and temperate plants and animals.
- It serves as sanctuary for the protection of more than 20 federally listed and 70 state-listed threatened and endangered species, as well as numerous species of special concern. Many of these species face tremendous pressure from natural forces and human influences in the south Florida ecosystem.
- It provides important foraging and breeding habitat for more than 400 species of birds (including homeland to world-renowned wading bird populations), and functions as a primary corridor and refuge for migratory and wintering wildlife populations.
- It includes archeological and historical resources spanning approximately

6,000 years of human history, revealing adaptation to and exploitation of its unique environment.

- It preserves natural and cultural resources associated with the homeland of American Indian tribes of Florida (including the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, and other American Indian groups such as the Council of the Original Miccosukee Seminole Nation Aboriginal People).
- It preserves the remnants of a nationally significant hydrologic resource that sustains south Florida's human population and serves as a global experiment in restoration.
- It provides the public with the opportunity to experience Everglades wilderness for recreation, reflection, and solitude in proximity to a major metropolitan area.

PRIMARY INTERPRETIVE THEMES

Primary interpretive themes are those ideas and concepts about Everglades National Park that are key to helping visitors gain an understanding of the park. The themes, which are based on the park's purpose and significance, provide the foundation for all interpretive media and programs in the park. The themes do not include everything that may be interpreted, but rather they identify the ideas that are essential to understanding and appreciating the park's importance.

Interpretive themes for Everglades National Park are as follows:

- Everglades National Park serves as a dynamic laboratory for innovative scientific investigations that identify and monitor a vast array of fragile and unique resources. The revelations

from this work inform good environmental decision making throughout the world, which protects ecosystems subject to the needs and desires of human populations.

- The water-dominated landscape of the Everglades has offered a myriad of experiences, challenges, and opportunities to humans that have inhabited this place for approximately the last 6,000 years.
- The Everglades landscape is of great cultural importance to distinct groups of past and present American Indians. Historically, these parklands served as a home; a source of abundant natural and cultural resources; a place of refuge; and today a reminder of past and present challenges, trials, and injustices.
- The greater Everglades ecosystem is the liquid heart of south Florida, where the seasonal ebb and flow of water over unique geography defines the environment, supports the region's web of life, and challenges humans to comprehend their relationship to nature and wilderness.
- Everglades National Park provides an opportunity for people to understand and experience the value of a diverse wilderness in proximity to extensive development. The park's designation as a World Heritage Site, an International Biosphere Reserve, and a Wetland of International Importance attests to its importance as a benchmark for monitoring environmental impact and revealing change.
- The diverse habitats and protected status of Everglades National Park, both temperate and tropical, demonstrate the park's value as an important sanctuary, in an increasingly urbanized landscape, for wild animals, plants, and birds. Species, from those most common to those highly endangered, reveal life histories that are intimately tied to

these places' natural cycles of abundance, flood, fire, hurricane, drought, life, and death.

SPECIAL MANDATES

Special mandates are legislative or judicial requirements that are specific to a particular unit of the national park system. They are typically mandated by Congress or by the courts. Special mandates for Everglades National Park are listed below.

Preservation of Primitive Conditions

Everglades National Park shall be permanently reserved as a wilderness, and no development project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in this area.

(1934 park enabling legislation)

Ecosystem Protection

The purposes of this Act are to . . . assure that the park is managed in order to maintain the natural abundance, diversity, and ecological integrity of native plants and animals, as well as the behavior of native animals, as a part of their ecosystem.

(Everglades National Park Protection and Expansion Act of 1989)

Reserved Area Protection

The purposes of this act are as follows: (1) to replace the special use permit with a legal framework under which the tribe can live permanently and govern their own affairs in a modern community within the park, (2) to

protect the park outside the boundaries of the Miccosukee Reserved Area from adverse effects of structures or activities within that area, and (3) to support restoration of the South Florida ecosystem, including restoring the environment of the park.

(Miccosukee Reserved Area Act, October 30, 1998, Public Law 105-313)

Designated Wilderness

In 1978, a 1,296,500-acre designated wilderness area that includes land, freshwater, and submerged marine areas was established within Everglades National Park; the wilderness was originally named "Everglades Wilderness" (National Parks and Recreation Act of 1978). The name of the wilderness area was later changed to "Marjory Stoneman Douglas Wilderness."

(Marjory Stoneman Douglas Wilderness and Ernest F. Coe Visitor Center Designation Act of 1997)

Commercial Airboating

The secretary is authorized to negotiate and enter into concession contracts with the owners of commercial airboat and tour facilities in existence on or before January 1, 1989, located within the [East Everglades Addition] for the provision of such services at their current locations under such rules and conditions as [s]he may deem necessary for the accommodation of visitors and the protection of biological resources of the area.

(Everglades National Park Protection and Expansion Act of 1989)

The available legislative history on Public Law 101-229 provides additional insight into the meaning and intent of this provision on commercial airboats. Especially helpful was a document prepared by U.S. Department of the Interior (USDI) legislative counsel,

included in a report on the Senate hearing of the bill that ultimately was enacted. This document indicated that owners of legitimate commercial airboat and tour facilities in existence on or before January 1, 1989, would be afforded the opportunity to negotiate and enter into a concession contract with the National Park Service.

Private Airboating

The park shall be closed to the operation of airboats . . . except that within a limited capacity and on designated routes within the [East Everglades Addition], owners of record of registered airboats in use within the Addition as of January 1, 1989, shall be issued nontransferable, nonrenewable permits, for their individual lifetimes, to operate personally owned airboats for noncommercial use in accordance with rules prescribed by the Secretary [of the Interior] to determine ownership and registration, establish uses, permit conditions, and penalties, and to protect the biological resources of the area

(Everglades National Park Protection and Expansion Act of 1989)

Marjory Stoneman Douglas (Gulf Coast) Visitor Center

The Secretary [of the Interior] is authorized and directed to expedite the construction of the visitor center at Everglades City, Florida, as described in the Development Concept Plan, Gulf Coast (dated February 1989) and shall designate the visitor center as the “Marjory Stoneman Douglas Center” in commemoration of the vision and leadership shown by Mrs. Douglas in the protection of the Everglades.

(Everglades National Park Protection and Expansion Act of 1989)

Tarpon Basin

In March 2009, the Everglades National Park boundary was expanded by the Omnibus Public Land Management Act of 2009 to include the nearly 600-acre Tarpon Basin parcel (Tarpon Basin) in Key Largo, Florida. Tarpon Basin is adjacent to Everglades National Park and Florida Bay, along the Intracoastal Waterway in Key Largo. It consists of about 590 acres of mangrove forest and coastal shoreline and 10 acres of tropical hardwood hammock. In June 2010, the National Park Service acquired Tarpon Basin from The Nature Conservancy. This Addition to the national park will help protect mangrove forest, coastal wetlands, native hardwood hammock vegetation, and wildlife habitat, including habitat for several threatened and endangered species (the American crocodile, manatee, roseate spoonbills, and several species of sea turtles).

East Everglades Operations Center

Public Law 108-483, passed in 2004, authorized the National Park Service to “acquire . . . not more than 10 acres of land located outside the boundary of the park and adjacent to or near the East Everglades area of the park for the development of administrative, housing, maintenance, or other park purposes.” Everglades National Park has acquired a site close to the park boundary near Chekika, which will be used to support park administration and operational needs in the East Everglades.

Service-wide Laws and Policies

Many park management directives are specified in laws and policies guiding the National Park Service. For example, there are laws and policies about managing environmental quality such as the Clean Air Act, the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, and Executive Order 11990, “Protection of Wetlands”; laws governing the

preservation of cultural resources such as the National Historic Preservation Act of 1966, as amended (NHPA), and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA); and laws about providing accessible public services such as the Architectural Barriers Act of 1968, as amended (ABA)—to name only a few. In other words, a general management plan is not needed to decide that it is appropriate to protect endangered species, control invasive nonnative species, protect historic and archeological sites, conserve artifacts, or provide for access for persons with disabilities. Laws and policies have already set the direction for those and many other management considerations within the park. Although the National Park Service strives to meet the resource conditions set forth in laws and policies with or without a new GMP and as quickly as funding or staffing limitations allow, the general management plan is critical in providing long-term guidance on how we comply with laws and policies.

There are other laws and executive orders that are applicable solely or primarily to units of the national park system. These include the 1916 Organic Act that created the National Park Service, the General Authorities Act of 1970, the Redwoods Act of 1978 (relating to the management of the national park system), and the National Park Service Concessions Management Improvement Act of 1998.

The NPS Organic Act (16 *United States Code* [USC], section 1) provides the fundamental management direction for all units of the national park system

[P]romote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . by such means and measure as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them

unimpaired for the enjoyment of future generations.

The National Park System General Authorities Act (16 USC 1a-1 et seq.) affirms that while all national park system units remain “distinct in character,” they are “united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage.” The act makes it clear that the NPS Organic Act and other protective mandates apply equally to all units of the national park system. Further, amendments state that NPS management of park units should not “derogat[e] . . . the purposes and values for which these various areas have been established.”

The Redwoods Act of 1978 reasserted the systemwide standard of protection established by Congress in the original Organic Act. It stated

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

The National Park Service Concessions Management Improvement Act of 1998, together with NPS regulations promulgated thereunder, governs the provision of

commercial visitor services, called concessions, in the national parks. This law replaced the original National Park System Concessions Policy Act of 1965. The 1998 act, like the 1965 act before it, states that, as a matter of policy, concessions are to be limited to those that are “necessary and appropriate for public use and enjoyment” and are “consistent to the highest practicable degree with the preservation and conservation of the resources and values” of the park. Among other provisions, the new law governs NPS contracting for concession services in the parks, payments from concessioners to the National Park Service in return for the privilege to do business within a unit of the national park system, and the transfer of concessions contracts or permits.

The National Park Service also has established policies for all units under its stewardship. These are identified and explained in a guidance manual entitled *NPS Management Policies 2006*. The alternatives considered in this document incorporate and comply with the provisions of these mandates and policies.

Impairment of National Park Resources

In addition to determining the environmental consequences of implementing the alternatives, *NPS Management Policies 2006* (section 1.4) requires analysis of potential effects to determine whether alternatives would impair the park’s resources and values.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on resources and values. Although Congress has given the National Park Service

the management discretion to allow certain impacts within a unit, that discretion is limited by the statutory requirement that the National Park Service must leave resources and values unimpaired unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of resources and values, including the opportunities that otherwise would be present for the enjoyment of those resources or values (*NPS Management Policies 2006* section 1.4.5). An impact on any resource or value may constitute impairment. An impact would be more likely to constitute impairment if it results in a moderate or major adverse effect on a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the area;
- key to the natural or cultural integrity of the area or to opportunities for enjoyment of the area; or
- identified as a goal in the area’s general management plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the area; visitor activities; or activities undertaken by concessioners, contractors, and others operating in the park. An evaluation of impairment is not required for topics related to visitor use and experience (unless the impact is resource based), NPS operations, or the socioeconomic environment. When it is determined that an action or actions would have a moderate to major adverse effect, an explanation is presented for why this would not constitute impairment. Impacts of only negligible or minor intensity would, by definition, not result in impairment.

DESIRED CONDITIONS AND STRATEGIES

This section focuses on parkwide desired conditions and strategies to guide management of Everglades National Park. These desired conditions and strategies guide actions taken by NPS staff on such topics as natural and cultural resource management, park facilities, and visitor use management. Each topic discussed below has two parts: (1) desired conditions for that topic (in italics), and (2) broad strategies that may be used to achieve those desired conditions.

Desired conditions articulate the ideal conditions the National Park Service is striving to attain. The term desired conditions is used interchangeably with goals. Desired conditions provide guidance for fulfilling the park's purpose and for maintaining the park's significance on a parkwide basis.

The strategies describe actions that could be used by the National Park Service (and/or its partners) to achieve the desired conditions. Most of these strategies are already being implemented. Those not already being implemented are consistent with NPS policy, are not believed to be controversial, and require no analysis and documentation under the National Environmental Policy Act (or analysis and documentation, if necessary, would be completed separately from this *General Management Plan / Wilderness Study / Environmental Impact Statement*). This is not an exhaustive list of strategies. As new ideas, technologies, and opportunities arise, they will be considered if they further support the desired conditions.

The parkwide desired conditions and strategies in this section, combined with the management actions that are specific to the management alternative ultimately selected for implementation (see chapter 2), will form the complete general management plan for Everglades National Park.

ECOSYSTEM MANAGEMENT

Desired Conditions

Marine, estuarine, freshwater, and terrestrial habitats are managed from an ecosystem perspective, considering both internal and external factors affecting visitor use, environmental quality, and resource stewardship. Management decisions about ecosystems are based on scholarly and scientific information. Resources and visitation are managed in consideration of the ecological and social conditions of the national park and surrounding area. NPS managers adapt management strategies to changing ecological and social conditions and are partners in regional land planning and management. NPS staff demonstrates leadership in resource stewardship and conservation of ecosystem values.

Strategies

- Continue to participate in and encourage ongoing partnerships with local, state, and federal agencies, and nongovernmental organizations in programs that have importance within and beyond park boundaries.
- Central to ecosystem management is long-term monitoring of changes in the condition of cultural and natural resources and related human influences. Improvement or degradation of resources and visitor experience cannot be determined with any certainty without a monitoring program. To protect, restore, and enhance park resources within and around the national park, NPS staff will do the following:
 - Continue to play a key role in implementation of the Comprehensive Ecosystem Restoration Plan.

- Initiate or continue long-term monitoring of resources and visitor use, including use of visitor experience and resource protection framework or other user capacity process, as appropriate.
 - Promote research to increase understanding of national park resources, natural processes, and human interactions with the environment with emphasis on significant resources.
 - Ensure baseline and ongoing monitoring data, including associated specimens, are preserved and remain accessible.
 - Practice science-based decision making and adaptive management, incorporating the results of resource monitoring and research into NPS operations.
 - Identify lands/waters outside the national park where ecological processes and human use affect park resources or are closely related to park resource management considerations; initiate joint research, monitoring, management actions, agreements, or partnerships to promote resource conservation.
- Work to protect the values of marine and estuarine resources, including preservation of fundamental physical and biological processes.
 - Provide education and outreach programs to highlight conservation and management issues facing the park and related lands and encourage partners who are able to assist with ecosystem stewardship.
 - Continue to restore disturbed sites.
 - Strive to control invasive nonnative species in coordination with adjacent landowners, other agencies, and NPS staff specialists.

NATURAL RESOURCES (GENERAL) AND BIOLOGICAL DIVERSITY

Desired Conditions

The resources and processes of the national park retain a significant degree of ecological integrity. Management decisions about natural resources are based on scholarly and scientific information and on the national park's significant resources. Park resources and values are protected through collaborative efforts with neighbors and partners. Visitors and employees recognize and understand the value of the park's natural resources. Human impacts on resources are monitored, and harmful effects are minimized, mitigated, or eliminated.

Biologically diverse native communities are protected and restored when possible. Particularly sensitive communities are closely monitored and protected. Endemic species and habitats are fully protected; invasive nonnative species are controlled; and native species are reintroduced when conditions allow. Genetic integrity of native species is protected. Threatened and endangered species are protected to the greatest extent possible and are generally stable or improving. Natural fire regimes are investigated and supported where possible.

Strategies

- Continue to inventory biotic and abiotic resources in the national park and assess their status and trends.
- Continue long-term systematic monitoring of key indicators or ecosystem conditions to track ecosystem health, detect natural and human-caused trends, document changes in species or communities, evaluate the effectiveness of management plans and restoration projects, and mitigate impacts where possible.
- Implement and keep current a cooperative wildland fire management plan that includes interagency participation to maintain conditions

within the natural range as much as possible.

- Work in consultation with American Indian tribes to identify, evaluate, and determine appropriate treatment for park resources traditionally used or procured by American Indian tribes.
- Inventory human-made structures and modifications, and remove those that do not contribute to the purposes or management of the park or are judged to be unsafe provided they have been determined not to have cultural significance.
- Manage, control, or eradicate invasive nonnative species where prudent and feasible.
- Provide information to adjacent property owners about natural processes, wildlife, invasive nonnative species, critical habitats, and threats to resources.
- Conserve and restore habitats for threatened and endangered species and species of special concern.
- In conjunction with other NPS offices, continue to expand the park's data management systems for analyzing, modeling, predicting, and testing trends in resource conditions.
- Regularly update the park's resource stewardship strategy.
- Apply mitigation techniques to minimize impacts of construction and other activities on park resources.
- Continue to educate staff, visitors, and the public about the significance of natural resources and major threats to these resources.
- Continue to participate in the NPS South Florida and Caribbean Inventory and Monitoring Network.
- Work with neighboring agencies and partners to monitor vital components of the ecosystem to better assess its condition and trends.

Air Quality

Desired Conditions

Everglades National Park is a class I area under the Clean Air Act. This designation permits the least degradation of air quality and air quality-related values including visibility. The air quality of the national park is enhanced or maintained.

Strategies

- Continue to monitor and record air pollution levels and analyze changes and trends over time.
- Monitor and reduce emissions, as possible, from NPS administrative activities. Use clean air technologies for administrative and operational uses.
- Require bus tour companies to turn off engines when buses are parked to reduce emissions.
- Continue to participate in regional air quality planning and research and implementation of air quality standards.
- Pursue regional partnerships for development of alternative transportation systems and clean fuels that improve air quality.
- Conduct fire management activities in compliance with regional air quality standards and minimize the effects of smoke from prescribed fire activities.

Water Resources and Wetlands

Desired Conditions

Hydrologic conditions within Everglades National Park and the south Florida ecosystem are characteristic of the natural ecosystem prior to European American intervention, including water quality, quantity, distribution, and timing. Water levels and timing of water deliveries reflect quantities resulting from natural rainfall and are distributed according

to pre-engineered drainage patterns. Water is free of introduced agricultural nutrients and urban-related pollutants.

Strategies

- Continue to monitor water quality and quantity within a local and regional context, and expand monitoring as needed to more fully understand the status and trends of ground and surface water.
- Participate in local, state, and national water quality remediation and watershed planning programs.
- Update strategies for water resources management as needed to reflect changing resources and management issues.
- Continue to inventory wetlands so that important wetland communities can be identified and protected.
- Continue to identify and address threats to wetlands such as invasive nonnative species.
- Continue to assess human-related threats to water quality and quantity.
- Maintain a “no net loss of wetlands” policy, and strive to achieve a longer term goal of net gain of wetlands across the national park system through restoration of previously degraded wetlands.
- Avoid to the extent possible short- and long-term impacts associated with the destruction or modification of wetlands, and avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.
- Compensate for unavoidable adverse impacts to wetlands by restoring wetlands that have been previously degraded.

Vegetation

Desired Conditions

Most of the park is managed to allow natural processes that enhance and maintain native plant communities. Communities include the diverse species and genetics representative of an ecologically functioning subtropical wetland system.

Strategies

- Continue to eradicate invasive nonnative plants in the park. Work with local, state, tribal, and other federal agencies, private landowners, and visitors to minimize introduction and the spread of invasive nonnative plant species into the park and the region.
- Continue to pursue restoration of disturbed lands within the boundary such as the Hole-in-the-Donut. Inventory and prioritize disturbed areas for restoration.
- Continue to use fire as a tool to achieve vegetation management objectives and ensure public safety.
- Develop monitoring programs to detect the effects of human stressors on vegetation and determine natural vegetation dynamics and processes.
- Monitor plant communities to assess their condition. If it is shown that human use is degrading an area, consider a variety of mitigating measures to restore the area to an acceptable condition. Such measures may include establishing trails, delineating or hardening trails, erecting signs or taking other educational measures, restricting access to problem areas, closing problem areas, or restoring degraded areas.

Wildlife

Desired Conditions

Natural wildlife populations and systems are understood and perpetuated. Natural fluctuations in populations are permitted to occur to the greatest extent possible. Natural influences are mimicked if necessary. NPS staff work with neighbors and partners to achieve mutually beneficial goals related to wildlife.

Strategies

- Continue cooperative management of threatened and endangered species within and outside the national park to stabilize or improve the status of these species.
- Continue to cooperate with the Florida Fish and Wildlife Conservation Commission (FWC), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) to better understand populations and determine appropriate management actions for game and nongame species.
- Strive to preserve populations and habitats of migratory species inhabiting the park.
- Cooperate with others to ensure preservation of populations and migratory species outside the park.
- Strive to identify species that have occupied the national park in the past and evaluate the feasibility and advisability of reintroducing extirpated species.
- Continue to educate visitors and the public about wildlife issues and concerns.
- Manage populations of invasive nonnative fish and wildlife species wherever such species threaten park resources or public health and when control is prudent and feasible.

Fisheries

Desired Conditions

Native fish populations and habitat are understood and perpetuated. Naturally functioning and healthy fisheries are maintained as an important component of the ecology of Florida Bay and other waters in the park.

Strategies

- Develop and maintain a current fisheries management plan.
- Continue monitoring sport fish populations and implement appropriate harvest and size limits (in cooperation with the Florida Fish and Wildlife Conservation Commission, U.S. Fish and Wildlife Service, and National Marine Fisheries Service) as necessary to meet management goals.
- Continue cooperative management of special status species and essential fish habitat within and outside the national park to stabilize or improve the status of these species and habitat.
- Continue to educate the public about fish management concerns.
- Manage populations of invasive nonnative fish species wherever such species threaten park resources and when such control is prudent and feasible.

Wilderness

Desired Conditions

Wilderness areas retain their wilderness characteristics and values. Visitors find opportunities for primitive recreation and solitude. Wilderness areas are affected primarily by the forces of nature, and signs of people remain substantially unnoticeable.

Strategies

- Develop and maintain a current wilderness stewardship plan for designated wilderness areas to guide preservation, management, and use of these lands.
- Ensure that management decisions affecting wilderness are consistent with the “minimum requirements” concept.
- Manage proposed wilderness areas as wilderness, in keeping with established NPS management policies and Director’s Order 41: *Wilderness Preservation and Management*.
- Establish baseline wilderness character criteria and monitor character trends to maintain or improve the condition of wilderness.

Cultural Resources (General)

Desired Conditions

Cultural resources are identified, evaluated, managed, interpreted, and protected within their broader context. Management decisions about cultural resources are based on scholarly research and scientific information and consultation with the Florida state historic preservation office (SHPO) and with American Indian tribes, and other groups with historic connections to the park, as appropriate. The historic integrity of properties listed in (or eligible for listing in) the National Register of Historic Places is protected. Visitors and employees recognize and understand the value of the park’s cultural resources. Human and natural impacts on cultural resources are monitored, and adverse effects are minimized or eliminated.

Strategies

- Continue to collect information to fill gaps in the knowledge and understanding of the national park’s cultural resources, to assess status and

trends, and to effectively protect and manage cultural resources.

- In accordance with the National Historic Preservation Act, continue to locate, identify, and evaluate cultural resources to determine if they are eligible for listing in the National Register of Historic Places (national register).
- Prepare and update national register nominations as appropriate.
- Update and keep current the park’s Cultural Landscape Inventory, List of Classified Structures (the NPS inventories of evaluated historic and prehistoric structures and landscapes that have historical, architectural, and/or engineering significance), and archeological information system.
- Work in consultation with the Florida state historic preservation office, American Indian tribes, and other interested parties to identify, evaluate, monitor, and determine appropriate treatment for historic structures, archeological sites, traditional cultural properties and other ethnographic resources, and cultural landscapes.
- Conduct scholarly research and use the best available scientific information and technology for making decisions about management of park cultural resources.
- Build a partnership program that considers appropriate adaptive use to maintain historic buildings and cultural landscapes throughout the park.
- Continue to initiate and regularly update plans and prioritize actions needed to protect cultural resources.
- Continue to research, document, catalogue, exhibit, and store the national park’s museum collection according to NPS standards.
- Make the museum collection more accessible for study and for public observation.

- Continue to educate staff, visitors, and the public about cultural and historic issues relating to the park.

Historic Structures

Desired Conditions

The character of historic structures is preserved to retain a high degree of integrity. Whenever possible, adaptive use of historic structures for park needs is considered before building new infrastructure.

Strategies

- Prepare historic structure inventories and reports and amend them as needed. Implement actions identified in historic structure reports and add a record of treatment to the reports.
- Prepare and update national register nominations as appropriate.
- Monitor, inspect, and manage identified and evaluated historic structures to enable long-term preservation of historic features, qualities, and materials.
- Use historic structures as they were historically used, or adaptively use them in ways that are compatible with park purpose and that retain historic materials, features, spaces, and spatial relationships to the extent practicable.
- Consider historic buildings for appropriate adaptive use by other public and private entities to assist in preservation of the structures.
- Create design guidelines and/or historic structure reports for specific areas in the national park to preserve architectural and character-defining features. Include provisions for design review to ensure the compatibility of new planning, design, and construction.
- Preservation maintenance and other approved treatments of historic

structures are conducted in a manner that maintains, to a high degree, the integrity of historic materials and fabric. Involve historical architects and other professionals in work that could affect historic structures.

Cultural Landscapes

Desired Conditions

Everglades National Park's cultural landscapes are preserved to retain a high degree of integrity. (Cultural landscapes reflect human adaptation and use of natural resources and are often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built.)

Strategies

- Prepare cultural landscape inventories and reports and amend existing reports as needed.
- Monitor, inspect, and manage identified and evaluated cultural landscapes to enable long-term preservation of historic features, qualities, and materials.
- Create design guidelines and/or cultural landscape reports for specific developed areas in the national park to preserve character-defining features.
- Implement actions identified in cultural landscape reports and add a record of treatment to the reports.
- Involve cultural landscape specialists in the preparation of plans and specifications for preservation, rehabilitation, and restoration in consultation with park management staff.
- Collaborate with park natural resource staff to develop cultural landscape preservation strategies that complement activities to manage native vegetation and natural processes.

Archeological Resources

Desired Conditions

Archeological resources are identified and preserved. (Archeological resources are the remains of past human activity and records documenting the scientific analysis of these remains. Archeological features are typically buried, but may extend above ground. Although archeological resources are commonly associated with prehistoric peoples, they may also be products of more recent historical activities.) Archeological sites may also represent or be components of historic structures and cultural landscapes.

Strategies

- Conduct sufficient research to identify and evaluate park archeological resources and assess condition and potential threats.
- Continue long-term monitoring of archeological sites to measure deterioration from natural and human sources and to evaluate the effectiveness of management actions to protect resources and mitigate impacts.
- Preserve and protect archeological resources by eliminating and avoiding natural and human impacts, stabilizing sites and structures, monitoring conditions, and enforcing protective laws and regulations.
- Make decisions that promote preservation of archeological resources in place.
- Carry out required consultation and legal compliance and consider concerns raised.
- Include information about archeological resources, as appropriate, in interpretive and educational programs for the public.
- Work with American Indian tribes to identify, evaluate, document, protect, and interpret archeological sites.

Ethnographic Resources

Desired Conditions

Ethnographic resources having cultural importance for associated tribes and other traditionally associated groups are identified and protected. Opportunities remain for tribal members and traditionally associated people to access culturally important places in the park. Ethnographic resources are defined by the National Park Service as any “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 28, Cultural Resource Management Guideline, 181).

Strategies

- Consult with the culturally associated Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, the Seminole Nation of Oklahoma, as well as other American Indian groups and stakeholders such as the Council of the Original Miccosukee Seminole Nation Aboriginal People to develop and accomplish the programs of Everglades National Park. Park programs and activities would be conducted in a way that respects the beliefs, traditions, and other cultural values of those who have ancestral or historic ties to park lands.
- Identify and document, through studies and consultations, traditional cultural properties and other ethnographic resources, traditionally associated people and other affected groups, and such groups’ cultural affiliations to park resources.
- Recognize the sensitivity of ethnographic resources and associated data and provide confidentiality to the extent possible under the law.
- Collaborate with traditional cultural experts to develop a park strategy for dealing with ethnographic resources.

- Monitor effects of use on ethnographic resources and effects of park plans on authorized uses and traditional users.

Museum Collections

Desired Conditions

Everglades National Park's museum management program provides high-quality, professional, museum collection management services, ensuring preservation and accessibility in the most responsive, efficient, and cost-effective manner possible. As a result, the national park's museum collection is properly inventoried, curated, protected, and preserved. New acquisitions are identified, evaluated, accessioned, and cataloged. Collections are managed in accordance with all applicable NPS policies and professional guidelines for museum collection storage, exhibition, and use. Provisions are made for appropriate access to the collection by NPS staff and the public for their use in exhibits, interpretation, resource management, and research. (Museum collections include objects, artifacts, specimens, samples, documents, photographs, artwork, plans, manuscripts, etc., acquired through donation, purchase, exchange, transfer, or field collection that support and document a park's mission, history, resources, management activities, interpretive themes, and administrative history).

Strategies

- Acquire, develop, and preserve museum collections that document the history, resources, and significance of the national park.
- Maintain high standards for museum practices and ensure accountability for park collections.
- Continue to research, document, and catalog the museum collection, which serves as an interpretive and management resource for park staff and the public.
- Continue to support professional conservation assessments and treatment of objects, specimens, and archival documents in the park's museum collection.
- Continue to seek, use, and cooperate with NPS and non-NPS partners for preservation, exhibition, and management of the park's collection, as appropriate.
- Continue to host and participate in the NPS South Florida Collections Management Center, a multipark museum program to professionally manage the collections from Big Cypress National Preserve, Biscayne National Park, De Soto National Memorial, Dry Tortugas National Park, and Everglades National Park.
- Construct and maintain a new multipark collection storage repository, in keeping with the congressionally approved NPS National Museum Storage Strategy (2007).
- In conjunction with construction of the storage repository, develop a public museum for exhibition of the park's museum collection.
- Develop traditional and web-based exhibits to make collections more accessible.
- Support research and dissemination of information.
- Use existing and emergent technologies for collections access and management.

Visitor Use and Experience

Desired Conditions

Visitors from diverse backgrounds can experience a range of opportunities consistent with the purpose and significance of the national park. Most visitors understand and appreciate the purpose and significance of the national park and value their stewardship role in

preserving natural and cultural features. They actively contribute to the park's preservation through appropriate use and behavior. Park programs and services are accessible to all, and conflicts between different user groups are minimized.

Visitor use levels and activities are consistent with preserving park purpose and significance, and with providing opportunities for recreation, education, and inspiration. Management decisions are based on scholarly and scientific information. When such information is lacking, managers make decisions based on the best available information, adapting as new information becomes available. Regional recreational opportunities continue to be coordinated among agencies for public benefit and ease of use.

Strategies

- Work toward providing programs and facilities that are effective in reaching and serving diverse communities.
- Collect data over time to monitor visitor experience as part of an overall effort to protect desired resource conditions and visitor experience.
- Address threats to resources and the visitor experience by means other than limiting or restricting use (e.g., through education programs). If necessary, however, implement more restrictive methods.
- Base restrictions on visitor use on a determination that such measures (1) are consistent with the park's enabling legislation and NPS laws and policies, (2) are necessary to prevent degradation of the resources or values for which the park was established, (3) will minimize visitor use conflicts, and (4) will provide for public safety or provide opportunities for a quality visitor experience.

Visitor Information, Interpretation, and Education

Desired Conditions

Interpretive and educational services/ programs at the national park facilitate intellectual and emotional connections between visitors and park resources, foster understanding of park resources and resource stewardship, and build a local and national constituency. Outreach programs through schools, organizations, and partnerships build connections to the park. Curriculum and place-based education inspire student understanding and resource stewardship. Visitors receive adequate information to orient themselves to the park and possible opportunities for a safe and enjoyable visit.

Strategies

- Update the 2010 long-range interpretive plan as needed, with an emphasis on providing interpretation, orientation, and information services in the most effective manner.
- Stay informed of changing visitor demographics and preferences to effectively tailor programs for visitors. Develop interpretive media supportive of park purpose, significance, and interpretive themes.
- Continue to promote improved pre-trip planning information and orientation for park visitors through the park's website and other media. Work with local communities and other entities to provide services outside park boundaries, where appropriate.
- Cooperate with partners, other governmental agencies, educational institutions, and other organizations to enrich interpretive and educational opportunities locally, regionally, and nationally.
- Create and implement an education strategy plan that outlines goals and

actions for providing curriculum and place-based education programs.

- Continue to regularly update plans and prioritize actions needed to serve visitors and provide effective interpretation.
- Continue to educate staff, visitors, and the public about park interpretation/education programs.

Viewsheds and Vistas

Desired Conditions

Natural vistas and cultural landscapes provide park visitors with an immediate and lasting sensory experience that strongly conveys the character of the national park. Key scenic vistas are identified and protected. Park managers work with neighbors, local communities, and land managers to preserve scenic values.

Strategies

- Identify and document key vistas and viewpoints in the park.
- Work with neighboring landowners, communities, conservancy groups, management agencies, and others to develop preservation goals for identified viewsheds; identify potential threats; and establish a sense of stewardship by these groups for important visual resources.
- Work with neighboring communities, partners, and others to preserve the scenic character of park entrance areas and corridors and complement the park's key viewpoints and vistas.

Night Sky

Desired Conditions

The naturally dark night sky is preserved. Artificial light sources in the park and outside the park, to the maximum extent possible, do not hinder opportunities to see the moon, stars,

planets, and other celestial features, and they do not hinder the ability of animals to use celestial features for navigation, etc.

Strategies

- Establish baseline data for the dark night sky through NPS programs.
- Determine if light sources in the national park exceed appropriate levels. Study and implement ways to minimize artificial and unnecessary light.
- Work with neighboring communities and partners and also within a regional context to protect the quality of the night sky and the experience thereof.

Natural Soundscapes

Desired Conditions

Natural soundscapes, which are important to many vertebrate and invertebrate species, are preserved. (For example, bats and dolphins use reflected sound waves (echolocation) to navigate and to locate prey; frogs, birds, and insects rely on natural sounds to find mates or avoid predators.) Visitors have opportunities in most areas of the park to experience natural sounds.

Strategies

- Continue to collect baseline data on park soundscapes to understand characteristics and trends in natural soundscapes.
- Continue to monitor noise from motorboats and airboats, seek and encourage development and use of quieter motorboat and airboat engines, and work with local, state, and federal agencies on other measures to minimize/reduce noise levels.
- Provide opportunities for visitors to enjoy areas within the park with minimal motor noise.

- Educate visitors and encourage them to consider how noise they produce affects others.
- Continue to control land-based noise sources:
 - Enforce existing noise regulations.
 - Require bus tour companies to comply with regulations that reduce noise levels (e.g., turning off engines when buses are parked).
 - Limit use of generators.
 - Maintain quiet hours in campgrounds.
- Continue to work with the Federal Aviation Administration (FAA), military, commercial businesses, and general aviation entities to minimize noise and visual impacts of aircraft on the park.
- Minimize noise generated by NPS use of noise-producing machinery such as motorized equipment. Consider noise potential when procuring and using park equipment.

Climate Change

Desired Conditions

Everglades National Park is a leader in efforts to address climate change by reducing the contribution of NPS operations and visitor activities to climate change; preparing for and mitigating climate change impacts; and increasing its use of alternative transportation, renewable energy, and other sustainable practices. NPS staff proactively monitor and mitigate for climate change impacts on cultural and natural resources and visitor amenities. Education and interpretive programs help visitors understand climate change impacts in the national park and beyond, and how they can respond to climate change. Partnerships with various agencies and institutions allow NPS staff to participate in research on climate change impacts to park and ecosystem resources.

Strategies

- Identify key natural and cultural resources and visitor amenities that are at risk from climate change. Establish baseline resource conditions, identify thresholds, and monitor for change. Identify key resources in various management zones/areas (e.g., backcountry, seagrass protection, or NPS operations) that may require different management responses to climate change impacts.
- Explore and establish alternative transportation options for staff and visitors such as parking and shuttle or ferry services. Explore use of low-emission vehicles, biofuels, and electric vehicles for NPS operations. Encourage partners and concessioners to provide or use alternative transportation.
- Form partnerships with other resource management entities to maintain regional habitat connectivity and refugia that allow species dependent on national park resources to better adapt to changing conditions.
- Undertake comprehensive climate change planning to anticipate, adapt to, and mitigate for climate change impacts on the national park. This might include climate change scenario planning, participation in the NPS Climate Friendly Parks program, or adherence to the NPS Climate Change Response Strategy (NPS 2010b) or Green Parks Plan (NPS 2012) guidance. Engage visitors and inspire them to take action through leadership and education. Use the dynamic environment of the south Florida coast as a teaching opportunity about climate change. Educate visitors about climate change and research efforts, and climate change impacts on the resources they are enjoying.

- Restore key ecosystem features and processes, and protect key cultural resources to increase their resiliency to climate change. By reducing other types of impacts on resources, the overall condition of the resources could more easily recover from or resist the impacts of climate change.
- Pursue opportunities through park operations and visitor services to use and promote green technologies and products and reduce overall energy and resource consumption.
- Incorporate sea level rise projections in all park planning efforts and project designs. Evaluate proposed facility investments prior to project approvals using the best scientific information available and the climate change strategies described above to ensure the long-term sustainability of these investments. Consider whether to replace or maintain facilities in flood-prone zones and, if so, how to adapt them to withstand climate change. If such financial investments are concluded to be unwise, consider other options or potentially do not pursue or implement the project.

Facilities and Services

Desired Conditions

Everglades National Park takes a measured approach to facility development to serve visitor needs and protect park resources. Visitor and administrative facilities are as compatible as possible with natural processes and surrounding landscapes, aesthetically pleasing, and functional. Historic structures and properties are adaptively used when practicable and appropriate. Commercial services in the park are limited to those that are necessary and appropriate and that are compatible with the park purpose. If possible, commercial support services are based outside the park rather than inside. Staff housing is sufficient to ensure an adequate level of protection for park resources,

visitors, employees, and government property, and to provide necessary services. Adequate response (equipment and people) for visitor, resource, and facility protection; search and rescue; fire management; critical utility operations; and safety is available. Everglades National Park is a leader in sustainability. Decisions regarding NPS operations, facilities management, and development at the national park—from initial concept through design and construction—reflect principles of resource conservation and sustainability.

Strategies

- Build, locate, and/or modify facilities according to the *Guiding Principles of Sustainable Design* (NPS 1993) or similar guidelines. Establish architectural guidelines to ensure sustainability and compatibility with the natural and cultural environment. Properly maintain and upgrade existing facilities using sustainability principles, where possible, to serve the park mission.
- Implement the *Flamingo Commercial Services Plan*.
- Consider the availability of existing or planned facilities in nearby communities and on adjacent lands, as well as the possibility of joint facilities with other agencies when deciding whether to pursue new developments in the park. This would ensure that any additional facilities in the park are necessary, appropriate, and cost-effective.
- Integrate NPS asset management practices into decision making and planning. Build, modify, and/or maintain facilities according to projected funding levels and defined park priorities. Consider removal of facilities that do not meet minimum NPS criteria and/or are not cost-effective to maintain.
- Continue to strive to provide affordable housing in or near the park

for emergency response staff and seasonal and entry-level employees.

- Provide commercial visitor services (for example, services provided through concessioners) that are necessary and appropriate for visitor use and enjoyment through the use of concession contracts and commercial use authorizations. Ensure that concession operations are consistent with the protection of park resources and values and demonstrate sound environmental management and stewardship.
- Permit new rights-of-way and telecommunication structures only with specific statutory authority and approval by NPS managers, and only if there is no practicable alternative to such use of NPS lands. Site any new telecommunication structures so they do not jeopardize the park's purpose, significance, and viewshed. Consider park management zones, viewsheds and vistas in reaching decisions regarding rights-of-way and telecommunication structures.
- Incorporate mitigation measures into the design and construction of new facilities to address issues related to rising sea level, permanent elevated/hardened/re-locatable facilities, and mobile/seasonal structures. Evaluate proposed facility investments prior to project approvals using the best scientific information available and the climate strategies described above to ensure the long-term sustainability of these investments. If such financial investments are concluded to be unwise, consider other options or potentially do not pursue or implement the project.

Accessibility

Desired Conditions

New and renovated facilities are designed and constructed to be universally accessible in accordance with the Americans with Disabilities Act of 1990 and the Architectural Barriers Act Accessibility Standards (2006). All visitors, including those with disabilities, have opportunities to experience various portions of the park, including representative portions of the backcountry.

Strategies

- Identify and modify existing facilities to meet accessibility standards as funding permits, or as facilities are replaced or rehabilitated. Design new facilities to meet accessibility standards.
- Provide public information about ease of access for various facilities and trails.
- Periodically consult with disabled persons or their representatives to increase awareness of the needs of the disabled and to determine how to make the park more accessible.
- Continue to provide boardwalks and other infrastructure for visitors with special accessibility needs.
- Develop park services, interpretive programs, and media based on accessibility standards and needs.

Relations with Private and Public Organizations, Adjacent Landowners, Government Agencies, and Volunteers

Desired Conditions

The national park is managed holistically, as part of a greater ecological, social, economic, and cultural system. Positive relations are maintained with those owning property within the park boundary, adjacent landowners,

surrounding communities, and private and public groups that affect and are affected by the national park. The national park is managed proactively to ensure that NPS values are effectively communicated and understood.

The national park, which includes three international designations: International Biosphere Reserve (1976), World Heritage Site (1979), Wetland of International Significance (1987), and was first included as World Heritage Site in Danger in 1993, is managed to fulfill the goals of these designations and is removed from the list of World Heritage Sites in Danger through achieving the desired state of conservation as described in the 2015 Everglades National Park State of Conservation Report to the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Committee.

Strategies

- Continue to foster partnerships with public and private organizations.
- Foster a spirit of cooperation with neighbors, and encourage compatible uses of adjacent lands. Keep landowners, land managers, tribes, local governments, nongovernmental organizations, and the public informed about park management activities and issues.
- Consult periodically with landowners and communities that are affected by or potentially affected by park visitors and management actions.
- Work closely with local, state, and federal agencies and tribal governments whose programs affect or are affected by activities in the national park.
- Continue to support and encourage volunteers who contribute to national park programs.
- Continue to support the efforts of others to protect adjacent lands that are important to preserving national park resources through appropriate

planning, zoning, and other protection methods.

- Continue to work cooperatively with the designating organizations and other protected areas to fulfill common and park-specific goals and towards implementation of the corrective measures identified in the 2015 Everglades National Park State of Conservation Report to the UNESCO World Heritage Committee.

Relations with American Indian Tribes

Desired Conditions

Park staff work to ensure that traditional American Indian ties to the national park are recognized; park staff also strive to maintain positive, productive, government-to-government relationships with tribes culturally associated with the park. The rights, viewpoints, and needs of tribes are respected, and issues that arise are promptly addressed. American Indian values are considered in the management and operation of the park.

Strategies

- Consult regularly and maintain government-to-government relations with federally recognized tribes that have traditional ties to resources in the national park (the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma) to ensure productive, collaborative working relationships.
- Continue to consult, as appropriate, with nonfederally recognized tribal groups and other stakeholders, including the Council of the Original Miccosukee Simanolee Nation Aboriginal People, who also have traditional ties to the park.
- Continue to identify and deepen the understanding of the significance of

the national park's resources and landscapes to American Indian people through collaborative research.

- Identify, protect, and preserve sites and resources that are significant to federally recognized tribes as required by federal laws and NPS management policies.
- Create opportunities for and invite the participation of tribes in protecting and interpreting natural and cultural resources of interest within the national park.
- Support the continuation of traditional activities in the park by the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma, and the Council of the Original Miccosukee Seminole Nation Aboriginal People to the extent allowed by law and policy.
- Work with tribes to conduct ethnographic studies that identify culturally significant resources and traditional cultural properties.
- Seek input from tribes during development of interpretive programs that relate to American Indians.
- Consult with American Indians under the Native American Graves Protection and Repatriation Act for actions that affect or have the potential to affect human remains or items of sacred or ceremonial significance.
- Work with the tribes to identify mutual interests and concerns and join with the tribes, as appropriate, to address these matters.

Research

Desired Conditions

The National Park Service works with partners to learn about natural and cultural resources and associated values. Research priorities for the national park are aligned with its purpose and significance.

Strategies

- Encourage and support basic and applied research through various partnerships and agreements to enhance understanding of resources and processes or to answer specific management questions.
- Mitigate impacts of research conducted on natural and cultural resources and wilderness values, as needed to preserve those resources for future generations to enjoy and study.
- Develop and implement criteria to determine whether requested research supports national park purpose and significance or other park goals.
- Develop/update the list of research issues that are important to the national park.
- Ensure that specimens, artifacts, and archives (e.g., data, research results, photographs, reports, etc.) collected or generated by scientists, partners, and NPS staff conducting research in the park are submitted, retained, and properly curated for long-term access and study.
- Ensure that the long-term benefits of research to park resources by accessioning specimens, vouchers, artifacts, data, and archives into the park museum collection.
- Ensure that all research activities in the park are necessary and cannot be conducted outside park boundaries.

RELATIONSHIP OF THE GENERAL MANAGEMENT PLAN TO OTHER PLANNING EFFORTS

This section describes other plans and planning efforts that are related to the general management plan for Everglades National Park. These include NPS plans and plans prepared by neighboring agencies and entities. The plans that are *most* important to know about as they relate to this general management plan are discussed in this section. These projects were considered in the cumulative impacts analysis in the environmental analysis in chapter 5. Other relevant plans are included in appendix C.

EVERGLADES NATIONAL PARK PLANS

Long-Range Interpretive Plan

This plan, in preparation, includes park interpretive themes that are the most important ideas and concepts to be communicated to the public about the park and that form the core of interpretive programs and media. The plan also describes visitor experience goals, and it recommends a variety of interpretive services (guided and self-guided) and outreach activities to communicate the park's purpose, significance, and interpretive themes. The development of this interpretive plan is being closely coordinated with this Everglades general management plan so there is consistency between the two.

Flamingo Area Improvement Plans

Plans for improving the Flamingo area included the *Flamingo Commercial Services Plan* and Flamingo Master Plan and Design Program (NPS 2010a), and are further discussed in the following section titled "Ongoing NPS Projects and Projects Planned for the Near Future." Further efforts have been updated and outlined in each of the

alternative narratives related to improvements at Flamingo.

Climate Action Plan

This plan outlines ways for Everglades National Park to reduce emissions of park vehicles and facilities, reduce energy consumption, prepare for potential climate change, and improve climate change education programs for staff and visitors alike. This plan will complement the general management plan.

Land Protection Plan for the East Everglades Addition

This 1991 plan determined that all lands in the East Everglades Addition are needed for ecosystem restoration. It set priorities for acquisition, and gave examples of compatible and incompatible land uses. Land acquisition is integral to restoration of the hydroperiod and sheet flow of Shark River Slough.

As specified in the Land Protection Plan, the federal government's intent for each of these properties is full fee acquisition because complete ownership of these parcels would allow fulfillment of the park's mission and goals for hydrologic and ecosystem restoration, as well as for other important park management, operational, and resource protection purposes.

Although the long-term intent for these private parcels remains full fee acquisition, interim solutions such as acquisition of the flowage easements sufficient to advance projects critical to hydrologic and ecosystem restoration, and other park management requirements may be pursued to achieve the goals set forth in the plan (e.g., establish

airboat concessions contracts consistent with the 1989 Expansion Act). Site-specific mitigation and environmental compliance may be required in the future based on specific activities and proposed site improvements.

The undisturbed, privately owned tracts needed to enhance and restore the ecology through restoration of the hydrologic system constituted the top priority for protection. State and other nonfederal public lands comprised the second priority group, and the commercial tracts along U.S. Highway 41 constituted the third priority group. Third-party mineral rights were included in the fourth priority grouping.

Activities that would disturb the ecology, interfere with restored hydrologic systems, or prevent public enjoyment of the Addition would be considered incompatible uses. Residential, commercial, or industrial construction or agricultural activities would not be compatible. Major additions to existing developments or agricultural activities, as well as the construction of utility lines and roads also would not be compatible.

The land protection plan identified that hunting and off-road vehicle use (e.g., airboats and all-terrain vehicles), except as authorized in the enabling legislation, would not be compatible with the purpose of the Addition.

Everglades Restoration Plans

Plans to restore the Florida Everglades, discussed below, are independent of and complementary to this general management plan. Park managers will work to ensure active collaboration in order to best incorporate goals of the general management plan through continued restoration efforts. Such restoration plans are critical to the health and ecological integrity of Everglades National Park resources.

The south Florida ecosystem stretches south from Orlando through Chain of Lakes,

Kissimmee Valley, Lake Okeechobee, and the remaining Everglades to the waters of Florida Bay and the adjacent coral reefs. The ecosystem encompasses 18,000 square miles within 16 counties. There is a long-standing, cooperative effort among federal, state, and local government agencies, tribes, environmental organizations, universities, businesses, and local citizens to preserve and restore the greater Everglades ecosystem through more than 200 restoration projects. Listed below are the projects that would have the most influence on Everglades National Park.

Modified Water Deliveries Project

This project was initiated by Congress as part of the 1989 Everglades Expansion and Protection Act, which authorized the park to acquire 107,600 acres including Northeast Shark River Slough. The act also directed the U.S. Army Corps of Engineers (USACE) to modify the Central and Southern Florida Project to help restore natural hydrology by providing a way for additional water to flow from Water Conservation Area 3, north of Tamiami Trail, into the park. Project features should allow for improved quantity, quality, timing, and distribution of water flows into Northeast Shark River Slough. Some project features have been completed, and other components are scheduled for implementation over the next several years. The Tamiami Trail component of the Modified Water Deliveries (MWD) project—constructing a 1.0-mile bridge and strengthening and raising the remainder of the 10.7-mile highway corridor to allow increased water to flow under Tamiami Trail and into Everglades National Park has been completed. The 1.0-mile bridge will provide the ability to flow additional water into the park once several additional steps are completed, including acquisition of six remaining properties still in private ownership and completion of a water management operational plan.

In 2012, Congress appropriated funds to acquire remaining privately owned parcels in

the East Everglades Addition. The National Park Service is currently working to acquire these properties through negotiations with the property owners, and in the case of the Florida Power & Light Company (FPL) property, through an environmental impact statement (EIS) titled “Acquisition of Florida Power & Light Company Land in the East Everglades Expansion Area,” released for public review and comment in January 2014. The Record of Decision for this project is expected in 2015.

Two components of the Modified Water Deliveries project have not been initiated, i.e., the conveyance features to improve flows from Water Conservation Area 3 to North-east Shark River Slough and the combined operational plan. The purpose of the combined plan is to revise the operational plan for the Central and Southern Florida Project to include the Modified Water Deliveries project and C-111 water detention features to meet the environmental objectives of these two projects, while maintaining the other water-related needs of south Florida.

Although the MWD project will improve ecological conditions in Everglades National Park, it was never intended to address regional environmental degradation. A much larger effort was authorized to accomplish restoration of the Greater Everglades ecosystem (see *Comprehensive Everglades Restoration Plan*).

Comprehensive Everglades Restoration Plan

The *Comprehensive Everglades Restoration Plan* is a framework and guide to restore, protect, and preserve the water resources of central and south Florida. It provides a framework for restoration of the Everglades while providing for other water-related needs of the region, including water supply and flood protection. The plan is a component of the world’s largest ecosystem restoration effort encompassing 16 counties and an 18,000-square-mile area. The *Comprehensive*

Everglades Restoration Plan includes more than 60 elements designed to capture, store, and redistribute fresh water previously lost to tides, and to regulate the quality, quantity, timing, and distribution of flows. Implementation of this restoration plan could take more than 30 years to complete and cost at least \$11 billion. There are a number of CERP projects that are intended to provide improvements to flows in and around Everglades National Park, with the projects listed below having the most direct relationship to the general management plan.

Central Everglades Planning Project. The Central Everglades Planning Project was initiated in 2011 for the purpose of expediting the delivery of increased clean water to the central Everglades and Everglades National Park, including Florida Bay. The Central Everglades Planning Project would outline a suite of projects that would reduce excessive water discharges to the Atlantic and Gulf of Mexico estuaries, restore Everglades habitats, and deliver additional freshwater to the central Everglades and Everglades National Park.

The Central Everglades Planning Project is attempting to integrate several components of the *Comprehensive Everglades Restoration Plan* that were identified to benefit Everglades National Park on a faster time line than initially described with the plan. The draft Project Implementation Report / Environmental Impact Statement was available for public and agency comment in 2013. The U.S. Army Corps of Engineers expects to issue a Final EIS and Record of Decision in late 2014.

Everglades Restoration Transition Plan. The Everglades Restoration Transition Plan (ERTP), led by the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service, was a project to evaluate and modify the interim operational plan. The interim operational plan dictates water management in and around Everglades National Park by prescribing structural operations for inflow structures, border canals, and adjacent

detention ponds. ERTTP focuses on improving conditions for three federally listed threatened and endangered species—the wood stork, the Cape Sable seaside sparrow, and the Everglade snail kite in Everglades National Park—and the water conservation areas to the north. The ERTTP Record of Decision was issued in 2011.

Water Conservation Area 3 Decompart-mentalization. Water Conservation Area 3 is immediately north of Everglades National Park. The compartmentalization and constriction of historically broad wetlands, altered hydroperiods, reduction of wildlife, and degradation of water quality are among the environmentally detrimental effects resulting from construction of the Central and Southern Florida Project. Water Conservation Area 3 is part of this project. The project would reduce barriers to sheet flow such as canals and levees to the extent practicable. The goal is to restore historical sheet flow distributions, depth patterns, hydroperiods, and hydrologic connectivity in the various landscapes within Water Conservation Area 3 and in the Northeast Shark River Slough within Everglades National Park. This project is scheduled for completion in 2019.

Everglades National Park Seepage Management. The goal of this project is to reduce eastward water seepage from the Everglades system for the benefit of wetland communities within Everglades National Park. The project would likely include a suite of measures of detention ponds, in-ground seepage barriers, and modifications to adjacent canal water level management to maintain surface and groundwater in the national park. Because of the effects of existing canals, pump stations, and other water control structures providing flood control and water supply, it has long been recognized that controlling fresh water seepage out of natural system areas is necessary to restore ecological function to the park.

C-111 Spreader Canal Project. This project is designed to rehydrate southeastern coastal

marshes by restoring more natural overland sheet flow, restoring natural flows to Florida Bay via Taylor Slough, and returning coastal zone salinities in eastern Florida Bay to, as close as possible, predrainage conditions. This project, started in 2010, is intended to provide a more natural hydropattern in Taylor Slough by reducing eastward groundwater losses to the C-111 canal system, including features that extend the existing seepage management aspects of the Modified Water Deliveries project southward, with additional detention areas and the use of a canal that runs along the park boundary. Loss of freshwater from the park into the canal system is frequently observed. In the wet season water that would normally flow through Taylor Slough bypasses the park. This project would alleviate the problem of significant water diversion from Taylor Slough.

CERP Master Recreation Plan. The Master Recreation Plan focuses on opportunities to provide recreational features as CERP projects are designed, planned, and implemented. The plan provides guidance for identifying, evaluating, and addressing the impacts of CERP implementation on existing recreational use in the south Florida ecosystem and identifying and evaluating potential new recreation, public use, and public educational opportunities. This general management plan for Everglades National Park and subsequent implementation activities would pursue opportunities where there is consistency between the CERP Master Recreation Plan and this general management plan.

Tamiami Trail Modifications: Next Steps. The Tamiami Trail Modifications: Next Steps project was approved in February 2011 and authorized by Congress later that year. The Next Steps project builds on the 1-mile bridge and Tamiami Trail road improvements discussed under the Modified Water Deliveries project. The selected alternative for this project includes an additional 5.5 miles of bridging within the 10.7-mile section of Tamiami Trail adjacent to the Northeast Shark River Slough. These additional

modifications and road raising would allow much greater water flows into the park and provide additional hydrological and ecology

restoration of significant park resources. At present, congressional appropriation of this project is needed for implementation.

ONGOING NPS PROJECTS AND PROJECTS PLANNED FOR THE NEAR FUTURE

Projects that are ongoing or that are funded and likely to be initiated (or in some cases even completed) before the general management plan is completed, are listed below. These projects are *not* part of actions proposed in this *General Management Plan / Wilderness Study / Environmental Impact Statement* and will be (or have been) covered under separate environmental compliance documents (as appropriate). These projects are considered in the cumulative impact sections of this document.

FLAMINGO AREA IMPROVEMENTS

In 2008, the National Park Service approved the *Flamingo Commercial Services Plan*, a plan to rehabilitate or replace aged visitor and staff facilities at the historic Flamingo developed area of Everglades National Park that were damaged by successive hurricanes. The redesigned Flamingo area will emphasize operational efficiency, eco-friendly concepts, and sustainable design while preserving the historic character of the district. In recognition of the vulnerable coastal environment of Flamingo, new overnight accommodations and support facilities would be either mobile/seasonal facilities or elevated/hardened/re-locatable structures.

Lodging could include cottages, houseboats, and seasonal ecotents, and additional electrical hook-ups for the RV camping area. The new design would facilitate pedestrian and bicycle access and circulation throughout the Flamingo area. About 50 acres at Flamingo would be restored to more natural conditions.

Although a decision document (Finding of No Significant Impact) was issued in 2008, several factors have required the National Park Service to reassess decisions regarding the nature of proposed development at Flamingo.

These factors include current and anticipated federal funding levels, improved understanding of what would make a viable concessions contract at Flamingo, and the site's susceptibility to climate change and sea level rise.

The Flamingo Master Plan and Design Program (NPS 2010a) provides more detailed guidance (drawings, architectural sketches, design character guidelines, phasing, etc.) for implementing the *Flamingo Commercial Services Plan*.

Further information about the original 2008a *Flamingo Commercial Services Plan* and the Flamingo Master Plan and Design Program can be found through links on the park's website.

SNAKE BIGHT POLE / TROLL ZONE PILOT PROJECT

Everglades National Park has implemented a pole/troll boating zone in Florida Bay to help protect seagrass and wildlife habitat and enhance a range of visitor experiences, including shallow-water fishing, wildlife viewing, and paddling opportunities. This project began in 2009 following recommendations from the public that the park initiate a pilot pole/troll zone project in Florida Bay before completion of this general management plan. A pilot pole/troll zone was established in the Snake Bight area in 2011, totaling about 9,400 acres near Flamingo. Baseline monitoring of seagrass conditions has been completed.

A follow-up monitoring study to determine the success of the zone for protecting and recovering seagrass habitat is anticipated to be completed in 2015 and will help inform GMP implementation.

FLORIDA POWER & LIGHT COMPANY LAND ACQUISITION PROJECT

The Omnibus Public Lands Act of 2009 authorized, but did not mandate, the Secretary of the Interior to exchange a corridor of Florida Power & Light (FPL)-owned land in the middle of the East Everglades Addition with park lands on the eastern boundary of the park. The park's 1991 land protection plan identified the need to acquire all private lands within the East Everglades Addition, including the FPL property, to fulfill the park's mission. In January 2014, a draft environmental impact statement was released. The draft environmental impact statement describes alternatives for acquiring FPL land and evaluates the environmental consequences of implementing each alternative. The potential land acquisition would be subject to such terms and conditions as the Secretary of the Interior may require. The National Park Service expects to issue a Final EIS and Record of Decision in late 2014 or in 2015.

RESTORE DISTURBED AREAS THROUGHOUT EVERGLADES NATIONAL PARK

The National Park Service will continue to restore areas disturbed by past land uses to more natural conditions. Such areas are concentrated in the East Everglades and Pine Island areas of the park and include former agricultural areas, airstrips, residential fill pads, roads, borrow pits, canals and other human-made features on lands incompatible with ecosystem restoration purposes and fulfilling other park goals, once those lands are in federal ownership such as the AM radio and commercial airboat sites along Tamiami Trail, and remnant telephone and electric poles and equipment. The project will attempt to restore natural topography and habitats and involves demolishing and removing nonhistoric structures, removing materials (including fill material), filling in borrow pits, and controlling and removing invasive nonnative vegetation. Any potential cultural

resources (such as archeological sites or historic structures and the Old Tamiami Trail) would be evaluated for eligibility for the National Register of Historic Places before a decision about disposition is made. Decisions would be made in consultation with the state historic preservation office, the appropriate tribe(s), local governments, and others.

RESTORE WETLANDS IN THE WESTERN EVERGLADES AND BIG CYPRESS NATIONAL PRESERVE

Groundbreaking took place in 2010 on the 55,000-acre Picayune Strand Restoration project. This project covers a variety of activities (installing culverts and weirs and filling or plugging canals and ditches) to restore water flow in wetlands and estuaries and to enhance wildlife habitat in the southwestern portion of the Everglades ecosystem.

IMPROVE WATER FLOW UNDER PARK ROADS

Culverts are being replaced under several park roads (main park road, Old Ingraham Highway, and Research Road) to reestablish more natural water flow and permit aquatic life to cross underneath the roads, from one side of the road to the other.

RESTORE HOLE-IN-THE-DONUT WETLANDS

The Hole-in-the-Donut project near the main entrance to the park is restoring about 6,000 acres of former agricultural land infested with Brazilian pepper, an invasive nonnative. The land is being restored to wetlands by mechanically removing woody vegetation and scraping away disturbed soils to bedrock. Wildlife and plants then return on their own within a few years. The objectives of the project are: (1) restoration of wetland habitat, (2) removal and control of invasive nonnative plants, especially Brazilian pepper, and (3)

restoration of a wetland vegetation community that resembles natural Everglades wetlands in species composition and dynamics. Restoration work, begun in 1996, has been completed on about two-thirds of the project area.

REPLACE MARINE BULKHEADS AT FLAMINGO

This project involves replacing seawalls and marine bulkheads at the Flamingo Visitor Center and two public marina boat basins.

RESURFACE MAIN PARK ROAD AND RELATED IMPROVEMENTS

A project to resurface and improve the main park road, turnout areas, and adjacent parking lots, from the park's main entrance to Flamingo is underway. The project includes replacement of culverts, rehabilitation of road base and shoulders, milling, overlaying asphalt, striping, and establishing passing lanes.

About two-thirds of this effort has been funded and completed. The park is seeking the funds needed to complete the final segment of the project, from the main park entrance to Pa-hay-okee.

INVASIVE EXOTIC SNAKES RESEARCH AND MANAGEMENT

From 2000 to 2009, more than 1,300 Burmese pythons were removed from the park and adjacent lands. Snakes longer than 17 feet have been captured. Pythons are well established in the park, with breeding in the Everglades conclusively established. Pythons eat a wide variety of prey and pose a risk to many resources, including threatened and

endangered species. A recently published U.S. Geological Survey (USGS) study (Rodda et al. 2009) suggests the range of pythons could notably increase in Florida and the southern United States, posing an increased threat in the future. This same document concludes that there is a high risk of establishment for five species of giant constrictor snakes and a medium risk for four other species of giant snakes. The U.S. Fish and Wildlife Service, National Park Service, and U.S. Geological Survey are working with many state partners and nongovernmental organizations to address this concern. Public outreach and research to understand the habits of these species in their new environment is critical in the development of effective management/eradication strategies.

INVASIVE NONNATIVE FISH RESEARCH AND MANAGEMENT

Since 2000, seven new invasive nonnative fish species have been collected within the park. Several of these species have established reproductive populations and continue to expand their range and increase in abundance within the park. The canal systems of south Florida are the likely source for most of these species. Natural Everglades marshes near canals often have higher populations of invasive nonnative fish than natural marshes in the interior of the park. The introduction of invasive nonnative fish species into Everglades National Park is a significant resource management challenge. Although the park needs increased water flows, such flows could serve as a conduit for invasive nonnative fish to enter and further populate the park's ecosystem. Research is underway to understand the extent and potential threats these species could have on the park's natural system, and to identify effective management strategies to minimize their impact on park resources.

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE 2



Visitors at Anhinga Trail



Golden Silk Orbweaver

INTRODUCTION

This chapter of the general management plan presents four alternatives, including the NPS preferred alternative, for future management of Everglades National Park. The alternatives were developed through a lengthy, collaborative process that is described in more detail in the following section.

This chapter also includes sections on implementation of the general management plan, management zones, user capacity, mitigation measures common to all action alternatives, the environmentally preferred alternative, and actions/alternatives dismissed from detailed analysis. A table that summarizes the key differences between the alternatives and a table that summarizes the expected impacts of implementing the alternatives are also included. (The latter table is based on the analysis in “Chapter 5: Environmental Consequences.”)

IMPLEMENTATION OF THE GENERAL MANAGEMENT PLAN

Although this general management plan provides the analysis and justification for future national park funding proposals, this plan does not guarantee future NPS funding. Many actions would be necessary to achieve the desired conditions for natural resources, cultural resources, recreational opportunities, and facilities as envisioned in this plan. The plan establishes a vision of the future that will guide day-to-day and year-to-year management of the national park, but full implementation would likely take many years.

The park will request funding to achieve these desired conditions; although the park hopes to secure this funding and will prepare itself accordingly, the park may not receive enough funding to achieve all desired conditions. National park managers will continue to pursue other options, including expanding the

service of volunteers, drawing upon new or existing partnerships, and seeking alternative funding sources, including the philanthropic community. Many potential partner groups exist whose missions are compatible with that of the national park and these groups may offer to work with the park for mutual benefit.

DEVELOPMENT OF THE ALTERNATIVES

Much of the guidance for managing Everglades National Park is defined in the park’s purpose and significance statements, special mandates, servicewide laws and policies, and desired conditions (see chapter 1). Within these sideboards, the National Park Service solicited input from the public, NPS staff, government agencies, tribes, and other organizations regarding planning issues and management direction for the national park. Public scoping meetings were held in 2003, and in 2004 a dozen focus group meetings were held with various community and interest groups to begin gathering ideas for alternatives.

Management alternatives were then developed through a progression of collaborative planning steps, incorporating public input and information about visitor use, facilities, and park resources. In 2005, the first preliminary management alternatives were approved by the NPS regional director. In 2006, the scope of the planning project changed to include a wilderness study for the East Everglades Addition. After first determining which portions of the East Everglades have wilderness characteristics and are therefore eligible to be considered for wilderness designation, the planning team developed wilderness options for the East Everglades Addition and incorporated those options into the preliminary alternatives.

In 2007, four preliminary general management plan / wilderness study alternatives, named alternative A (no-action), alternative B, alternative C, and alternative D, were presented to the public in GMP Newsletter 4. A series of public meetings about these alternatives were then held. There was intense public interest in the management options for marine areas. (In fact, some groups were prompted to suggest new alternatives for the marine areas.) On the basis of this interest, park managers promised to reconsider marine aspects of the alternatives after undertaking additional studies. In 2007 and 2008, two studies were conducted, and after undergoing peer review they were released to the public in early 2009. The first study dealt with boat use in the park and is discussed in chapter 4 under “Visitor Use” under the subheading “Annual and Seasonal Visitation.” The second study on propeller scarring of seagrass in Florida Bay is discussed in chapter 4 under “Vegetation” in the subsection on “Communities.” These two studies were key to developing the revised alternatives for marine areas. The complete studies are available through links on the park’s website.

Based on these studies and many ideas from the public, the planning team then developed revised alternatives for marine areas of the park. These revised alternatives for marine areas of the park were alternative 1 (the no-action alternative), alternative 2, alternative 3, and alternative 4. They were distributed for public comment in 2009 in GMP Newsletter 5, and more public and stakeholder meetings were held. After reviewing all public and agency input received to date and conducting additional follow-up work, the planning team refined the general management plan alternatives again, retaining alternatives 1–4 labels. Finally, the planning team analyzed the probable impacts of implementing these alternatives.

DEVELOPMENT OF THE NPS PREFERRED ALTERNATIVE

Next, the planning team turned its attention to developing a preferred alternative that reflected its best thinking and input from the public. This process included using a tool called “Choosing by Advantages.” This involves identifying and comparing the relative advantages of each alternative according to a set of evaluation factors. The following six factors (listed in no particular order) were used to evaluate the alternatives for the Choosing by Advantages process:

1. allows natural conditions and processes to be maintained and restored
2. preserves cultural resources (archeological and ethnographic resources, historic structures, and cultural landscapes)
3. provides an appropriate range of visitor opportunities
4. establishes/maintains wilderness character
5. improves operational efficiency
6. provides other advantages to Everglades National Park, partners, and/or stakeholders

The team then looked at the relationships between the *advantages* of the alternatives (based on information from the impact analysis that was conducted earlier) and the dollar costs of the alternatives. Using this information, the team combined the best attributes of the preliminary alternatives into an NPS preferred alternative providing the greatest overall benefit while also considering costs.

Once the NPS preferred alternative was developed, alternative 3 was dropped from detailed analysis because the NPS preferred alternative was similar, a reasonable range of alternatives could be maintained without it, and for cost and document length reasons. Thus, four alternatives are analyzed in this document—no-action (alternative 1), NPS

preferred alternative, alternative 2, and alternative 4.

The early alternatives developed for this plan were more extensive in their costs and scope for one-time facility construction improvements at both the Flamingo and Gulf Coast visitor center sites.

Continued scoping and internal review resulted in refinement of the alternatives that reduced proposed one-time facility construction improvements and rehabilitation costs, as well as long-term operational commitments.

A discussion of the process and issues identified as well as how the alternatives were refined is included in this chapter.

Other issues identified in more recent scoping and review focused on how to support the long-term resilience of the national park from expected impacts from climate change such as sea level rise, increased coastal erosion, and higher storm surges.

Additional refinements to the preferred alternative were made based on public and agency comment received during public review of the *Draft General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement*, and subsequent analysis conducted by the planning team, which sometimes involved stakeholders at key points. These refinements can be found in the description of the preferred alternative in this chapter. Responses to substantive comments, including summaries of modifications to the preferred alternative in response to substantive comments can be found in “Appendix I: Comment Analysis and Response Report.”

POTENTIAL FOR BOUNDARY ADJUSTMENTS

The National Park and Recreation Act of 1978 requires general management plans to address whether boundary modifications should be made to park units. Boundary adjustments may be recommended in order to

- protect significant resources and values or to enhance opportunities for public enjoyment related to park purposes
- address operational and management issues such as the need for access or the need for boundaries to correspond to logical boundary delineations such as topographic or other natural features or roads
- otherwise protect park resources that are essential to fulfilling park purposes

In the case of Everglades National Park, no specific boundary adjustments were identified as being needed. Thus, none of the alternatives in this general management plan propose changes to the park boundary. This plan does not preclude future consideration of boundary adjustments should needs or conditions change. The boundary has been adjusted in the past in fairly small increments where opportunities have arisen to provide mutual benefits to the National Park Service and other agencies or entities. The park would continue to consider these opportunities on a case-by-case basis.

MANAGEMENT ZONES

The building blocks for a general management plan are the management zones (discussed in this section) and the alternatives (discussed in the next section). All are developed within the scope of the park's enabling legislation, purpose, significance, legislation, and special mandates.

Management zones are descriptions of desired conditions for park resources and visitor experience in different areas of the park. Each management zone description includes desired conditions for natural and cultural resources, visitor opportunities and experiences, appropriate facilities, and management/research activities. Important or sensitive natural and cultural resources are found parkwide and therefore occur in multiple zones. The management approach identified for these resources can vary as

indicated in the desired resource conditions presented for each zone. The management zones for Everglades National Park were first presented to the public in May 2007 in GMP Newsletter 4—they were then revised based on public comment and further consideration.

In formulating the alternatives that are discussed in the following section, the management zones were placed in different locations in the park according to the overall intent (concept) of each alternative. Because the management zones prescribe desired (new) conditions, they have not been applied to the no-action alternative (alternative 1).

An overview of the management zones for Everglades National Park is provided on the following pages, with more detail in table 1, which follows.

Developed Zone

These are the main visitor facility and service areas, including facilities and services related to visitor orientation and information. This zone also accommodates NPS operational facilities. This zone does not occur in designated wilderness.



*School group at
Royal Palm area*



*Entrance to the park; Ernest Coe Visitor Center/
Park Headquarters buildings*

Frontcountry Zone

These are easily accessible attraction areas that provide opportunities for many visitors to enjoy and learn about the park. This zone does not occur in designated wilderness.



Guided bike trip in Long Pine Key



Commercial airboat tour in the East Everglades

Boat Access Zone

This water zone provides access to various types of recreational watercraft, including motorboats. This zone may occur on surface waters above (overlying) designated submerged marine wilderness.



Boat trip on Florida Bay

Pole/Troll Zone

This water zone protects vulnerable shallow marine areas while allowing watercraft propelled by paddles, poles, or trolling motors. This zone may occur above (overlying) designated submerged marine wilderness.



Flats fishing in Florida Bay

Pole/Troll/Idle Zone

This water zone protects sensitive shallow marine areas while allowing watercraft propelled by paddles, poles, trolling motors and combustion engines operating at idle speed when there is sufficient water depth. This zone occurs in areas of the bay with variable water depths that can occasionally accommodate engine motors operating at idle speeds.

This zone occurs on surface waters above (or overlying) designated submerged marine wilderness.



Florida Bay flats and keys

Backcountry (Nonmotorized) Zone

(Water)

(Land)

This is the wildest zone, providing opportunities for tranquil, nonmotorized wilderness experiences on land and water. This zone may occur in designated wilderness (land) or above (overlying) submerged marine wilderness.



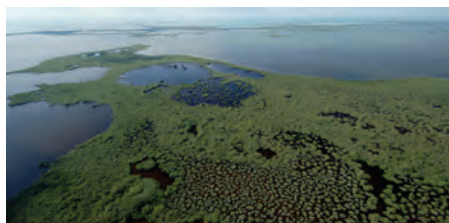
Paddling in the backcountry



Coastal Prairie Trail

Special Protection Zone

This land or water zone protects key sensitive wildlife areas or areas serving as long-term ecological benchmarks for research. They are managed to protect the physical structure of habitats and ecological processes. This zone may occur in designated wilderness (land) or above (overlying) submerged marine wilderness.



Crocodile Sanctuary



Ibis and Roseate Spoonbills roosting

TABLE 1. EVERGLADES NATIONAL PARK MANAGEMENT ZONES

	Attribute	Developed Zone	Frontcountry Zone	Boat Access Zone*	Pole/Troll/Idle Zone	Pole/Troll Zone	Backcountry (Nonmotorized) Zone	Special Protection Zone
Overview	Management Zone Overview	These are the main visitor facility and service areas, including facilities and services related to visitor orientation and information. This zone also accommodates NPS operational facilities. This zone does not occur in designated wilderness.	These are easily accessible attraction areas that provide opportunities for many visitors to enjoy and learn about the park. This zone does not occur in designated wilderness.	This water zone provides access to various types of recreational watercraft, including motorboats. This zone may occur on surface waters above (or overlying) designated submerged marine wilderness. *The three light blue colors give a general indication of water depth (darker is deeper).	This water zone protects sensitive shallow marine areas while allowing watercraft propelled by paddles, poles, trolling motors, and combustion engines operating at idle speed when there is sufficient water depth. This zone occurs in areas of the bay with variable water depths that can occasionally accommodate combustion engine motors operating at idle speeds. This zone occurs on surface waters above (or overlying) designated submerged marine wilderness.	This water zone protects vulnerable shallow marine areas while allowing watercraft propelled by paddles, poles, or trolling motors. This zone may occur on surface waters above (or overlying) designated submerged marine wilderness.	This is the wildest zone, providing opportunities for tranquil, nonmotorized wilderness experiences on land and water. This zone may occur in designated wilderness (land) or above (overlying) submerged marine wilderness.	This land or water zone protects key sensitive wildlife areas or areas serving as long-term ecological benchmarks for research. They are managed to protect the physical structure of habitats and ecological processes. This zone may occur in designated wilderness (land) or above (overlying) submerged marine wilderness.
Desired Resource Conditions	Natural Resource Conditions	Resources are protected, but may be substantially modified to allow for high levels of visitor use and to meet visitor and operational needs. Tolerance for resource impacts is moderate to high.	Resources are protected, but may be modified to provide visitor access to park resources. Natural processes remain largely intact. Tolerance for resource impacts is moderate.	Aquatic and benthic resources are maintained in a near-natural condition, supporting healthy interaction among human, plant, and wildlife communities. Natural resources and processes predominate. Evidence of recreational impacts is minimal. Tolerance for resource impacts is low.	Aquatic and benthic resources are maintained in a near-natural condition, supporting healthy interaction among human, plant, and wildlife communities. Natural resources and processes predominate, with emphasis on the preservation of shallow water habitats. Evidence of recreational impacts is minimal. Tolerance for resource impacts is low.	Aquatic and benthic resources are maintained in a near-natural condition, supporting healthy interaction among human, plant, and wildlife communities. Natural resources and processes predominate, with emphasis on the preservation of shallow water habitats. Evidence of recreational impacts is minimal. Tolerance for resource impacts is low.	Natural resources (including aquatic and benthic resources) are maintained in a near-natural condition, supporting healthy interaction among human, plant, and wildlife communities. Natural resources and processes predominate. Evidence of recreational impacts is minimal. Tolerance for resource impacts is low.	Natural resources (including aquatic and benthic resources) are maintained in a near-pristine, intact condition for the purpose of maintaining a long-term baseline to measure ecological changes. Key sensitive wildlife areas are protected and preserved, allowing wildlife to thrive and reproduce. Tolerance for resource impacts (especially to exceptional or critical resources) is very low.
	Cultural Resource Conditions	Archeological and ethnographic resources are identified, documented, and protected. Adverse resource impacts are avoided or minimized to the extent possible, and unavoidable impacts are mitigated. Historic structures and cultural landscapes are identified, stabilized, preserved, rehabilitated for adaptive use, or restored.	Archeological and ethnographic resources are identified, documented, and protected. Adverse resource impacts are avoided or minimized to the extent possible, and unavoidable impacts are mitigated. Historic structures and cultural landscapes are identified, stabilized, preserved, rehabilitated for adaptive use, or restored.	Submerged cultural resources, including archeological and ethnographic resources, are identified, documented, and protected. Adverse resource impacts are avoided or minimized to the extent possible, and unavoidable impacts are mitigated.	Submerged archeological (and ethnographic resources) are identified, documented, and protected. Adverse resource impacts are avoided or minimized to the extent possible, and unavoidable impacts are mitigated.	Submerged archeological (and ethnographic resources) are identified, documented, and protected. Adverse resource impacts are avoided or minimized to the extent possible, and unavoidable impacts are mitigated.	Archeological and ethnographic resources are identified, documented, and protected. Adverse resource impacts are avoided or minimized to the extent possible and unavoidable impacts are mitigated. Historic structures and cultural landscapes are stabilized and preserved.	Archeological and ethnographic resources are identified, documented, and protected. Tolerance for resource impacts is very low. Unavoidable impacts are mitigated. Historic structures and cultural landscapes are stabilized and preserved.
	Natural Sights and Sounds	Sights and sounds of human activities may make it difficult to observe natural sights and sounds.	In certain times, seasons, and areas, sounds and sights of human activities may make it difficult to observe natural sights and sounds. In other areas of the zone and during certain seasons natural sounds and sights may predominate.	Natural sights and sounds predominate, except for the sights and sounds of motorboats either stationary or transitioning between different areas in the bay.	Natural sights and sounds predominate, except for the sights and sounds of motorboats, either stationary or transitioning at an idle speed between different areas in the zone or traveling at greater speeds within adjacent boat access zones.	Natural sights and sounds predominate except for the sight of motorboats either stationary or transitioning via pole or trolling motor between different areas in the zone or traveling at greater speeds within adjacent zones.	Natural sounds and sights predominate.	Natural sounds and sights predominate.

TABLE 1. EVERGLADES NATIONAL PARK MANAGEMENT ZONES

	Attribute	Developed Zone	Frontcountry Zone	Boat Access Zone*	Pole/Troll/Idle Zone	Pole/Troll Zone	Backcountry (Nonmotorized) Zone	Special Protection Zone
Visitor Opportunities and Experiences	Visitor Opportunities	<p>Common visitor activities include scenic driving, viewing scenic vistas, taking short walks, picnicking, camping in developed campgrounds, visiting indoor interpretive exhibits, attending interpretive programs, and procuring supplies and services.</p> <p>High use levels are accommodated, and encounters with others are likely. Basic necessities and conveniences are provided so visitors do not need a high degree of self-reliance or outdoor skills.</p>	<p>Common visitor activities include scenic driving, short hikes, bicycling, fishing, camping, commercial airboat tours, viewing outdoor wayside exhibits, attending interpretive walks, etc.</p> <p>High use levels are accommodated, and encounters with others are likely. Expectations for solitude are low during peak visitor periods.</p>	<p>Common visitor activities include motorboating, paddling, fishing, nature/wildlife viewing, camping at designated sites, and taking guided tours.</p> <p>Expectations for solitude are relatively low, but solitude usually can be found if sought. Visitors are self-reliant and require strong marine and navigational skills unless they are with a commercial tour or guide.</p> <p>There are good opportunities for challenge and adventure.</p>	<p>Common visitor activities include boating (with propulsion by paddles, trolling motors, or poles), fishing, nature/wildlife viewing, camping at designated sites, and taking guided tours. Combustion engines must be run at no greater than idle speed.</p> <p>Expectations for solitude are generally greater than in the boat access zone. Visitors are self-reliant and require strong marine and navigational skills unless they are with a commercial tour or guide.</p> <p>There are good opportunities for challenge and adventure.</p>	<p>Common visitor activities include boating (with propulsion by paddles, trolling motors, or poles), fishing, nature/wildlife viewing, camping at designated sites, and taking guided tours. Combustion engines must be trimmed up and not used in this zone.</p> <p>Expectations for solitude are generally greater than in the boat access zone. Visitors are self-reliant and require strong marine and navigational skills unless they are with a commercial tour or guide.</p> <p>There are good opportunities for challenge and adventure.</p>	<p>Common visitor activities include hiking, paddling, fishing, nature/wildlife viewing, camping at designated sites, and taking guided tours.</p> <p>To preserve wilderness character, motorized and mechanized vehicles are not permitted. (Motorboats are permitted in emergency situations.).</p> <p>Expectations for solitude are relatively high, and solitude can be found in most areas. Visitors are fully self-reliant and immersed in nature.</p> <p>There are outstanding opportunities for challenge and adventure.</p>	<p>Not open to public access, but visitors understand the need for and support these special protection areas.</p>
	Orientation / Interpretation	<p>Opportunities for visitors to obtain orientation to and information about the park are readily available through visitor centers, ranger-led programs, self-guided trails, and wayside exhibits.</p> <p>Opportunities to interpret cultural, natural, and wilderness resources are identified, developed, and integrated into park programs.</p>	<p>Opportunities for visitors to obtain orientation to and information about the park are readily available; site specific information is emphasized. Opportunities include ranger-led programs, self-guided trails, and wayside exhibits.</p> <p>Opportunities to interpret cultural, natural, and wilderness resources are identified, developed, and integrated into park programs.</p>	<p>Visitors are provided with orientation, resource protection, and boating safety information before entering this zone. Visitor education is relied upon to a large extent to prevent impacts from recreational use.</p>	<p>Visitors are provided with orientation, resource protection, and boating safety information before entering this zone.</p>	<p>Visitors are provided with orientation, resource protection, and boating safety information before entering this zone.</p>	<p>Orientation information is not provided within this zone, but is available elsewhere.</p>	<p>Information gained through research in portions of this zone is shared with visitors off-site, through the park’s interpretation and education programs.</p>
	Commercial Services	<p>Appropriate commercial services include lodging, camping, food service, merchandise and fuel sales, boat rentals, canoe/kayak rentals and livery service, bicycle rentals, and shuttle service. Commercial tours (e.g., tram and boat tours) and guide service may be procured in this zone.</p>	<p>Appropriate commercial services include camping, bicycle rentals, and limited convenience concessions. Commercial tours (e.g., tram, boat, and airboat tours) and guide services may be procured in this zone.</p>	<p>Appropriate commercial services include tours (e.g., boat tours) and guide services.</p>	<p>Appropriate commercial services include boat tours and guide services (boats propelled by paddle, pole, trolling motor, or combustion engines operating at idle speed).</p>	<p>Appropriate commercial services include boat tours and guide services (boats propelled by paddle, pole, or trolling motor).</p>	<p>Appropriate commercial services include nonmotorized tours and guide services.</p>	<p>No commercial services are appropriate in this zone.</p>
Facilities	Appropriate Facilities	<p>Facilities accommodate high levels of visitor, administrative, and operational use safely and efficiently.</p> <p>This zone may include facilities such as visitor centers, roads, parking areas, lodging, campgrounds, picnic areas, surfaced walkways, and trailheads and trails. Operational facilities such as employee housing, administrative offices and maintenance areas may also be present.</p>	<p>Facilities facilitate visitor access and enjoyment of easily accessible resource attractions.</p> <p>Limited visitor facilities (wayside exhibits, trails and trailheads, parking areas, roads) are appropriate. Existing disturbed sites are used where feasible.</p>	<p>Facilities are minimal and may include navigational aids, signs, research facilities, docks, and chickees (backcountry platforms).</p>	<p>Facilities are minimal and may include navigational aids, signs, research facilities, docks, and chickees.</p>	<p>Facilities are minimal and may include navigational aids, signs, research facilities, docks, and chickees.</p>	<p>Facilities are minimal and may include navigational aids, signs, research facilities, docks, designated campsites, chickees, and maintained trails.</p> <p>In designated wilderness, any facilities are consistent with NPS wilderness management policies.</p>	<p>Facilities are minimal and may include navigational aids, signs, and research plot markers and apparatus authorized by NPS permit. No visitor use facilities are present.</p> <p>In designated wilderness, any facilities are consistent with NPS wilderness management policies.</p>

TABLE 1. EVERGLADES NATIONAL PARK MANAGEMENT ZONES

	Attribute	Developed Zone	Frontcountry Zone	Boat Access Zone*	Pole/Troll/Idle Zone	Pole/Troll Zone	Backcountry (Nonmotorized) Zone	Special Protection Zone
Management and Research	Management and Research	Most NPS management activities are associated with supporting visitor use and park operations, and mitigating adverse impacts from visitor use.	Management is focused on maintaining visitor facilities, mitigating adverse natural and cultural resource impacts from visitor use, and providing high quality visitor experiences.	Management is focused on preserving natural resources and processes. As necessary, restoration activities are conducted to restore degraded or damaged areas. Relatively high levels of management and visitor education are needed to ensure resource protection and safety and a range of desirable visitor experiences.	Management is focused on preserving natural resources and processes. As necessary, restoration activities are conducted to restore degraded or damaged areas. Relatively high levels of management and visitor education are needed to ensure resource protection and safety and a range of desirable visitor experiences.	Management is focused on preserving natural resources and processes. As necessary, restoration activities are conducted to restore degraded or damaged areas. Relatively high levels of management and visitor education are needed to ensure resource protection and safety and a range of desirable visitor experiences.	Management is focused on preserving natural and cultural resources. As necessary, restoration activities are conducted to restore degraded or damaged areas. Relatively low levels of management and visitor education are needed to ensure resource protection and safety and ensure a range of desirable visitor experiences. In designated wilderness, natural and cultural resource management activities and research and other administrative uses are consistent with NPS wilderness management policies.	Management is focused on preserving natural resources and processes. As necessary, restoration activities are conducted to restore degraded or damaged areas. Research activities such as conducting baseline inventories and resource condition assessments may be permitted and are nonmanipulative. In designated wilderness, natural and cultural resource management activities and research and other administrative uses are consistent with NPS wilderness management policies.
	Permit Requirements and Restrictions	None.	None.	Localized areas may be closed to public use for restoration or resource protection purposes.	Localized areas may be closed to public use for restoration or resource protection purposes.	Localized areas may be closed to public use for restoration or resource protection purposes.	Motorized and mechanized vehicles are not permitted. There may be limits on numbers of visitors, length of stay, group size, and overnight use to protect resources or visitor experiences. Localized areas may be closed to public use for restoration or resource protection purposes.	No public access is allowed. Infrequent administrative and research access (permit is required) may be allowed.

ALTERNATIVES

This *General Management Plan / Wilderness Study / Environmental Impact Statement* presents four alternatives, including the NPS preferred alternative, for future management of Everglades National Park. Alternative 1, the no-action alternative, represents continuation of existing management direction and is included as a baseline for comparing the consequences of implementing the other action alternatives. The action alternatives are the NPS preferred alternative, alternative 2, and alternative 4. (Alternative 3 was created during an early phase of alternative development, but was dropped from detailed consideration in this plan. See the “Alternatives and Actions Considered but Dismissed from Detailed Evaluation” section later in this chapter for more information.) These three action alternatives present different ways to manage resources and visitor use and improve facilities and infrastructure at the national park. Each of the alternatives has an overall concept, followed by a more detailed description of how different areas of the park would be managed (management zones and related actions). These alternatives embody the range of what the National Park Service and most members of the public want to see accomplished with regard to natural

resource conditions, cultural resource conditions, visitor use, and visitor experience at the park.

Continued scoping and internal review resulted in refinement of the alternatives that reduced proposed one-time facility construction improvements and rehabilitation costs, as well as long-term operational commitments.

As noted in “Guidance for the Planning Effort” in chapter 1, the National Park Service would continue to follow laws, policies, and special mandates regardless of the alternatives considered in this plan. These laws, policies, and mandates are not repeated in this chapter. However, other aspects of management would differ among the alternatives, and those aspects are the focus of this chapter.

The alternatives do not include many details on resource management or visitor use management. More details on *how* to achieve the desired future would be determined in follow-up implementation plans once it has been decided *what* those conditions should be.

ALTERNATIVE 1: NO ACTION

OVERALL CONCEPT AND PARKWIDE ACTIONS

Alternative 1, the no-action alternative, would continue existing management. The no-action alternative provides a baseline for evaluating changes and impacts of the three action alternatives. This baseline is characterized primarily by conditions at Everglades National Park as of December 2009, with continuation of current management practices into the future (business as usual). This alternative assumes implementation of some approved and funded facility improvements, plus improvements at Flamingo as outlined in the *Flamingo Concession Services Plan* and also Gulf Coast improvements.

The park would continue to be managed according to the enabling legislation, other applicable laws, NPS policies, and guidance in the park's 1979 Master Plan and other approved plans. Management activities would continue to conserve natural resources and processes while accommodating a range of visitor uses and experiences. Resource management and other projects that have already been funded would be implemented. Resource management would be approached from an ecosystem perspective, considering outside influences (e.g., regional water management structures and operations, Everglades restoration efforts, climate change, and socioeconomic considerations) on resources and natural processes. As possible with available funding and staffing levels, the park would strive to identify, protect, stabilize, and interpret (as appropriate) significant cultural resources and historic properties such as archeological sites, historic structures, and cultural landscapes in accordance with applicable policies and guidelines.

Visitors would continue to have access to a wide variety of land- and water-based opportunities and programs, including

concessioner trips at Gulf Coast, Shark Valley, and Flamingo, plus self-guided opportunities and guided trips throughout the park.

Aside from a few planned and funded upgrades for specific facilities, the built environment would remain at its current level. Existing facilities at the park head-quarters area (Long Pine Key, Key Largo, Shark Valley, and the Gulf Coast) would be maintained and continue to serve operational needs and visitors, in some cases at less than desired levels. Flamingo facilities would be maintained as well until planned improvements are funded and implemented.

Transportation to and within the park would continue to be primarily by private vehicle or vessel. Regional public transportation has numerous routes within Miami-Dade County, some of which extend to the Homestead / Florida City area. None of these routes access the park, and there are no approved plans to extend these routes to the park.

Table 5 summarizes key differences among the alternatives.

HEADQUARTERS / PINE ISLAND / ROYAL PALM / MAIN PARK ROAD

The Ernest F. Coe Visitor Center, near the east entrance of the park in the park headquarters area, would remain the primary park visitor center and would continue to provide visitor orientation, films, exhibits, and a cooperating association bookstore (see "Alternative 1: No Action" map at the end of this section). Many park visitors would receive their first interpretive information at this visitor center. Park headquarters and the Pine Island maintenance and housing area would remain at their current locations. The Krome Center facility in Homestead would remain as a center for park science staff

focused on implementation of the *Comprehensive Everglades Restoration Plan* and other ecosystem restoration efforts.

The Daniel Beard Center and Robertson Building would continue to serve as administrative facilities for park resource managers, fire and aviation operations, and cooperating researchers. The Daniel Beard Center and Robertson Building would continue to be home to the South Florida Collections Management Center (SFCMC), which would continue to provide collection management support to the four south Florida national park system units and DeSoto National Memorial. The existing collection storage facility does not meet NPS collections standards, and there is inadequate space for the collections and for museum staff and researchers to work with the collections. Under this alternative, there would continue to be no public museum in the park, which meets NPS standards for museum collection exhibition.

The Royal Palm visitor contact station would continue to provide functional interpretive office and storage space and a cooperating association bookstore. The Anhinga and Gumbo Limbo trails would continue to provide opportunities for interpreting the Everglades ecosystem. The popular guided interpretive programs would continue. However, the number of programs offered has decreased, and the possibility exists that future funding levels may require further cutbacks in the number of interpretive services offered.

The Long Pine Key area would continue to offer a picnic area and campground, and the Long Pine Key nature trail would be maintained for hiking and bicycling through the pinelands.

The main park road was designed and constructed to provide access to the variety of habitats in the park. Turnouts, interpretive walks, and wayside exhibits inform visitors about the range of habitats in the park, the flora and fauna within them, and ecosystem

restoration issues and challenges. The road would continue as the primary interpretive corridor providing visitors with opportunities to explore the interior of the park. As the primary access route to Flamingo, the road would continue to have heavy traffic, with many vehicles towing boats down to Flamingo/Florida Bay. Visitors in private vehicles, recreational vehicles, buses, and occasionally bicycles would also continue to use the park's main road.

Ecological restoration of the Hole-in-the Donut area (see "Interrelationships with Other Plans and Programs" in chapter 1) would continue, as would seasonal, guided interpretive tours of the Nike Missile Base site. Buildings associated with the Nike complex, which is on the National Register of Historic Places for its Cold War significance, would continue to be used for park purposes such as administrative and storage space.

Flamingo

The Flamingo area would continue as a key visitor recreational destination. The area would continue to serve as the southern portal of the Wilderness Waterway and as a major boat access point to Florida Bay, Whitewater Bay, and numerous backcountry rivers and bays, some of which include designated campsites and chickees. The base of NPS operations for western Florida Bay, Whitewater Bay, and Cape Sable would remain at Flamingo.

It is expected that a new, long-term concession contract for Flamingo would be awarded. Concession services would include overnight accommodations, food service, a marina with boat rentals, the campground, and guided boat tours operated by a park concessioner. See the chapter 1 section titled "Ongoing Projects and Projects Planned for the Near Future, Flamingo Area Improvements" for more background information on this topic.

- New facilities at Flamingo would be designed to be sustainable, elevated/hardened/re-locatable.
- The existing gas station would be adaptively re-used by the park.
- New overnight guest accommodations provided via the concession operations would include cabins, houseboats, and seasonal ecotents.
- Rehabilitation of the existing visitor center to meet visitor information, orientation, lodging, tour, and rental needs.
- The historic Mission 66 visitor center would be rehabilitated, preserved, and adaptively reused to enhance visitor services and administrative work space.
- Increased education and recreational opportunities would be located at Flamingo and may include more guided tours and land and water vendor services.
- Food and beverage services to accommodate park visitors would be provided by the concessioner.
- Concessions housing would be rehabilitated; some additional units of NPS and concessions housing would be provided to serve peak season operations.
- The NPS/concessions maintenance area would be improved (replacement buildings would be provided; work spaces would be reorganized, etc.).
- Restoration would occur at camping loops B and C (approximately 50 acres).
- Character-defining features of the Mission 66 cultural landscape would be preserved where feasible.

Florida Bay

Florida Bay, with its shallow basins and banks, is a complex resource. It is designated as a submerged marine wilderness area, and includes important wildlife habitat and a world-class fishery. Florida Bay is a popular destination for recreation, especially boating, fishing, paddling, wildlife viewing, and photography. Flamingo would remain the only Florida Bay boat access point within Everglades National Park. All other access to the bay would originate from outside the park such as from the Intracoastal Waterway in the upper keys that shares a 40-mile boundary with the park.

Under the no-action alternative, there would be no change in how boaters would use or access Florida Bay. No boater permit would be required. NPS boundary and channel markers would be maintained. Marked channel/access routes and recommended motorboat routes would continue to be identified on National Oceanic and Atmospheric Administration (NOAA) maps, commercially offered charts, and the *Florida Bay Map and Guide*, all of which are widely available and used by boaters. A few short idle speed, no-wake areas for safety purposes would remain, amounting to the only boating restrictions on Florida Bay. The shallows and banks would remain highly vulnerable to seagrass scarring from motorboat propellers and groundings. Small-scale seagrass restoration and monitoring efforts (for selected areas badly damaged by propeller scarring and groundings) would continue to be implemented with substantial support from volunteers and partners.

Two keys in Florida Bay (Little Rabbit and North Nest) would continue to be open to visitors for day use and camping. These sites, plus the two chickees at Johnson Key and Shark Point, would be managed in accordance with the park's backcountry permit program and the updated backcountry management plan. Bradley Key and Carl Ross Key would remain open to visitor use during daylight hours. Other keys in the bay would remain

closed to public use to protect bird nesting and rookery sites.

All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to public access. Opportunities for visitors to enjoy and learn more about Florida Bay would continue via the many guided fishing trips and ecotours offered in this extensive, complex area.

Key Largo

Facilities at the 20-acre NPS site in Key Largo (ranger station and Florida Bay Interagency Science Center) would continue to provide a base of operations for NPS law enforcement, interpretation, natural resource management, and ecological research activities. Other agencies working on Florida Bay management and restoration would continue to have office space and dock facility access. The Key Largo ranger station would continue to serve primarily park operations, with limited visitor services.

East Everglades Addition

In 1989, the Everglades National Park Protection and Expansion Act added 109,506 acres of the northeast portion of Shark River Slough (the East Everglades Addition) to the park. Although the 1979 Master Plan does not address management of the East Everglades Addition, the 1991 land protection plan for the East Everglades Addition specified that all lands in East Everglades were needed for ecosystem restoration, set priorities for acquisition, and gave examples of compatible and incompatible land uses. Under the no-action alternative, the East Everglades Addition would continue to be managed under the guidance provided in the Expansion Act and the land protection plan.

Wilderness. None of the East Everglades Addition would be proposed for designation as wilderness under the no-action alternative.

Private Airboating. According to the 1989 East Everglades Expansion Act, private airboat operators who were owners of record of registered airboats in use within the East Everglades Addition on January 1, 1989, may continue using airboats in the East Everglades Addition during their lifetimes. Thus, private airboating would continue for the foreseeable future, and most use would likely remain on commonly used airboat trails or routes, although there are currently no park guidelines identifying such requirements.

Commercial Airboating. Four commercial airboat tour operators based along Tamiami Trail would continue to provide guided trips into the East Everglades Addition (plus food/beverage service, wildlife shows, gift shops, etc.) for visitors with little input or oversight from the National Park Service. These businesses would continue to operate at their own discretion without a permit from the National Park Service.

Other Management Elements. Backcountry paddling would remain an option for visitors (with a special use permit required for overnight stays), but with no paddling trails or designated primitive campgrounds, such use would likely remain at very low levels.

There are nine former hunting camps of various ages and conditions on tree islands in the East Everglades Addition that were established and used before this area became part of the national park. Under this alternative, there would continue to be no management action taken on these camps. Use of such sites would continue without permits or regulations (aside from the permit requirement for overnight use).

Chekika, a former state recreation area, would remain open for day use on a seasonal basis. Other area infrastructure, such as trails, roads, and borrow pits, would be informally used by the public for activities such as wildlife viewing, bicycling, and fishing.

East Everglades administrative and operational activities (e.g., ranger, fire

management operations, maintenance, etc.) would continue to operate out of adapted former residences within the East Everglades Addition. These structures are not well suited to park operational uses, which leads to operational inefficiencies and is inconsistent with the intent of the Everglades Expansion Act.

Tamiami Trail / Shark Valley

Tamiami Trail (U.S. Highway 41), a two-lane highway that connects the east and west coasts of Florida, crosses Shark River Slough along the park's northern boundary. Many travelers along Tamiami Trail would continue to be unaware of their proximity to the national park and the educational and recreational opportunities available along the more than 20 miles of roadway that borders the park.

Shark Valley would remain the primary place for park orientation and interpretation along the northern park boundary. Visitors would continue to hike, bike, or ride an interpretive tram on the 15-mile Shark Valley loop road and visit the Shark Valley observation tower at the halfway point. The park's cooperating association (the Everglades Association) would continue to operate a bookstore in the Shark Valley visitor contact station. Interpretive operations and a park housing unit would also remain. Despite recent facility improvements, Shark Valley would likely continue to be crowded and congested during peak winter visitor periods.

The Tamiami ranger station near the intersection of Tamiami Trail and Loop Road would continue to serve as an operations center and ranger station for this district of the park. Existing housing for park staff would also remain.

Shark River Slough, primarily a sawgrass prairie and hardwood hammock landscape characteristic of much of the interior of the park, is the classic vision of "the glades." Shark River Slough, except for airboating activities

previously described, has relatively few visitors—this trend would likely continue under this alternative.

Gulf Coast / Ten Thousand Islands / Everglades City

Everglades City would continue to serve as the western gateway to the park. The 20 acres of NPS land in Everglades City would remain as the center for visitor services and park operations for the Gulf Coast. Visitor services include visitor information and orientation at the small Gulf Coast Visitor Center, concessioner-operated boat tours, and a small concessions store. Space within the visitor center is limited, and the second floor facility does not meet ABA accessibility standards.

Legislation passed in 1989 required construction of a replacement visitor center (to be named the Marjory Stoneman Douglas Visitor Center) at this site. However, it was not built because the allocated funding for the project was used for emergency repairs following hurricane Andrew in 1992. The vision, associated environmental documentation, and cost estimates that were developed in 1990 are now outdated. Thus, the replacement visitor center was not included as part of this no-action alternative.

Facilities for public access to the water would continue to be limited in the Everglades City area. Space is at a premium in the small boat basin that is used for NPS maintenance and ranger operations and concessions tours. An NPS canoe launch is available near the visitor center, but it is in poor condition. Visitors seeking to launch motorboats near Everglades City would continue to use public and private facilities outside the park.

Everglades City is the northern entry point to Wilderness Waterway for motorized and paddle craft. Visitors would continue to have access to the numerous designated campsites and chickees in marine and estuarine portions of the park. These campsites would be managed in accordance with the backcountry

permit program and backcountry management plan of the park, as updated.

The NPS structures at Everglades City would continue to serve park interpretive, resource management, law enforcement/protection, and maintenance operations. These facilities have limited work and storage space. This site would also continue to support concessions operations.

The Chokoloskee Area of Inadequate Protection for manatees was established by the U.S. Fish and Wildlife Service in 2001. This designation was removed in April 2010 based on implementing the zones depicted in figure 5b, along with signage and law enforcement commitments. In addition, there are a few small, short, idle speed, no-wake areas for safety purposes that would remain within the Gulf Coast / Ten Thousand Islands area.

Costs and Staffing. The NPS staffing level under the no-action alternative would be 214 FTE staff members. The actual staffing level in 2011 was 181 staff members because funding was insufficient to fill all 214 authorized positions. Volunteers and partnerships would

continue to be key contributors to NPS operations. Annual operating costs of this alternative would be \$17.0 million. One-time capital costs (for Flamingo improvements) would be \$13.3 million.

The cost estimates provided here are for comparison to other alternatives only; they are not to be used for budgeting purposes. Although the numbers appear to be absolutes, they represent a midpoint in a possible range of costs.

Presentation of these costs does not guarantee future NPS funding. Project funding would not come all at once; it would likely take many years to secure and may be provided by partners, donations, or other non-NPS federal sources. Although the National Park Service hopes to secure this funding, the park may not receive enough funding to achieve all desired conditions within the time frame of this management plan (the next 20 or more years). More information on costs is provided at the end of this chapter.

Rulemaking. All existing closures and restrictions would be retained through the original authorizations.

NPS PREFERRED ALTERNATIVE

OVERALL CONCEPT AND PARKWIDE ACTIONS

Using management zoning and collaborative techniques such as adaptive management, user education, and a national park advisory committee, the NPS preferred alternative would support restoration of natural systems and protection of cultural resources while providing improved opportunities for a quality visitor experience. This concept is represented in management zoning by establishing pole/troll and pole/troll/idle zones over most of the shallowest areas of Florida Bay (submerged marine wilderness); establishing frontcountry and backcountry zones as well as identifying proposed and proposed potential wilderness in portions of the East Everglades Addition to provide for a variety of visitor experiences; and by identifying certain segments of the wilderness waterway as seasonal backcountry (nonmotorized) zones, as well as seasonal idle speed zones to provide a variety of possible experiences in the gulf coast area of Everglades National Park.

Adaptive management would be used to improve success at achieving desired conditions for natural and cultural resources and visitor experiences. Adaptive management focuses on learning and adapting through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable ecosystems (Williams et al. 2009). The National Research Council, part of the Academy of Sciences, defines adaptive management as

[A] decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of

these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a trial and error process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals; increases scientific knowledge; and reduces tensions among stakeholders.

Adaptive management (1) helps managers maintain flexibility in their decisions, knowing that uncertainties exist and provides managers the latitude to change direction, (2) improves understanding of ecological and social systems to achieve management objectives, and (3) is about taking action to improve progress toward desired outcomes. Figure 1 illustrates the adaptive management process. Adaptive management strategies may require additional planning and compliance during project implementation.

To provide input on implementation of the general management plan and adaptive management for the park's marine and shallow-water resources, the park would establish a federally designated park advisory committee (sanctioned by the Secretary of the Interior). This committee would be composed of diverse stakeholders and would help park managers consider various perspectives on different management issues (e.g., resource protection, visitor use and access, zoning refinements, education programs, monitoring, and restoration efforts). Benefits of a formal advisory committee would be realized by both park managers and the public; examples

include regular and ongoing cooperation to assist the park in implementing the general management plan; identifying and evaluating key issues affecting the park and neighboring communities, nearby parks and protecting areas, and resources; developing a park constituency that is aware of and concerned about the condition of the park and ways to protect and experience it; reviewing additional implementation-level planning efforts and ensuring their adequate implementation; and participating in adaptive management and monitoring efforts related to meeting park goals. An advisory council has been working with the adjacent Florida Keys

National Marine Sanctuary during the past decade. This council has strengthened the understanding and protection of the sanctuary while enhancing the overall relationship between the sanctuary, adjacent communities, and diverse stakeholders. The park would also implement a user capacity program to assist in managing the levels, types, and patterns of park use to preserve park resources and the quality of visitor experience. The concept of user capacity and the program proposed for implementation are described in more detail in the “User Capacity” section of this chapter.

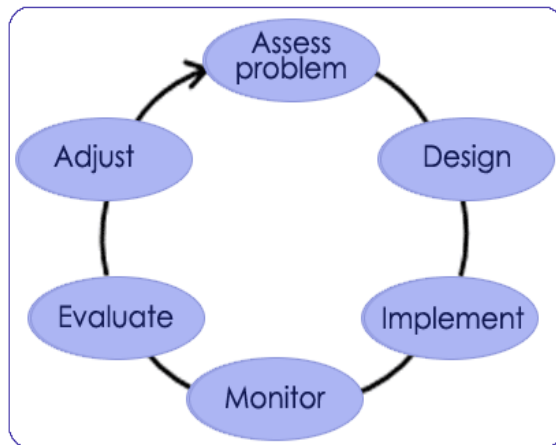


FIGURE 1. DIAGRAM OF THE ADAPTIVE MANAGEMENT PROCESS

[Note: This figure is from “Adaptive Management: the U.S. Department of the Interior Technical Guide” (Williams et al. 2009).]

The park would commit to a more comprehensive natural resource management program. In contrast to the important contributions of park managers to large-scale watershed and ecosystem restoration projects that are largely focused outside the park, this program would support implementation of desired conditions described in this general management plan, implement natural resource components of this plan, and contribute to the adaptive management and

user capacity components of the plan. A current example of adaptive management being implemented that is directly related to the GMP is the seasonal modification to the Snake Bight pole/troll zone that began in the summer of 2013 with an expansion of the Jimmy’s Lake idle-speed area during summer–early fall when there are higher water levels in the area. Based on public input and resource assessments of the area, an extension of about 0.25 mile was determined to allow access

flexibility while maintaining desired resource and visitor experience conditions for about a four-month period in 2013. This extension would continue until implementation of the preferred alternative pole/troll zones that enhances access opportunities in Snake Bight including the year-round expansion of the Jimmy's Lake idle-speed area. Program examples include:

- monitoring/assessing key park resource conditions and trends (such as seagrass recovery and protection of important wildlife habitat including that for threatened and endangered species recovery)
- conducting small- and large-scale restoration projects in the park (such as fish passage projects under roads and within developed areas of the park, restoration of disturbed sites to natural conditions, and management/removal of invasive nonnative plants and animals from large areas)
- initiating efforts to better understand complex issues such as long-term sustainability of the park fishery
- improving decision making and developing the capacity for resource managers' timely participation in the numerous projects and plans that are a constant part of park responsibilities

A comprehensive cultural resource management program would be established at the park. This program would focus on efforts to inventory, document, and protect all types of cultural resources and would include rehabilitation or adaptive use of some historic structures. Archeological sites and other historic properties would be regularly monitored to assess resource conditions and inform long-term treatment strategies. Selected cultural sites would be interpreted for the public. Ethnographic resources would be better interpreted and protected (than in the no-action alternative) in consultation with associated American Indian tribes and other peoples traditionally associated with the park.

Cultural landscapes would be identified, preserved, and interpreted. Museum collections would continue to be acquired, managed, and preserved to document and support the park's natural and cultural resources, interpretive themes, and administrative history. Increased public access to the collections would be achieved through exhibits, emerging technologies, and research opportunities. A new multipark museum facility would be constructed to meet museum standards, provide better access for researchers and park staff to collections, and provide an exhibit space to interpret the collections to park visitors.

A mandatory boater education permit program would be implemented to provide all boaters with information, not only on boat safety in the park, but also on the key elements of this plan related to use of the park's marine areas. This information would help them avoid harming shallow sea bottom, seagrass, and wildlife, and operate watercraft in a manner that respects other users. This program would encourage boaters to become partners in resource stewardship. Operators of all boats—motorized and nonmotorized—using park waters would receive program information, which could be tailored to type of use and/or type of trip (motorboat vs. paddler, short vs. long-term trips, guided trips, etc.). The education course would be made as widely accessible and convenient as possible (e.g., on the Internet, web-based applications, at visitor contact stations, at marinas, at gateway communities, and possibly in mobile learning centers). Details of this education and permitting system would be developed separately from this management plan with input from the public. The education program would take advantage of the lessons learned from the National Parks and Conservation Association-led Eco-mariner program, launched in 2009, with a broad-range of program partners.

This program, coupled with other on-the-water changes such as pole/troll and pole/troll/idle zones and improved aids to navigation and signage, would provide a

multifaceted approach to enhanced resource protection and visitor experience. The park's law enforcement presence would be increased, especially on marine waters, to increase visitor understanding of and compliance with proper navigation, management zones, and idle and slow speed designations and enhance resource protection through heightened awareness of sensitive resources and minimum impact boat operation techniques. When this plan is completed, key findings and information important to using the park's marine waters would be incorporated into the mandatory boater education permit program.

A boating safety and resource protection plan would be developed. This plan would address boating in marine waters of Florida Bay, the Gulf Coast, and Ten Thousand Islands in more detail as it relates to visitor safety and resource protection. It would consider how to further avoid/minimize the risk of boat-boat collisions, boat-wildlife collisions, groundings, and other impacts on the sea bottom, which is federally designated wilderness.

This plan would determine how to avoid and minimize risks to wildlife (including the manatee and other marine endangered species), so a separate manatee management plan would not be necessary. The plan has been identified as a more effective way to protect threatened and endangered species and other important resources in the park, rather than addressing issues in a narrower way through the development of separate management plans for resources. The plan would consider the best, most current information available including completed elements of the boater education permit program discussed above, as well as relevant scientific and resource management information. This data, together with a more detailed evaluation of channel/access routes shown on the "NPS Preferred Alternative" map, would be used to make more informed decisions about how/if channel/access routes would be marked and accessed.

The boating safety and resource protection plan would be developed with public input and would be updated regularly to respond to changing conditions, new information, and lessons learned. Once the plan was completed, key findings and information important to visitor experience and resource protection within the park's marine waters would be incorporated into updates of the boater education program and other materials related to the use and management of these resources.

Headquarters / Pine Island / Royal Palm / Main Park Road

The park headquarters and Ernest F. Coe Visitor Center area would be in the developed zone. The Ernest F. Coe Visitor Center would continue to be the primary site for information, orientation, and interpretation for visitors (see "NPS Preferred Alternative" map at the end of this section). There would be no change in the use of park headquarters. A center for park science staff focused on the comprehensive ecosystem restoration plan and other ecosystem restoration efforts would likely remain in a gateway community or at park headquarters.

The main park road would also be in the developed zone. The Long Pine Key campground and interpretive turnouts at attractions along the main park road would be in the frontcountry zone to allow for basic facilities that support visitor use and expanded interpretive opportunities. Long Pine Key would continue to be managed for a mix of day use opportunities and camping. The Long Pine Key nature trail would be in the frontcountry zone, with interpretation focused on pineland habitat. This trail would continue to be open to bicycling. At Long Pine Key campground, electric hookups and solar hot-water showers would be provided. Bicycle rentals, snacks, and basic camping supplies would be provided seasonally by a concessioner, possibly using the vacant residential structure near the picnic area. Interpretive programs and media would be

expanded and updated at the Royal Palm area, including integrating prehistoric and historic themes into these programs. Where the road portion of the Anhinga Trail has created an impediment to water movement, more natural water flow would be restored by installing bridges or culverts.

Most of the area beyond the main park road corridor would be in the backcountry (nonmotorized) zone to perpetuate preservation of designated wilderness and protection/restoration of natural processes and natural and cultural resources. Canoeing and “slough slogging” (walking in the wetlands) would be the primary visitor activities in this area.

To enhance pre-visit information and orientation for visitors, park managers would pursue a partnership with the Homestead and Florida City area communities to provide a cooperative visitor contact station in this national park gateway area. Opportunities such as using vacant commercial space in an area that is highly visible to visitor traffic would be explored. During the shorter term, this pre-trip information function could be accomplished with an unstaffed NPS information kiosk at a gateway site and through web-based information.

NPS staff would pursue the goal of providing some form of alternative transportation from gateway communities to destinations along the Main Park Road and the Tamiami Trail, such as from south Miami-Dade County to the national park’s Ernest F. Coe Visitor Center / Royal Palm area. This would make it easier for those without private vehicles (or who prefer to use public transportation) to get to the park. NPS staff would also pursue potential opportunities for alternative transportation from the visitor center / Royal Palm area to Flamingo, with stops along the way. The ideal would be a system that allows visitors to spend time at key interpretive stops along the main park road to have more in-depth learning and experiential opportunities. It is likely that this service would be offered during the high visitor use winter months at

first. Implementation of this idea could take the form of dedicated guided bus tours, or a shuttle system that picks up and drops off visitors at regular intervals. The idea would probably need to be tested and implemented on an incremental basis based on what is most feasible given economic viability, potential partnerships, funding sources, etc. Appendix C describes additional alternative transportation efforts being pursued by partner agencies.

Restoration of the Hole-in-the-Donut would continue under the NPS preferred alternative. New interpretation of ongoing restoration, wayside exhibits, and daytime hiking opportunities would be provided, and this could include spur overlook trails to one or two mounds. Most of the Hole-in-the-Donut area, as potential wilderness, would be in the backcountry zone. Restoration activities in this area are anticipated to continue for the life of this plan and would be carried out under the wilderness minimum requirements process.

The area encompassing the Daniel Beard Center, Robertson Building, and the historic Nike Missile Base site would be in the developed zone. The Daniel Beard Center and Robertson Building would continue to be used for park administrative purposes such as resource management and research. Visitor opportunities in the vicinity would be expanded to include interpretation of the Nike Missile Base site (after rehabilitation and visitor safety improvements). Interpretive programs would be extended into the shoulder seasons, and enhanced interpretation would require site improvements such as improved vehicular access, parking, and restrooms. A tram or shuttle for guided tours would also be pursued. The historic integrity of the national register district would be maintained, and some historic buildings at the missile site would continue to be used for park administrative purposes.

The South Florida Collections Management Center, currently housed in the Daniel Beard

Center and Robertson Building, would be relocated to a new museum in this area of the park, providing for public exhibits and a storage facility that meets NPS collections standards. Museum collections would continue to be acquired, preserved, and accessible to researchers, and the public would have its first opportunity to experience the center's vast resources and collections. Part of this new facility could be used to support interpretation and public use (e.g., interpretation and public tour staging space) of the Nike Missile Base site.

Bicycling on the main park road from the park entrance to Flamingo would continue to be allowed. Connections with nearby trails comprising the South Dade Greenway Network and North Dade Greenway Network, including the proposed Biscayne–Everglades Greenway, Miami Western Greenway, and other parks and open space areas being pursued by partner agencies (see appendix C for some potential projects), would be provided where feasible. The park would also pursue development of some additional hiking/bicycling trails in frontcountry zones at Long Pine Key and Flamingo.

Paddle launch sites along the main park road (e.g., Coot Bay Pond, Noble Hammock canoe trail, and Hells Bay canoe trail) and paddling opportunities for persons with disabilities would be improved. Examples include installing modest small floating docks or other nonmuddy interface between land and water (to make launching safer and easier), safety improvements at parking areas, and better water trail wayside signs.

Flamingo

The Flamingo area would continue as a key visitor interpretive and recreational destination for short and multiday park experiences focused on the area's natural and cultural resource diversity. The area would continue as a major center for wildlife viewing, boating, camping, and fishing

activities. Flamingo would be in the developed zone and would provide a variety of land- and water-based visitor opportunities to enjoy and learn about the park.

Flamingo would continue to serve as the southern portal of the Wilderness Waterway and the new Everglades Paddling Trail (described in the “Gulf Coast / Everglades City” section below). Flamingo would also serve as a major boat access point to Florida Bay, Whitewater Bay, and numerous backcountry rivers and bays, some of which include designated campsites and chickees. NPS operations for western Florida Bay, Whitewater Bay, and Cape Sable would remain at Flamingo.

As in the no-action alternative, a new, long-term concession contract for Flamingo would be awarded. Concession services would include overnight accommodations, food service, a marina with boat rentals, the campground, and guided boat tours operated by a park concessioner. See the chapter 1 section titled “Ongoing Projects and Projects Planned for the Near Future, Flamingo Area Improvements” for more background information on this topic. In future years, the park could work with concessioners, commercial use authorization holders, and other partners to support enhanced recreational and educational opportunities consistent with the goals of the general management plan.

- New facilities at Flamingo would be designed to be sustainable, hardened, mobile, elevated/hardened/relocatable.
- The existing gas station would be adaptively re-used by the park.
- New overnight guest accommodations provided via concession operations would include elevated cottages, houseboats, and seasonal ecotents.
- The existing visitor center would be rehabilitated to meet visitor information, orientation, lodging, tour, and rental needs.

- The historic Mission 66 visitor center would be rehabilitated, preserved, and adaptively reused to enhance visitor services and administrative workspace.
- Increased education and recreational opportunities would be based out of Flamingo and may include more guided tours and land and water vendor services.
- Food and beverage service to accommodate park visitors would be provided by the concessioner.
- Concessions housing would be rehabilitated, and some additional units of NPS and concessions housing would be provided to serve peak season operations.
- The NPS/concessions maintenance area would be improved (replacement buildings would be provided, workspaces would be reorganized, etc.).
- Restoration would occur at the former cottage area, and parts of the campground (B and C loops) determined by park and concession managers to be beyond current and future needs. Character-defining features of the Mission 66 cultural landscape would be preserved where feasible.

Flamingo, like other entryways to park marine waters (the upper keys and Everglades City / Chokoloskee), would be an important location for contacting boaters and fulfilling the education/permit requirement. As mentioned in the overview section for this alternative, the intent of the education/permit requirement would be to create better stewards of the park, provide information about the challenges of marine navigation in the shallow marine and estuarine waters of the park, as well as information about boating etiquette to increase resource protection and visitor enjoyment.

Florida Bay

Flamingo would remain the main boat access point to Florida Bay within Everglades National Park. Much of Florida Bay would be in the boat access zone. Motorboat access could also continue via existing channels/ access routes, as identified on NOAA charts, products developed as part of the boater education program (such as GPS electronic charts), and in the widely available *Florida Bay Map and Guide*. Routes would include those already marked and maintained by the park and additional historical routes or corridors that would allow on-plane, idle speed, or slow speed transit depending on the resource, visitor experience and safety considerations. The terms “channel/access route,” “route,” or “corridor” refer to the traditional, long-standing method that has been used in the park for many decades to identify motorboat transit corridors in Florida Bay, Ten Thousand Islands, and other backcountry marine waters of Everglades National Park. These terms are not to be confused with “channels” as defined by regulation and maintained by the U.S. Coast Guard for deep water boating corridors including those adjacent to and within Everglades National Park (e.g., Intracoastal Waterway, Flamingo Marina Channel.)

The park’s designated channel/access routes are marked with wooden 4”x4” posts and pointers or PVC pipe and pointers. The pointers are attached at the top of each marker, and the channel/access routes are often “gated” to indicate how boaters should enter and navigate through the corridor to avoid/minimize natural and wilderness resource impacts and ensure safe transit to the maximum extent possible.

Future refinements to this system would be based on the boating safety and resource protection plan effort described in the “Overall Concept” section of this alternative. Along with improved marking and maintenance of the channel/access route and boundary markers and the mandatory boater education program, pole/troll zones,

pole/troll/idle zones, and idle and slow-speed corridors would be established to protect designated submerged marine wilderness, vegetation, and wildlife resources while allowing a wide range of recreation opportunities. New idle-, slow-speed, and on-plane corridors would also be added to improve visitor enjoyment and safety, while protecting shallow-water resources. Idle- and slow-speed corridors would allow motorized access to important destinations. These corridors would also provide access across sensitive resource areas, as water depth and other conditions permit. On-plane corridors occur in areas of the bay with sufficient water depth to allow boats to operate at faster, but safe speeds. For locations of these corridors, please see “Florida Bay Management Zones – NPS Preferred Alternative” map at the end of this section.

The pole/troll and pole/troll/idle zones shown on the “NPS Preferred Alternative” map were developed with much public input and are based on science and expert on-the-water knowledge of where boats can be operated with reduced likelihood of damaging seagrass beds and other shallow water habitats. The zone locations would be fine-tuned over time through the adaptive management process. Under this alternative, about 102,838 acres (about 26%) of Florida Bay waters within the park (392,580 acres) would be in the pole/troll zone and 24,588 acres (about 6%) would be within the pole/troll/idle zone. About 260,700 acres (about 66%) would be in the boat access zone, which allows on-plane, safe speed transit. Within pole/troll zones, boats would have to be propelled using push poles, electric trolling motors, or paddles. Within the pole/troll/idle zones, water depths may occasionally be suitable for certain types of boats to be propelled using internal combustion engines operated at idle speed. Internal combustion engines could also be used in designated channel/access routes. The pole/troll and pole/troll/idle zones would be minimally marked to preserve the scenery and aesthetics of Florida Bay and minimize maintenance requirements. This means that boaters would rely primarily on navigation

skills, global positioning system (GPS) technology, marine charts, and materials developed for the boater education program to comply with the zone requirements. The references to shoreline pole/troll zones in eastern Florida Bay on the “Florida Bay Management Zones – NPS Preferred Alternative” map are specific to shorelines along Blackwater Sound, Little Blackwater Sound, Shell Key, the Boggies, and Little Buttonwood Sound. The pole/troll zone for these areas would extend out 300 feet from the shorelines of these areas (with the boat access zone beyond that).

A 300-foot-wide idle speed, no-wake area would be designated along the mainland shoreline from Middle Cape eastward to Shell Creek (west end of Long Sound). The purpose of this designation would be to reduce shoreline erosion from motorboat wakes, improve safety and visitor experience for those on the shoreline or boating close to the shoreline, and to better protect wildlife. This zone would also serve as a buffer that would improve the natural soundscapes in the adjacent backcountry and wilderness areas. In many places along the shoreline, the idle speed, no-wake designation would be superseded by the more restrictive pole/troll zones. Visitors would be expected to abide by pole/troll zone, pole/troll/idle zone, backcountry zone, and idle-speed requirements, except in emergency situations.

All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks), except Joe Bay and Snag Bay as discussed below, would remain closed to public use and managed as a special protection zone, which has been the case for more than 20 years. Joe Bay includes the smaller area to the east known as Snag Bay, and the two areas make up roughly 48% of Crocodile Sanctuary. For simplicity in this plan, the two bays will be referred to collectively as Joe Bay.

Under this alternative, Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Additional access

for paddling would be provided through the establishment of a new car-top boat launch point near Long Sound on the 18-mile stretch of U.S. 1 (in partnership with the Florida Department of Transportation and others). This area would be managed as a boat access zone, and idle-speed would be enforced along shorelines.

Crocodile Sanctuary would continue to serve as a baseline area for long-term ecological monitoring and restoration studies; some 200 scientific studies and research projects are associated with this area. Under this alternative, Joe Bay would be established as the first and only catch-and-release fishing area in the park. An adaptive management program would be developed to evaluate the success of the opportunity in achieving desired resource and visitor experience conditions.

A comprehensive seagrass restoration plan that would allow the park and partners to efficiently implement actions to address damage to submerged marine and wilderness resources from boat groundings and propeller scarring would be established. Once completed, this plan would provide the framework for partnerships with organizations and volunteer groups to help park managers restore important resources in the park.

The National Park Service would pursue partnership opportunities for additional public boating (motorized and nonmotorized) access sites to Florida Bay.

The four keys in the bay now open to visitor use—two that allow overnight stays (Little Rabbit and North Nest keys) and two that are for day use only (Carl Ross and Bradley keys)—would remain open. All other keys would be in the special protection zone and remain closed to public use to protect nesting and roosting birds. Three additional chickees (platform campsites) would be built in Florida Bay to reduce the travel distance between campsites to a more reasonable length (i.e., 10–12 miles). The chickees would be

constructed in the water near keys (not on them). A wilderness stewardship plan would be developed to determine the most suitable locations for the chickees and to ensure that their development and maintenance is completed in a manner that protects wilderness character.

Opportunities would continue for visitors to enjoy and learn more about Florida Bay via the many guided fishing trips and ecotours offered in this vast, complex area.

Key Largo

The 20-acre NPS site in Key Largo, which includes the Key Largo ranger station and Florida Bay Interagency Science Center, would remain. As in the no-action alternative, the funded project to provide NPS replacement housing and a modest new research facility would be implemented, but housing for two additional staff would also be provided under this alternative. Hammock vegetation would be restored in the areas not needed for development. Visitor-oriented improvements would include a new visitor information kiosk and a venue to support the boater education/permit program, a paddle launch, and an interpretive trail through the site's upland hammock. Both the existing site in Key Largo and the new Tarpon Basin property would be considered to meet the recreational needs.

NPS staff would pursue an interagency visitor information/orientation facility/science and research facility in the upper keys with other agencies (e.g., such as the NOAA (Florida Keys National Marine Sanctuary), the U.S. Fish and Wildlife Service, and Florida State Parks, and Florida Fish and Wildlife Conservation Commission), and partners (e.g., universities and research/science institutions). Such a partnership facility would facilitate improved management and understanding of park, ecosystem, resource, and visitor use issues, and would be created only if there is adequate support and involvement from other partners. This could

be a convenient location for visitors to get information about recreational opportunities and regulations among the various park and protected areas, as well as interpretation of Florida Bay and keys marine environments. This facility could be yet another venue to support the proposed Everglades National Park boater education/permit program.

East Everglades Addition

The northwest portion of the East Everglades Addition, where much of the private and commercial airboat use typically occurs, would be managed as the frontcountry zone (see “NPS Preferred Alternative” map). Almost all the remaining area would be managed as backcountry (nonmotorized), providing the classic Everglades wilderness experience of solitude and adventure. The Chekika area would be managed as a developed zone.

The East Everglades Addition is the primary area within the park where ecosystem restoration efforts are ongoing. As a result, it is also a key area for ongoing ecosystem research and monitoring by the National Park Service and its partners to determine how well the resources are responding to restoration projects. Many of these short- and long-term efforts in this area of the park take place with the use of airboats. Private and commercial airboating (via concession contracts) would also be permitted (as described in the sections below). Within the East Everglades Addition, designated routes/trails (based on the existing airboat trail network) and the conditions under which they could be used, would be identified for a variety of purposes (e.g., airboating for administrative, resource management, and research/monitoring purposes; private recreational airboating; concessioner airboat tours; nonmotorized recreational paddling). Future refinements to this network would be based on adaptive management and user capacity programs that evaluate ecosystem and park resource conditions (natural, cultural, wilderness) and visitor experiences over time, and identify

ways to improve resource conditions and visitor enjoyment of this area.

Wilderness. For a definition of wilderness, refer to the first page of chapter 3; various wilderness terms are also defined in the glossary.

Under the NPS preferred alternative, approximately 42,200 acres of East Everglades would be proposed for wilderness designation, and about 43,100 acres would be proposed as potential wilderness. Potential wilderness would be converted to designated wilderness (or proposed wilderness if Congress has not yet acted) once nonconforming uses such as private airboating and ecosystem restoration activities ended and/or private property came into federal ownership. In addition to the northwest corner of the addition, where commercial airboats operate (see inset on “NPS Preferred Alternative” map), areas that would be excluded from the wilderness proposal include the following:

- an east-west strip (1,320 feet wide) along the park boundary south of Tamiami Trail (to permit modifications along Tamiami Trail for improved water delivery to Shark River Slough)
- a 1,320-foot strip just inside the entire length of the eastern boundary for resource management and maintenance activities associated with ecosystem restoration [Note: before the wilderness proposal is forwarded by the National Park Service for approval, the width of this strip would be fine-tuned based on the best available information.]
- Chekika and a 300-foot strip around the Chekika area
- a 150-foot strip from either side of the centerline of SW 168th Street and from either side of the centerline of SW 237th Avenue

Private Airboating. A private airboat permit system would be implemented. Private airboating, by those eligible (according to the 1989 East Everglades Expansion Act) would continue in the frontcountry zone. Airboats would be required to stay on designated routes (to minimize resource impacts) and other regulations would be established to ensure consistency with the purposes of the Expansion Act including the need to protect, enhance, and restore ecological conditions and support public enjoyment of the area. Designated routes would coincide with existing airboat trails (but not necessarily all existing airboat trails); specific determinations of which airboat trails would be designated for use would be determined under the rulemaking process (includes Special Regulations under 36 *Code of Federal Regulations* (CFR) or changes to the Superintendent's Compendium following GMP approval (see the "Rulemaking" section of this alternative). See the "Preferred Alternative East Everglades Addition: Existing Airboat Trails" map for the existing airboat trail network in the East Everglades Addition. New and/or improved airboat launch areas may be established near Chekika and along the Tamiami Trail.

Commercial Airboating. In this alternative, commercial airboats would operate within the frontcountry zone under NPS concession contracts. All existing commercial airboat properties would be acquired by the National Park Service. Consistent with the Land Protection Plan, the long-term intent is fee acquisition of all private properties within the East Everglades Addition. There is the potential to acquire less-than-fee ownership (i.e., flowage easement) as an interim step to meet ecosystem restoration goals should fee simple acquisition not be possible initially. Whether it was a fee acquisition or flowage easement acquisition, the National Park Service would be able to negotiate concessions contracts with those operators that have met terms specified in the 1989 Expansion Act.

To support park and ecosystem restoration goals, the park would seek to minimize/consolidate the number of commercial airboat facilities shared by as many as four operators. These goals include (1) additional bridging of the Tamiami Trail to maximize ecological benefits and reduce barriers to flow in the Northeast Shark River Slough (based on decisions reached in the Tamiami Trail Modifications: Next Steps and future CERP projects); and (2) improved long-term management of East Everglades natural and cultural resources, facilities, and programs.

The concessions contract(s) would identify

- Only services and facilities that are necessary and appropriate to Everglades National Park, consistent with NPS concessions management laws and policies, would be provided. Airboat interpretive tours, food service, and appropriate merchandise sales are examples of these types of services.
- Initial airboat concessions contracts would require that airboat properties meet applicable local, state, and federal laws, regulations, and codes.
- Interpretive and educational information for airboat tour visitors would be guided by park interpretive/educational standards and coordinated with the park's interpretive staff, as at Shark Valley, the Gulf Coast, and Flamingo areas.
- A variety of airboat tours would be provided, not necessarily all by the same operator.
- Commercial airboats would travel on designated routes; those designated routes would coincide with existing airboat trails (but not necessarily *all* existing airboat trails); specifics would be determined under the special rulemaking process following GMP approval (see the "Rulemaking" section of this alternative). Similar to regulations related to private

airboating discussed above, provisions of concessions contracts would ensure consistency with the Expansion Act and the Land Protection Plan, including the need to protect, enhance, and restore ecological conditions and support public enjoyment of the area.

Other Management Elements. Some tree islands in both the frontcountry and backcountry zones would be identified for day and camping use. To protect wetlands and wildlife, including threatened and endangered species, routes and sites might be periodically closed or have limited access during nesting season or low water periods. Other tree islands not specifically identified for visitor use would be closed to public use. Public use areas could be maintained cooperatively via contractual agreements with commercial airboat concessioners or other stakeholder organizations.

East Everglades cultural sites would be maintained and protected through a site stewardship program. Shark River Slough cultural/archeological resources would be integrated into interpretive programs.

Canoe/kayak launches would be provided along Tamiami Trail, allowing both short- and long-distance paddling opportunities. The locations of these access points would be coordinated with Tamiami Trail Modifications: Next Steps-related projects. (Possible locations include the L67 extension access at the western edge of the East Everglades Addition area and/or Gator Park.) Permits would be required for overnight use in the East Everglades Addition, similar to regulations in other areas of the park. Long-distance wilderness paddling routes (unmarked) would allow visitors to connect through Shark River Slough to the main park road, Everglades Paddling Trail, or Whitewater Bay / Gulf of Mexico.

Chekika would remain open at least seasonally as a day use area, with education and recreation programs focused on park

natural and cultural resources and ecosystem restoration efforts. Borrow pits/ponds at Chekika would be filled in and restored to allow for a return to more natural conditions.

Education and recreational opportunities (e.g., hiking, bicycling, wildlife viewing, and learning about Everglades restoration and history) would be expanded along Tamiami Trail, around SW 237th Avenue near Chekika, at some tree islands, and near the park's eastern boundary. This would be accomplished in cooperation with public and private entities that are involved in Tamiami Trail modification projects, eastern boundary water modification projects, restoration of natural flows into the park, and regional greenway efforts near the park. Previously disturbed sites would be used to the maximum extent possible.

A new East Everglades administrative/operations center would be established near Chekika, but outside the East Everglades district consistent with Public Law 108-483, which was passed in 2004. This center would include a ranger/visitor contact station, a fire management station, equipment and vehicle storage, wayside/ exhibit kiosks, and offices. Residences in the park that were used for these purposes would be demolished once the operations center is functional; then those sites would be restored to natural conditions.

NPS staff would pursue alternative transportation options (probably during the high visitor use season to start) from the Miami area to visitor destinations along Tamiami Trail (e.g., to commercial airboat tour sites and Shark Valley). Such options would likely involve cooperation and/or partnerships with other entities and could be part of day-long visits in the park to view wildlife and understand Everglades restoration and history. Appendix C describes additional alternative transportation efforts being pursued by partner agencies.

Tamiami Trail / Shark Valley

Much of the northern portion of the park would be managed as the backcountry zone. A visitor information kiosk and a series of turnouts would be provided along Tamiami Trail for visitor orientation and an overview of natural and cultural resource issues, including ecosystem restoration. Locations would be coordinated with Tamiami Trail modifications related to ecosystem restoration.

The facilities at both ends of Shark Valley would be in the developed zone, and the 15-mile Shark Valley loop road would be in the frontcountry zone. The interpretive tram and bicycle rentals would continue to operate. Two shelters/rest stops would be added along the loop road within the footprint of existing development. The reservation system for tram tours and bicycles would be expanded to minimize parking and congestion in this area, and the park would pursue on-site options for improving parking and traffic flow conditions during peak times (e.g., using a portion of Old Tamiami Trail and resource sharing with adjacent Miccosukee Tribe of Indians of Florida parking area). Pre-trip information would also be expanded to encourage visitation during off-peak hours, spread use out throughout the day, and inform visitors about what to expect. In future years, the park could work with concessioners, commercial use authorization holders, and other partners to support enhanced recreational and educational opportunities consistent with the goals of the general management plan. Appendix C describes additional alternative transportation efforts being pursued by partner agencies.

The National Park Service would coordinate with other land management agencies along Tamiami Trail to identify and pursue cooperative projects for improved operational efficiency. Park staff would pursue working cooperatively with the Miccosukee Tribe to integrate education programs and opportunities offered by both entities and to determine the feasibility of sharing resources and facilities to meet park and tribal goals.

Law enforcement, maintenance operations for the park's Tamiami District, along with some resource management administrative facilities and housing for several law enforcement rangers, would be relocated and centralized at a new operations facility. The location would be a previously disturbed site within the national park, e.g., a portion of the Gator Park site after NPS acquisition of the land. A ranger residence and interpretive operations would remain at Shark Valley. Current facilities would be removed once the new district facility is operational.

Gulf Coast / Ten Thousand Islands / Everglades City

Visitor and administrative facilities at Everglades City would be in the developed zone. The Marjory Stoneman Douglas Visitor Center would be constructed to replace existing facilities, as required by the Everglades National Park Protection and Expansion Act of 1989. Operation of the visitor center would focus on interpretation, orientation and concessions to address visitor opportunities available in the western portion of the park, protection of resources, and issuing backcountry permits. The size and scope of the \$7.9 million facility improvements would be consistent with the value analysis performed in 2012 to address the scaled-down version of improvements at the Gulf Coast. A modest-sized visitor center would be constructed on currently disturbed land while other areas of the site would be reclaimed and rehabilitated. All nonessential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. This would serve to minimize the administrative and maintenance footprint at Everglades City and to improve visitor experience in that area by removing visual clutter and noise associated with park maintenance functions.

Existing parking would be improved. A new canoe-kayak ramp and launch would be

constructed to support both NPS and concessions operations.

NPS staff would work cooperatively with public and private interests to provide improved boat access outside the park to Gulf Coast waters.

The NPS area at Everglades City would continue to function as a major portal to the western portion of the park. The concession operation would continue and would offer expanded opportunities to visit Ten Thousand Islands, the Gulf Coast, and Wilderness Waterway through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with more opportunities such as interpretive, fishing, and paddling tours. In future years, the park could work with concessioners, commercial use authorization holders, and other partners to support enhanced recreational and educational opportunities consistent with the goals of the general management plan. Additional land-based interpretive programs and activities would link the park and neighboring communities. A cultural heritage interpretive water trail would be established in the Ten Thousand Islands area; this trail would be unmarked but shown on maps, charts, pamphlets, and websites providing visitors with an understanding of significant archeological and historic sites.

Most marine areas of the Gulf Coast, including most of the Wilderness Waterway, would be in the boat access zone and managed as they are now. As in alternative one, the Manatee speed zones depicted in figure 5b, along with signage, law enforcement commitments, and small, short, idle speed, no-wake areas for safety purposes would remain within the Gulf Coast / Ten Thousand Islands area. As previously discussed, all boaters would be required to participate in a boater education permit program, which would provide information about resource protection, safety, and boater etiquette. Everglades City would continue as the northern access point for the Wilderness Waterway.

A new Everglades Paddling Trail would be established to provide enhanced opportunities for a more tranquil backcountry experience that is more consistent with wilderness values. This route would be minimally marked to preserve scenery and minimize maintenance requirements. The route would be marked by GPS waypoints. Most segments of the Everglades Paddling Trail would be in the boat access zone, and continued relatively infrequent use of these segments by motorboats would be expected. To provide wilderness paddling experiences, a few segments would seasonally be treated as backcountry (nonmotorized) zones during the peak winter and early spring seasons based on narrowness or shallowness of the water, low clearance to mangroves, and available alternate routes for motorboats. These seasonal backcountry segments would include a portion of Wood River, Shark-Watson River sites, and the Hells Bay area. Additionally, a seasonal idle-speed segment would be established on Turner River, from Hurdles Creek junction to the Big Cypress National Preserve boundary. Visitors could continue to camp at backcountry chickees along the Gulf Coast and interior waterways, and as many as eight new backcountry chickees would be provided.

At Gopher Creek, the existing idle speed, no-wake designation would remain, as in alternative 1, while additional study of the Gopher Creek area is undertaken. The park is committed to further understanding the resource conditions and opportunities in the Gopher Creek area, which will be a focus of the Boater Safety and Resource Protection Plan

Costs and Staffing. The NPS staffing level needed to implement the NPS preferred alternative would be 249 FTE staff members. Volunteers and partnerships would continue to be key contributors to NPS operations. Annual operating costs for this alternative would be \$22.6 million. One-time costs (including new construction and nonfacility costs such as major resource plans and projects) would be \$42.1 million. Major cost

components include the Marjory Stoneman Douglas Visitor Center at Gulf Coast, the improvements at Flamingo, the new South Florida Collections Management Center, the new East Everglades and Tamiami Trail operations centers, and major programs such as the boater education/permit program. More information on cost estimates is provided near the end of this chapter. Land acquisition costs are not included in the cost estimates.

The cost estimates provided here are for comparison to other alternatives only; they are not to be used for budgeting purposes. Although the numbers appear to be absolutes, they represent a midpoint in a possible range of costs.

Presentation of these costs does not guarantee future NPS funding. Project funding would not come all at once; it would likely take many years to secure and may be provided by partners, donations, or other federal sources. Although the National Park Service hopes to secure this funding, the park may not receive enough funding to achieve all desired conditions within the time frame of this general management plan (the next 20 or more years).

See appendix D for a discussion of implementation phasing.

Rulemaking. The National Park Service can close areas or otherwise regulate specific uses through special regulations published at 36 CFR when necessary for safety or resource protection. Several use restrictions proposed under this alternative would require rulemaking (includes Special Regulations under 36 CFR or changes to the Superintendent's Compendium with a public involvement component). Implementing the pole/troll and pole/troll/idle zones and identifying designated airboat routes in the East Everglades Addition would restrict uses of these areas and so would require special regulations and/or changes to the Superintendent's Compendium under sections 1.5 and 3.8(b)(2) of 36 CFR. Details

associated with airboat routes and aspects of concession operations would be identified in concessions contracts, operation and maintenance plans, and associated documents.

The continued closure of Little Madeira Bay and other areas of the special protection zone and the reopening of Joe and Snag bays as described in the preferred alternative would occur via the Superintendent's Compendium.

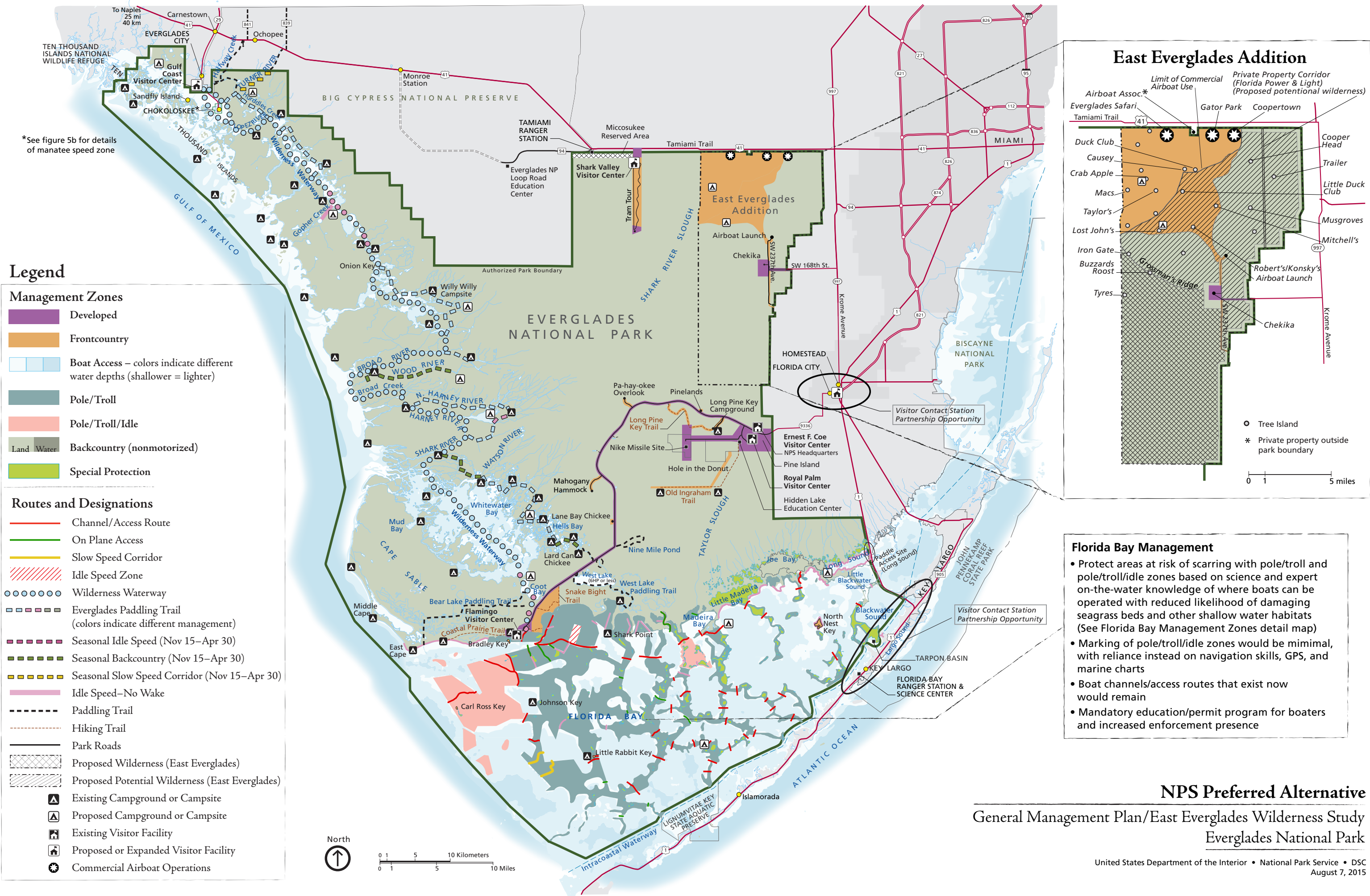
Closures or use restrictions deemed necessary under adaptive management or user capacity programs (to protect cultural or natural resources or desired visitor experience) would also be accomplished through the rulemaking process.

The closure of some tree islands in the East Everglades Addition to protect cultural and natural resources would be accomplished through the authority in 36 CFR 1.5 (Superintendent's Compendium) because it would not likely be a substantial alteration of public use patterns.






Implementing the idle- and slow-speed corridors would be accomplished under the discretionary authority of the park superintendent to set speed limits (36 CFR 3.8).

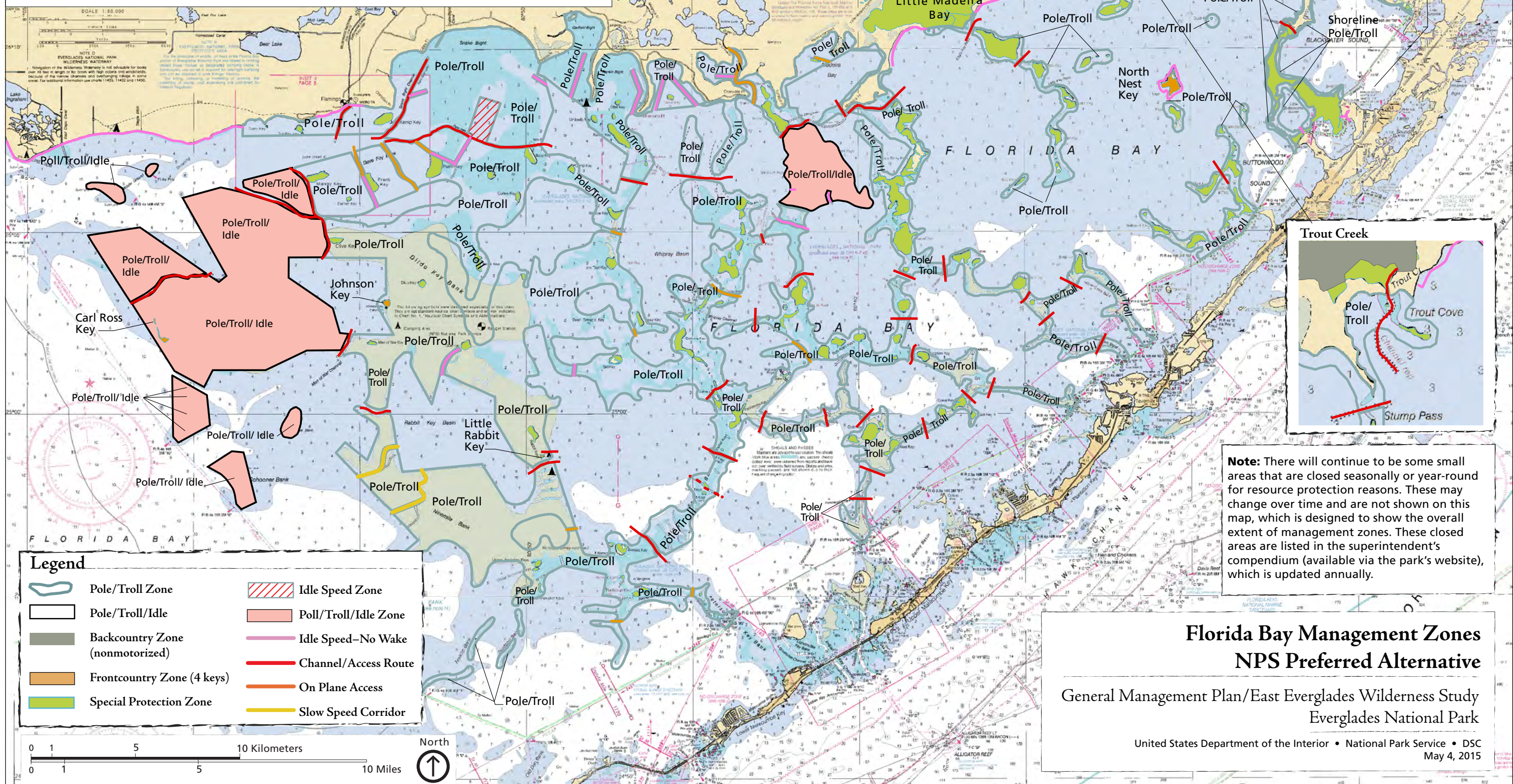
Establishing the mandatory boater education/permit process is authorized under 36 CFR 1.6, 3.3.

Where allowed under 36 CFR, the implementation of these actions would occur initially through changes to the Superintendent's Compendium to provide a reasonable assessment period of several years to better understand their effectiveness. The rulemaking process would be undertaken following the initial assessment period. The implementation of these processes, and changes to the Superintendent's Compendium would be initiated after the Record of Decision for this plan is signed.



Note: The management zones for Florida Bay are overlaid on a base map derived from NOAA Nautical Chart 11451. Base map (background) colors, defined immediately below, should not be confused with the management zones shown in the legend at the bottom of the page.

- | | | | |
|---|----------------------|---|--------------------------------------|
|  | Land |  | Banks, Shoals, or Flats |
|  | Deeper water (>6') |  | Banks, Shoals, or Flats (unverified) |
|  | Shallow water (≤ 6') | | |



Note: There will continue to be some small areas that are closed seasonally or year-round for resource protection reasons. These may change over time and are not shown on this map, which is designed to show the overall extent of management zones. These closed areas are listed in the superintendent's compendium (available via the park's website), which is updated annually.

Florida Bay Management Zones NPS Preferred Alternative

General Management Plan/East Everglades Wilderness Study
Everglades National Park

United States Department of the Interior • National Park Service • DSC
May 4, 2015

ALTERNATIVE 2

OVERALL CONCEPT AND PARKWIDE ACTIONS

Alternative 2 would strive to maintain and enhance visitor opportunities and protect natural systems while preserving many traditional routes and ways of visitor access. This concept is represented in the management zoning by the boat access zone in Florida Bay and a large (56,000-acre) frontcountry zone in the East Everglades Addition. This alternative would rely more on boater education and enhanced ranger patrols to provide some measure of increased protection for seagrass beds, banks, and other submerged marine wilderness values. Like the NPS preferred alternative, alternative 2 would continue visitor opportunities for commercial airboat tours. A modest portion of the East Everglades Addition (the southern portion, where airboat use would not occur) would be proposed for wilderness designation.

Alternative 2 would have several programs in common with the NPS preferred alternative—an adaptive management program, a park advisory committee, a user capacity program, an expanded natural resource program, a comprehensive cultural resource management program, and the boater education permit requirement. Details of these various programs would be the same as described in the NPS preferred alternative.

The mandatory boater education permit program, coupled with an increased law enforcement presence, especially on marine waters, would be relied on to increase understanding of and compliance with proper navigation and idle speed, no-wake designations and enhance resource protection through heightened awareness of sensitive resources and minimum impact boat operation techniques.

The park would develop a manatee management plan to identify ways to improve manatee protection within the national park while maintaining as many existing recreational boating opportunities as possible. This effort would include participation by staff from partner agencies having manatee management responsibilities such as the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission. Protection measures would be implemented using management tools that are as flexible as possible, such as the Superintendent's Compendium (a list of designations, closures, permit requirements, and other restrictions imposed under the discretionary authority of the park superintendent, as provided for in title 36 of the *Code of Federal Regulations*). Flexible management tools allow park managers to respond promptly to changing conditions such as changes in boat use patterns, changes in how manatees use different areas of the park, or changes in the incidence of boat-manatee collisions.

Table 5 summarizes key differences among the alternatives.

Headquarters / Pine Island / Royal Palm / Main Park Road

The headquarters and Ernest F. Coe Visitor Center area would be in the developed zone. The Ernest F. Coe Visitor Center would continue to be the primary site for information, orientation, and interpretation for visitors (see "Alternative 2" map at the end of this section). There would be no change in use of park headquarters. A center for park science staff focused on the *Comprehensive Ecosystem Restoration Plan* and other ecosystem restoration efforts would likely remain in a gateway community or at park headquarters.

The main park road would also be in the developed zone. Long Pine Key campground and interpretive turnouts at attractions along the main park road would be in the frontcountry zone to allow for basic facilities that support visitor use and expanded interpretive opportunities. The Long Pine Key area would continue to be managed for a mix of day use activities and camping. At Long Pine Key campground, electric hookups and solar hot-water showers would be provided. The Long Pine Key nature trail would be in the frontcountry zone, with interpretation focused on the pineland habitat. This trail would continue to be open to bicycling. Interpretive programs and media would be expanded and updated at the Royal Palm area.

Most of the area beyond the main park road corridor would be in the backcountry (nonmotorized) zone to perpetuate preservation of designated wilderness and protection/restoration of natural processes and natural and cultural resources. Canoeing and “slough sloggng” (walking in the wetlands) would continue to be the primary visitor activities in this area.

NPS staff would pursue the goal of providing some form of alternative transportation from gateway communities to destinations along the Main Park Road and the Tamiami Trail, such as from south Miami-Dade County to the Ernest F. Coe Visitor Center, Royal Palm, and Long Pine Key areas, with the terminus being Long Pine Key. This could be a fee-for-service commercial operation or could involve public transit; some costs could possibly be offset through partnerships, grants, or donations. This would allow visitors to stay multiple days at Long Pine Key if desired. This service would probably be offered during the high visitor use winter months at first, and implemented on an incremental basis based on what is most feasible.

Restoration of the Hole-in-the-Donut would continue for the life of this plan and would be carried out under the wilderness minimum requirements process. Portions of the Hole-in-the-Donut area would be in the

frontcountry zone to accommodate long-term, ongoing restoration activities. New interpretation of restoration activities for visitors, wayside exhibits, and day use hiking opportunities would be provided, as would primitive camping and evening programs at one or two mounds.

The area encompassing the Daniel Beard Center, Robertson Building, and the historic Nike Missile Base site would be in the developed zone. The Daniel Beard Center and Robertson Building would continue to be used for park administrative purposes such as resource management and research. The historic integrity of the national register district would be maintained, and historic buildings at the missile site would continue to be used for park administrative purposes. Seasonal, guided interpretive tours of the Nike Missile Base site would continue.

The South Florida Collections Management Center, currently housed in the Daniel Beard Center and Robertson Building, would be relocated to a new museum in this area of the park, providing public exhibits and a storage facility that meets NPS collections standards. Museum collections would continue to be acquired, preserved, and accessible to researchers. The public would have opportunities to experience the center’s vast resources and collections.

The main park road would continue to serve as the only motor vehicle route between the park entrance and Flamingo. Interpretive opportunities along the road would be enhanced to provide visitors with information on the park’s diverse habitats and landscapes. Visitors would continue to access the existing turnouts, boardwalk overlooks, and wayside exhibits.

Bicycling on the main park road from the park entrance to Flamingo would be allowed. Connections with nearby trails comprising the South Dade Greenway Network, including the proposed Biscayne–Everglades Greenway, would be provided where feasible.

Flamingo

As in alternative 1 and the NPS preferred alternative, the Flamingo area would continue as a key visitor interpretive and recreational destination for short and multiday park experiences focused on the area's natural and cultural resource diversity. The area would continue as a major center for wildlife viewing, boating, camping, and fishing activities. The Flamingo historic district would be in the developed zone and would promote a variety of land- and water-based visitor opportunities to enjoy and learn about the park.

Flamingo would continue to serve as the southern portal of the Wilderness Waterway and the new Everglades Paddling Trail, which is an element of this alternative. Flamingo would also serve as a major boat access point to Florida Bay, Whitewater Bay, and numerous backcountry rivers and bays, some of which include designated campsites and chickees. NPS operations for western Florida Bay, Whitewater Bay, and Cape Sable would remain at Flamingo.

As in the no-action alternative, a new long-term concession contract for Flamingo would be awarded. Concession services would include overnight accommodations, food service, a marina with boat rentals, the campground, and guided boat tours operated by a park concessioner. See the chapter 1 section titled "Ongoing Projects and Projects Planned for the Near Future, Flamingo Area Improvements" for more background information on this topic.

- New facilities at Flamingo would be designed to be sustainable, elevated/hardened/re-locatable.
- The existing gas station would be adaptively re-used by the park.
- New overnight guest accommodations provided via concessioner operations would include cabins, houseboats, and seasonal ecotents.

- Rehabilitation of the existing visitor center to meet visitor information, orientation, lodging, tour, and rental needs.
- The historic Mission 66 visitor center would be rehabilitated, preserved, and adaptively reused to enhance visitor services and administrative workspace.
- Increased education and recreational opportunities would be based out of Flamingo and may include more guided tours and land and water livery services.
- Food and beverage services to accommodate park visitors would be provided by the concessioner.
- Concessions housing would be rehabilitated, and some additional units of NPS and concessions housing would be provided to serve peak season operations.
- The NPS/concessions maintenance area would be improved (a few replacement buildings would be provided; workspaces would be reorganized, etc.).
- Restoration would occur at camping loops B and C (approximately 50 acres).
- Character-defining features of the Mission 66 cultural landscape would be preserved where feasible.

Flamingo, like the upper keys and Everglades City / Chokoloskee areas, would be an important location for contacting boaters and fulfilling the education/permit requirement. As explained earlier, the intent of the education/permit requirement would be to provide information about the challenges of marine navigation in the shallow marine and estuarine waters and information about boating etiquette to increase resource protection and visitor enjoyment.

Florida Bay

Flamingo would remain the main Florida Bay boat access point within Everglades National Park. Much of Florida Bay would be in the boat access zone. Under alternative 2, Florida Bay waters would be in the boat access zone, meaning no change in how boaters would use or access Florida Bay. The few short idle speed, no-wake areas for safety purposes would remain. The mandatory boater education/permit program and the increased marine law enforcement presence would provide some measure of increased protection for seagrass beds, banks, and other submerged marine wilderness values. NPS boundary and channel markers would be maintained. Marked channel/access routes and recommended motorboat routes would continue to be identified on NOAA maps, commercially offered charts, and the *Florida Bay Map and Guide*, which are widely available and used by boaters.

[Note: In contrast to the NPS preferred alternative and alternative 4, alternative 2 has no “Florida Bay Management Zones” map because there are no pole/troll or pole/troll/idle zones in the bay in this alternative.]

All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks), except Joe Bay and Snag Bay as discussed below, would be in the pole/troll zone. Fishing would be allowed in these areas. A new car-top launch point would be established on the 18-mile stretch of U.S. 1, near Long Sound (in partnership with the Florida Department of Transportation).

After being closed for more than 20 years, Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Joe Bay includes the smaller area to the east known as Snag Bay, and the two areas make up roughly 48% of Crocodile Sanctuary. For simplicity in this plan, the two bays will be referred to collectively as Joe Bay.

As shown in the “Alternative 2” map the pole/troll management zone would be limited to Little Madeira Bay.

As in the NPS preferred alternative, a comprehensive seagrass restoration program for submerged marine wilderness resources and sites damaged by groundings and propeller scarring would be established.

The four keys in the bay now open to visitor use—two that allow overnight stays (Little Rabbit and North Nest keys) and two that are for day use only (Carl Ross and Bradley keys)—would remain open. All other keys would be in the special protection zone and remain closed to public use to protect nesting and roosting birds. Five additional chickees (two more than in the NPS preferred alternative) would be built in Florida Bay to reduce the travel distance between campsites to about 8 to 10 miles. The chickees would be constructed in the water near keys (not on them); locations would be selected based on detailed evaluation of candidate sites.

Accessibility of park paddling trails and paddling facilities would be improved for persons with disabilities—this would be true for other areas of the park in addition to Florida Bay.

Opportunities would continue for visitors to enjoy and learn more about Florida Bay via the many guided fishing trips and ecotours offered in this vast, complex area.

Key Largo

The 20-acre NPS site in Key Largo, which includes the Key Largo ranger station and Florida Bay Interagency Science Center, would remain. Hammock vegetation would be restored in the areas not needed for development. Visitor-oriented improvements at this site would include a new visitor information kiosk and a venue to support the boater education/permit program.

NPS staff would pursue an interagency visitor information / orientation facility in the upper keys with other agencies such as the Florida Keys National Marine Sanctuary, the U.S. Fish and Wildlife Service, and Florida State Parks. In this alternative, opportunities to adaptively use existing facilities would be evaluated and pursued. Such a partnership facility would be created only if there is adequate support and involvement from other partners. This could be a convenient location for visitors to get information about recreational opportunities and regulations among the various park and protected areas, as well as interpretation of Florida Bay and keys marine environments. This facility could be yet another venue for fulfilling the proposed Everglades National Park boater education/permit requirement.

East Everglades Addition

The northern portion of the East Everglades Addition (except for the easternmost part, which is mostly marl prairie and inaccessible to airboats) would be in the frontcountry zone (see “Alternative 2” map). Most of the rest of the Addition would be in the backcountry (nonmotorized) zone, providing classic Everglades wilderness experiences.

Wilderness. Under alternative 2, about 39,500 acres of the southern portion of the East Everglades Addition would be proposed for wilderness designation (see “Alternative 2” map). Areas within this southern portion that would be excluded from the wilderness proposal include the following:

- a 1,320-foot strip just inside the eastern boundary [Note: before the wilderness proposal is forwarded by the National Park Service for approval, the width of this strip would be fine-tuned based on the best available information.]
- Chekika and a 300-foot strip around the Chekika area
- a 150-foot strip west of the centerline of SW 237th Avenue

Private Airboating. A private airboat permit system would be implemented. Private airboating, by those eligible (according to the 1989 East Everglades Expansion Act) would continue in the frontcountry zone. Airboats would be required to stay on designated routes (to minimize resource impacts) and other regulations could be established. Designated routes would coincide with existing airboat trails (but not necessarily all existing airboat trails); specifics would be determined under the rulemaking process following GMP approval (see the “Rulemaking” section of this alternative). New and/or improved airboat launch areas may be established near Chekika and along Tamiami Trail.

Commercial Airboating. In this alternative commercial airboats would operate within the frontcountry zone under NPS concession contracts. All existing commercial airboat properties would be acquired by the National Park Service. Contracts would be negotiated with the commercial operators that have met terms specified in the 1989 Expansion Act.

A wider range of airboat tours would be provided in this alternative than in the no-action alternative, including specialized tours to more destinations supporting natural and cultural resource understanding and education. Livery services for transportation of paddlers and campers to designated locations in the East Everglades Addition would also be provided.

The concessions contract(s) would include several provisions, as follows:

- Only services that are necessary and appropriate to Everglades National Park would be provided (airboat interpretive tours, food service, and appropriate merchandise sales are examples of these types of services). Activities that could continue under the no-action alternative but that may no longer be allowed under this alternative include wildlife shows, animals held in cages or pens, and

sales of some items such as animal objects.

- Airboat concessions contracts would require that airboat properties meet applicable local, state, and federal laws, regulations, and codes.
- Interpretive and educational information for airboat tour visitors would be guided by park interpretive/ educational standards and coordinated with the park's interpretive staff, as at the Shark Valley, Gulf Coast, and Flamingo areas.
- A variety of airboat tours would be provided, not necessarily all by the same operator.
- Commercial airboats would travel on designated routes; those designated routes would be based on the network of existing airboat trails (but not necessarily all existing airboat trails). Specifics would be determined under the rulemaking process following GMP approval (see the "Rulemaking" section of this alternative). Similar to regulations related to private airboating, provisions of future concessions contracts would ensure consistency with the Expansion Act, including the need to protect, enhance, and restore ecological conditions and support public enjoyment.

Other Management Elements. A few primitive campsites would be designated on tree islands that currently have camps or campsites. Tree islands in both the frontcountry and backcountry zones would be identified for day and camping use. To protect wetlands and wildlife, including threatened and endangered species, routes and sites might be periodically closed or have limited access during nesting seasons or low water periods. Other tree islands not specifically identified for visitor use would be closed. Permits would be required for overnight backcountry use, as in other areas of

the park. Paddling trails would also be provided.

Canoe/kayak launches would be provided along Tamiami Trail. As in the NPS preferred alternative, the locations of these access points would be coordinated with Tamiami Trail Modifications: Next Steps related projects.

Chekika would remain open at least seasonally as a day use area and for primitive camping. The level of education and resource-based programs would be increased.

As in the NPS preferred alternative, educational and recreational opportunities would be expanded along Tamiami Trail, around SW 237th Avenue near Chekika, at some tree islands, and near the park's eastern boundary in cooperation with public and private entities involved in restoration projects. Previously disturbed sites would be used to the maximum extent possible.

As in the NPS preferred alternative, a new East Everglades administrative / operations center would be established near Chekika, but outside the East Everglades district consistent with Public Law 108-483 (passed in 2004). Structures in the park that are now being used for these purposes would be demolished once the operations center is functional, and those sites would then be restored to natural conditions.

Tamiami Trail / Shark Valley

Much of the northern portion of the park would be managed as the backcountry zone. A visitor information kiosk and a series of turnouts would be provided along Tamiami Trail for visitor orientation and an overview of natural and cultural resource issues, including ecosystem restoration. As in the NPS preferred alternative, locations would be coordinated with changes associated with Tamiami Trail modifications related to ecosystem restoration.

The facilities at both ends of Shark Valley would be in the developed zone, and the 15-mile Shark Valley loop road would be in the frontcountry zone. The interpretive tram and bicycle rentals would continue to operate. Several shelters/rest stops would be added along the loop road within the footprint of existing development.

The National Park Service would coordinate with other land management agencies along Tamiami Trail to identify and pursue cooperative projects for improved operational efficiency. Park staff would pursue working cooperatively with the Miccosukee Tribe to integrate education programs and opportunities offered by both entities, and to determine the feasibility of sharing resources and facilities to meet park and tribal goals.

As in the NPS preferred alternative, law enforcement, maintenance operations for the park's Tamiami Trail District, along with some resource management administrative facilities and housing for several wildlife fire staff, would be relocated and centralized at a new operations facility in the park. The location would be a previously disturbed site within the national park, e.g., Gator Park. A ranger residence and interpretive operations would remain at Shark Valley.

Gulf Coast / Ten Thousand Islands / Everglades City

Visitor and administrative facilities at Everglades City would be in the developed zone. The Marjory Stoneman Douglas Visitor Center would be constructed to replace existing facilities, as required in the Everglades National Park Protection and Expansion Act of 1989. Operation of the visitor center would focus on interpretation, orientation, and concessions to address visitor opportunities available in the western portion of the park, protection of resources, and issuing backcountry permits. The size and the scope of the \$7.9 million facility improvements would be consistent with the value analysis performed in 2012 to address the scaled-down

version of improvements at the Gulf Coast. A modest-sized visitor center would be constructed on currently disturbed land while other areas of the site would be reclaimed and rehabilitated. All nonessential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. This would serve to minimize the administrative and maintenance footprint at Everglades City and to improve visitor experience in that area by removing visual clutter and noise associated with park maintenance functions.

Existing parking would be improved. A new canoe/kayak ramp and launch would be constructed to support both NPS and concessions operations.

NPS staff would work cooperatively with public and private interests to provide improved boat access outside the park to Gulf Coast waters.

The NPS area at Everglades City would continue to function as a major portal to the western portion of the park. The concession operation would offer expanded opportunities to visit Ten Thousand Islands, the Gulf Coast, and Wilderness Waterway through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with additional opportunities such as interpretive, fishing, and paddling tours. Additional land-based interpretive programs and activities would link the park and neighboring communities.

Most marine areas of the Gulf Coast, including most of the Wilderness Waterway, would be in the boat access zone, managed as they are now. As in alternative 1, the manatee speed zones depicted in figure 5b, along with signage; law enforcement commitments; and small, short, idle speed, no-wake areas for safety purposes would remain within the Gulf Coast / Ten Thousand Islands area. As previously discussed, all boaters would be required to participate in a boater education permit program, which would provide

information about resource protection, safety, and boater etiquette. Everglades City would continue as the northern access point for Wilderness Waterway.

As in the NPS preferred alternative, an Everglades Paddling Trail would be established to provide enhanced opportunities for a quieter, more tranquil experience that is more consistent with wilderness values. However, in this alternative the Everglades Paddling Trail would be unmarked (to preserve scenery and minimize maintenance requirements), but would be highlighted in the mandatory boater education program, in marine navigation charts, GPS systems, and other products that highlight park recreational opportunities. Also, except for existing idle speed, no-wake areas, the entire Everglades Paddling Trail would be in the boat access zone; continued relatively infrequent use of these segments by motorboats would be expected. Visitors could continue to camp at backcountry chickees along the Gulf Coast and interior waterways, and as many as eight new backcountry chickees would be provided.

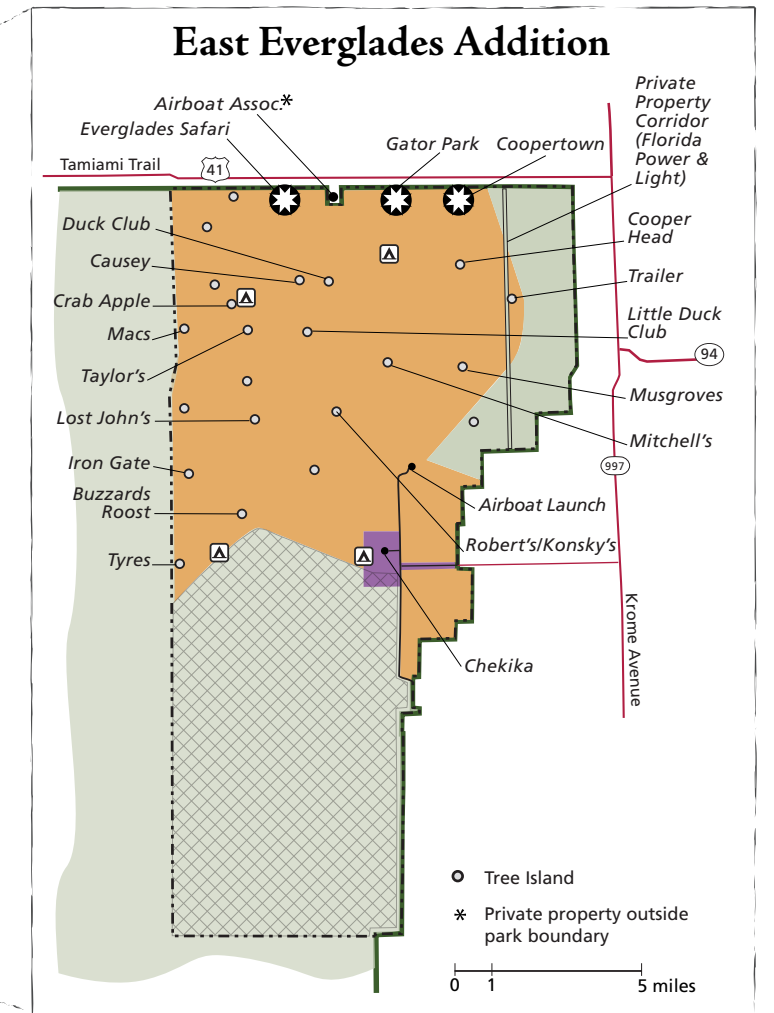
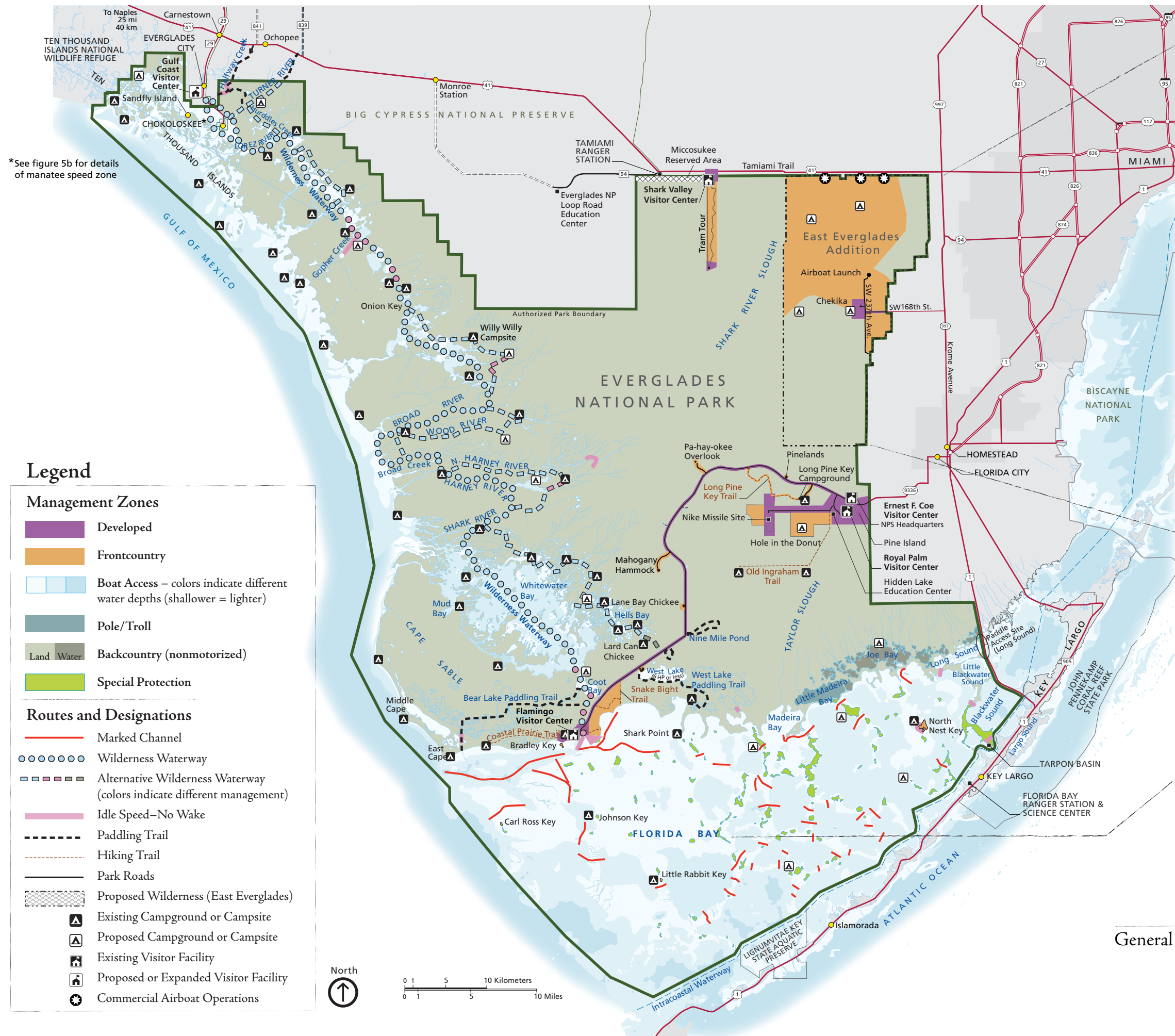
Costs and Staffing. The NPS staffing level needed to implement alternative 2 would be 240 FTE staff members. Volunteers and partnerships would continue to be key contributors to NPS operations. Annual operating costs for this alternative would be \$21.4 million. One-time costs (including new construction and nonfacility costs such as major resource plans and projects) would be \$38.5 million. Major cost components include the Marjory Stoneman Douglas Visitor Center

on the Gulf Coast, the improvements at Flamingo, the new South Florida Collections Management Center, the new East Everglades and Tamiami Trail operations centers, and major programs such as the boater education/permit program. More information on costs is provided near the end of this chapter. Land acquisition costs are not included in the cost estimates.

The cost estimates provided here are for comparison to other alternatives only; they are not to be used for budgeting purposes. Although the numbers appear to be absolutes, they represent a midpoint in a possible range of costs.

Presentation of these costs does not guarantee future NPS funding. Project funding would not come all at once; it would likely take many years to secure and may be provided by partners, donations, or other federal sources. Although the National Park Service hopes to secure this funding, the park may not receive enough funding to achieve all desired conditions within the time frame of this general management plan (the next 20 or more years).

Rulemaking. The National Park Service can close areas or otherwise regulate specific uses through special regulations published in the *Code of Federal Regulations* 36 (36 CFR) when necessary for safety or resource protection. Several closures and use restrictions proposed under this alternative would require rulemaking and these would be accomplished as described for the NPS preferred alternative.



- Florida Bay Management**
- Unrestricted boat access throughout most of Florida Bay
 - Protect seagrass and banks using mandatory education/permit program for boaters and increased enforcement presence
 - Marked channels (existing or previously marked) would remain

ALTERNATIVE 3

Alternative 3 was created during an early phase of alternatives development, but was dropped from detailed consideration in this plan. See the “Alternatives and Actions

Considered but Dismissed from Detailed Evaluation” section later in this chapter for more information.

ALTERNATIVE 4

OVERALL CONCEPT AND PARKWIDE ACTIONS

Alternative 4 would provide a high level of support for protecting natural systems while improving opportunities for certain types of visitor activities. This concept is represented in management zoning by establishing pole/troll zones over shallow areas of Florida Bay, and by designating 21,600 acres in the northwest portion of the East Everglades Addition as the frontcountry zone (where private airboating by eligible individuals would continue). Visitor opportunities for commercial airboat tours would be discontinued in this alternative. Nearly all of the East Everglades Addition would be proposed for eventual wilderness designation.

Alternative 4 would have several programs in common with alternative 2 and the NPS preferred alternative—an adaptive management program, a park advisory committee, a user capacity program, an expanded natural resource program, a comprehensive cultural resource management program, and the boater education permit requirement. Details of these various programs would be the same as described in the NPS preferred alternative.

The mandatory boater education permit program, coupled with other on-the-water changes such as pole/troll zones, would provide a multifaceted approach to enhanced resource protection and visitor experience. The park's law enforcement presence would be increased, especially on marine waters, to increase understanding of and compliance with proper navigation, management zones, and idle speed, no-wake designations and enhance resource protection through heightened awareness of sensitive resources and minimum impact boat operation techniques.

As in alternative 2, the park would develop a manatee management plan to identify ways to improve manatee protection within the national park while maintaining as many existing recreational boating opportunities as possible. Details would be as described in alternative 2.

Table 5 summarizes key differences among the alternatives.

Headquarters / Pine Island / Royal Palm / Main Park Road

The headquarters and Ernest F. Coe Visitor Center area would be in the developed zone. The Ernest F. Coe Visitor Center would continue to be the primary site for information, orientation, and interpretation for visitors, as in the other alternatives (see “Alternative 4” map at the end of this section). There would be no change in use of the park headquarters. A center for park science staff focused on the *Comprehensive Ecosystem Restoration Plan* and other ecosystem restoration efforts would likely remain in a gateway community or at park headquarters.

The main park road would also be in the developed zone. The Long Pine Key campground and interpretive turnouts at attractions along the main park road would be in the frontcountry zone to allow basic facilities that support visitor use and expanded interpretive opportunities. Long Pine Key would continue to be managed for a mix of daytime opportunities and camping. The Long Pine Key nature trail would be in the frontcountry zone, with interpretation focused on pineland habitat. This trail would continue to be open to bicycling.

As in alternative 2 and the NPS preferred alternative, most of the area beyond the main park road corridor would be in the

backcountry (nonmotorized) zone to perpetuate preservation of designated wilderness and protection/restoration of natural processes and natural and cultural resources. Canoeing and “slough slogging” would continue to be the primary visitor activities in this area.

As in the NPS preferred alternative, park managers would pursue a partnership with the Homestead and Florida City area communities to provide a cooperative visitor contact station in this national park gateway area and to enhance pre-visit information and orientation for visitors.

NPS staff would pursue the goal of providing alternative transportation from south Miami-Dade County to the national park’s Ernest F. Coe Visitor Center / Royal Palm area. This would make it easier for those who are without private vehicles (or who prefer to use public transportation) to get to the park. As in the NPS preferred alternative, NPS staff would also pursue potential opportunities for alternative transportation from the visitor center / Royal Palm area to Flamingo, with stops along the way. This would probably need to be implemented on an incremental basis based on what is most feasible given economic viability, potential partnerships, funding sources, etc.

Restoration of the Hole-in-the-Donut would continue for the life of this plan and would be carried out under the wilderness minimum requirements analysis process. The entire area would be restored as wetlands or hammocks. Potential wilderness would be converted to designated wilderness during the life of the general management plan.

The area encompassing the Daniel Beard Center, Robertson Building, and the Nike Missile Base site would be in the developed zone. The Daniel Beard Center and Robertson Building would continue to be used for park administrative purposes such as resource management and research. Visitor opportunities in the vicinity would be expanded to include interpretation of the

Nike Missile Base site after rehabilitation and visitor safety improvements. Interpretive programs would be extended into the shoulder seasons, and enhanced interpretation would require site improvements such as improved vehicular access, parking, and restrooms. The historic integrity of the national register district would be maintained, and historic buildings at the missile site would continue to be used for park administrative purposes.

The South Florida Collections Management Center, currently housed in the Daniel Beard Center and Robertson Building, would be relocated to a new museum centrally located in the Homestead-Florida City area. The new facility, which could be a partnership with a university or other public institution, would meet NPS collections standards. Museum collections would continue to be acquired, preserved, and accessible to researchers, and the public would have access, as appropriate, to the collection.

As in the other alternatives, the main park road would continue to serve as the only motor vehicle route between the park entrance and Flamingo. Interpretive opportunities along the road would be enhanced to provide visitors with information on the park’s diverse habitats and landscapes. Visitors would continue to access the existing turnouts, boardwalk overlooks, and wayside exhibits.

Bicycling on the main park road from the park entrance to Flamingo would be allowed. Connections with nearby trails comprising the South Dade Greenway Network, including the proposed Biscayne-Everglades Greenway, would be provided where feasible. In addition, increased hiking/cycling opportunities in nonwilderness areas at the headquarters / Long Pine Key area and Flamingo would be pursued.

Flamingo

As in all other alternatives, the Flamingo area would continue as a key visitor interpretive and recreational destination for short and multiday park experiences focused on the area's natural and cultural resource diversity. The area would continue as a major center for wildlife viewing, boating, camping, and fishing activities. The Flamingo historic district would be in the developed zone and would provide a variety of land- and water-based visitor opportunities to enjoy and learn about the park.

Flamingo would continue to serve as the southern portal of the Wilderness Waterway and the new Everglades Paddling Trail, which is an element of this alternative. Flamingo would also serve as a major boat access point to Florida Bay, Whitewater Bay, and numerous backcountry rivers and bays, some of which include designated campsites and chickees. NPS operations for western Florida Bay, Whitewater Bay, and Cape Sable would remain at Flamingo.

As in the no-action alternative, a new long-term concession contract for Flamingo would be awarded. Concession services would include overnight accommodations, food service, a marina with boat rentals, the campground, and guided boat tours operated by a park concessioner. See the chapter 1 section titled "Ongoing Projects and Projects Planned for the Near Future, Flamingo Area Improvements" for more background information on this topic.

- New facilities at Flamingo would be designed to be sustainable, hardened, mobile, elevated/hardened/relocatable.
- The existing gas station would be adaptively re-used by the park.
- New overnight guest accommodations provided via the concessioner operations would include cabins, houseboats, and seasonal ecotents.

- Rehabilitation of the existing visitor center to meet visitor information, orientation, lodging, tour, and rental needs.
- The historic Mission 66 visitor center would be rehabilitated, preserved, and adaptively reused to enhance visitor services and administrative workspace.
- Increased education and recreational opportunities would be based out of Flamingo and may include more guided tours and land and water livery services.
- Food and beverage service to accommodate park visitors would be provided by the concessioner.
- Concessions housing would be rehabilitated, and some additional units of NPS and concessions housing would be provided to serve peak season operations.
- The NPS/concessions maintenance area would be improved (a few replacement buildings would be provided; workspaces would be reorganized, etc.).
- Restoration would occur at camping loops B and C (approximately 50 acres).
- Character-defining features of the Mission 66 cultural landscape would be preserved where feasible.

A new long-term concession contract for Flamingo would be awarded. Concession services would include overnight accommodations, food service, a marina with boat rentals, the campground, and guided boat tours operated by a park concessioner, as described in the *Flamingo Concession Services Plan*.

Flamingo, like the upper keys and Everglades City / Chokoloskee areas, would be an important location for contacting boaters and fulfilling the education/permit requirement.

Florida Bay

Flamingo would remain the main Florida Bay boat access point within Everglades National Park. Much of Florida Bay would be in the boat access zone. Coupled with improved marking and maintenance of channel and boundary markers, as well as the mandatory boater education program, pole/troll zones, and idle-speed areas would be established to better protect designated submerged marine wilderness, vegetation, and wildlife resources while allowing reasonable recreational access. (See “Alternative 4” and “Florida Bay Management Zones” maps at the end of this section.)

In this alternative, the shallowest areas of Florida Bay (mean water depth 2 feet or less) would be managed as marked pole/troll zones based on the 2008 propeller scarring study’s (NPS 2008b) prediction of areas at risk of propeller and grounding damage. The pole/troll zones would be marked and also shown on marine charts and GPS maps. Under this alternative, about 159,564 acres (about 41%) of Florida Bay waters within the park (392,580 acres) would be in the pole/troll zone. Within pole/troll zones, boats would have to be propelled using push poles, electric trolling motors, or paddles. Internal combustion engines could be used in designated channel/access routes, but there would be fewer designated channel/access routes than now to reduce bottom impacts from propeller scarring and groundings.

A 300-foot-wide idle speed, no-wake area would be designated both along the mainland shoreline between East Cape and Middle Cape and around the keys in Florida Bay (the latter are not shown on the alternatives maps due to scale/clarity issues). The purpose of these designations is to reduce shoreline erosion from motorboat wakes, improve safety and experiences for those on the shoreline or boating close to the shoreline, and better protect wildlife. This zone would also serve as a buffer that would improve the natural soundscapes in the adjacent backcountry and wilderness areas. Visitors

would be expected to abide by pole/troll zone, backcountry zone, and idle-speed-no wake requirements, except in emergency situations.

As in the NPS preferred alternative, all areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks), except Joe Bay and Snag Bay as discussed below, would be in the special protection zone (no public use), which has been the case for more than 20 years. Joe Bay includes the smaller area to the east known as Snag Bay, and the two areas make up roughly 48% of Crocodile Sanctuary. For simplicity in this plan, the two bays will be referred to collectively as Joe Bay.

A new car-top boat launch would be established near Long Sound on the 18-mile stretch of U.S. 1 (in partnership with the Florida Department of Transportation and others). As in the NPS preferred alternative, NPS staff would pursue partnership opportunities for additional public boating (motorized and nonmotorized) access onto Florida Bay.

Crocodile Sanctuary would continue to serve as a baseline area for long-term ecological monitoring and restoration studies; some 200 scientific studies and research projects are associated with this area.

A comprehensive seagrass restoration program for submerged marine wilderness resources and sites damaged by groundings and propeller scarring would be established.

The four keys in the bay now open to visitor use—two that allow overnight stays (Little Rabbit and North Nest keys) and two that are for day use only (Carl Ross and Bradley keys)—would remain open. All other keys would be in the special protection zone and remain closed to public use to protect nesting and roosting birds. Four additional platform campsites (chickees) would be built in Florida Bay to reduce the travel distance between campsites to a more reasonable length (i.e., 8 to 10 miles). The chickees would be constructed in the water near keys (not on

them); locations would be selected based on detailed evaluation of candidate sites.

Opportunities would continue for visitors to enjoy and learn more about Florida Bay via the many guided fishing trips and ecotours offered in this vast complex area.

Key Largo

The 20-acre NPS site in Key Largo, which includes the Key Largo ranger station and Florida Bay Interagency Science Center, would remain. Hammock vegetation would be restored in the areas not needed for development. Visitor-oriented improvements at this site would include a new visitor information kiosk and a venue to support the boater education/permit program.

NPS staff would pursue an interagency visitor information/orientation facility in the upper keys with other agencies such as the Florida Keys National Marine Sanctuary, the U.S. Fish and Wildlife Service, and Florida State Parks. In this alternative, the opportunities in a new facility would be pursued. Such a partnership facility would be created only if there is adequate support and involvement from other partners. This could be a convenient location for visitors to get information about recreational opportunities and regulations regarding the various park and protected areas, as well as interpretation of Florida Bay and keys marine environments. This facility could be yet another venue for fulfilling the proposed Everglades National Park boater education/ permit requirement.

East Everglades Addition

As in the NPS preferred alternative, the northwest portion of the East Everglades Addition would be managed as the frontcountry zone until private airboat use ends (see “Alternative 4” map). After that, the frontcountry zone would be reduced to a strip along Tamiami Trail and the area around SW 237th Avenue. Most of the remaining area

would be managed as backcountry (nonmotorized), providing the classic Everglades wilderness experience of solitude and quiet.

Wilderness. Under this alternative there would be about 42,700 acres proposed for wilderness designation and 59,400 acres proposed as potential wilderness (see “Alternative 4” map). Potential wilderness would become designated wilderness once nonconforming uses such as private airboat use have ended and/or private property came into federal ownership. Areas that would be excluded from the wilderness proposal include the following:

- an east-west strip (1,320 feet wide) along the park boundary south of Tamiami Trail (to permit modifications along Tamiami Trail for improved water delivery to Shark River Slough)
- a 1,320-foot strip just inside the entire length of the eastern boundary (to permit drainage modification and seepage management infrastructure) [Note: before the wilderness proposal is forwarded by the National Park Service for approval, the width of this strip would be fine-tuned based on the best available information.]
- Chekika and a 300-foot strip around the Chekika area
- a 150-foot strip on either side of the centerline of SW 168th Street and on either side of the centerline of SW 237th Avenue

Private Airboating. A private airboat permit system would be implemented. Private airboating, by those eligible (according to the 1989 East Everglades Expansion Act), would continue in the frontcountry zone. Airboats would be required to stay on designated routes (to minimize resource impacts), and other regulations could be established. Designated routes would coincide with existing airboat trails (but not necessarily all

existing airboat trails); specifics would be determined under the rulemaking process following GMP approval (see the “Rule-making” section of this alternative). New and/or improved airboat launch areas may be established near Chekika and along Tamiami Trail.

Private airboating would continue in the frontcountry zone by those eligible, consistent with the 1989 East Everglades Expansion Act.

Commercial Airboating. In contrast to the other alternatives, commercial airboat operations within the park would end under this alternative, so visitors would no longer have the opportunity to take a commercial guided airboat tour. The commercial airboat sites would be acquired by the National Park Service to advance ecosystem restoration goals. One fill site that is now used as commercial airboat bases of operations would be used instead for visitor activities and programs such as picnicking, wildlife viewing, a canoe/kayak launch, and camping. If not needed for other purposes, the site would be restored to more natural conditions.

Other Management Elements. A few primitive campsites would be designated on tree islands that currently have camps or campsites. Tree islands in both frontcountry and backcountry zones would be identified for day and camping use. To protect wetlands and wildlife, including threatened and endangered species, routes and sites might be periodically closed or have limited access during nesting seasons or low water periods. Other tree islands not specifically identified for visitor use would be closed.

Canoe/kayak launches would be provided along Tamiami Trail, allowing both short- and long-distance paddling opportunities. As in the NPS preferred alternative, the locations of these access points would be coordinated with Tamiami Trail Modifications: Next Steps related projects. Permits would be required for overnight use in the East Everglades, as is the case in other areas of the park. Long-distance paddling routes (unmarked) would

allow visitors to connect through Shark River Slough to the main park road, Everglades Paddling Trail, or Whitewater Bay / Gulf of Mexico.

Some East Everglades Addition cultural sites would be maintained and protected through a stewardship program. Shark River Slough cultural/archeological resources would be integrated into interpretive programs.

Chekika would remain open at least seasonally for day use and would also serve as one of the park’s environmental education venues; this could include overnight programs.

Educational and recreational opportunities (e.g., hiking, bicycling, wildlife viewing, and learning about Everglades restoration and history) would be expanded along Tamiami Trail, around SW 237th Avenue near Chekika, and near the park’s eastern boundary, consistent with the management zones. This would be accomplished in cooperation with public and private entities that are involved in Tamiami Trail modification projects, eastern boundary water modification projects, and restoration of natural flows into the park and regional greenway efforts near the park. Previously disturbed sites would be used to the maximum extent possible.

As in the NPS preferred alternative and alternative 2, a new East Everglades administrative/ operations center would be established near Chekika, but outside the East Everglades district consistent with Public Law 108-483 (passed in 2004). Structures in the park that are now being used for these purposes would be demolished once the operations center is functional; those sites would be restored to natural conditions.

As in the NPS preferred alternative, the National Park Service would pursue alternative transportation options (probably during the high visitor use season to start) from the Miami area to visitor destinations along Tamiami Trail (to Shark Valley and sites in the East Everglades Addition). Such options

would likely involve cooperation and/or partnerships with other entities.

Tamiami Trail / Shark Valley

As in the other alternatives, much of the northern portion of the park would be in the backcountry zone. NPS staff would pursue a new multiagency visitor contact facility near the intersection of Tamiami Trail and Krome Avenue with other partners (e.g., local, state, and federal management entities involved in Everglades restoration and Tamiami Trail rebuilding). The intent would be to provide a centralized location for visitors to get information about outdoor recreational and educational opportunities, resource issues, and ecosystem restoration efforts throughout the Tamiami Trail corridor.

Generally, NPS staff would coordinate with other land management agencies along Tamiami Trail to identify and pursue other cooperative opportunities to increase operational efficiency. Park staff would pursue working cooperatively with the Miccosukee Tribe to integrate education programs and opportunities offered by both entities, and to determine the feasibility of sharing resources and facilities to meet park and tribal goals.

At Shark Valley, the facilities at each end of the 15-mile-loop road would be in the developed zone, and the loop road itself would be in the frontcountry zone. The interpretive tram and bicycle rentals would continue to operate. As in alternative 2, several shelters/rest stops would be added along the loop road within the footprint of existing development.

In contrast to the NPS preferred alternative and alternative 2, law enforcement, interpretation, and maintenance operations for the Tamiami Trail District would not be consolidated in a new facility; instead they would remain in existing facilities (as in alternative 1).

Gulf Coast / Ten Thousand Islands / Everglades City

Visitor and administrative facilities at Everglades City would be in the developed zone. The Marjory Stoneman Douglas Visitor Center would be constructed to replace existing facilities, as required by the Everglades National Park Protection and Expansion Act of 1989. Operation of the visitor center would focus on interpretation, orientation, and concessions to address visitor opportunities available in the western portion of the park, protection of resources, and issuing backcountry permits. The size and the scope of the \$7.9 million facility improvements would be consistent with the value analysis performed in 2012 to address the scaled-down version of improvements at the Gulf Coast. A modest-sized visitor center would be constructed on currently disturbed land while other areas of the site would be reclaimed and rehabilitated. All nonessential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. This would serve to minimize the administrative and maintenance footprint at Everglades City and to improve visitor experience in that area by removing visual clutter and noise associated with park maintenance functions.

Existing parking would be improved. A new canoe/kayak ramp and launch would be constructed to support both NPS and concessions operations.

The NPS area at Everglades City would continue to function as a major portal to the western portion of the park. The concession operation would continue and would offer expanded opportunities to visit Ten Thousand Islands, the Gulf Coast, and Wilderness Waterway through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with more opportunities such as interpretive, fishing, and paddling tours. Additional land-based interpretive programs and activities would link the park and neighboring

communities. A cultural heritage interpretive water trail would be established in the Ten Thousand Islands area; this trail would be unmarked but shown on maps, charts, websites, and pamphlets providing visitors with an understanding of significant archeological and historic sites in the region.

Most marine areas of the Gulf Coast, including most of Wilderness Waterway, would be in the boat access zone and managed as they are now. As previously discussed, all boaters would be required to participate in a boater education permit program, which would provide information about resource protection, safety, and boater etiquette. Everglades City would continue as the northern access point for Wilderness Waterway.

A new Everglades Paddling Trail would be established to provide enhanced opportunities for a quieter, more tranquil experience that is more consistent with wilderness values. This route would be minimally marked to preserve scenery and minimize maintenance requirements. Some segments of the Everglades Paddling Trail would be in the boat access zone, and continued relatively infrequent use of these segments by motorboats would be expected. To provide wilderness paddling experiences, some segments would be designated idle speed, no-wake areas or backcountry (nonmotorized) zones based on narrowness or shallowness of the water, low clearance to mangroves, and available alternate routes of access for motorboats. See “Alternative 4” map. Visitors could continue to camp at backcountry chickees along the Gulf Coast and interior waterways, and as many as eight new backcountry chickees would be provided.

Costs and Staffing. The NPS staffing level required to implement alternative 4 would be 251 FTE staff members. Volunteers and

partnerships would continue to be key contributors to NPS operations. Annual operating costs for this alternative would be \$22.7 million. One-time costs (including new construction and nonfacility costs such as major resource plans and projects) would be \$38.4 million. Major cost components include the Marjory Stoneman Douglas Visitor Center at Gulf Coast, the improvements at Flamingo, the new South Florida Collections Management Center, the new East Everglades operations center, and major programs such as the boater education / permit program. Land acquisition costs are not included in the cost estimates.

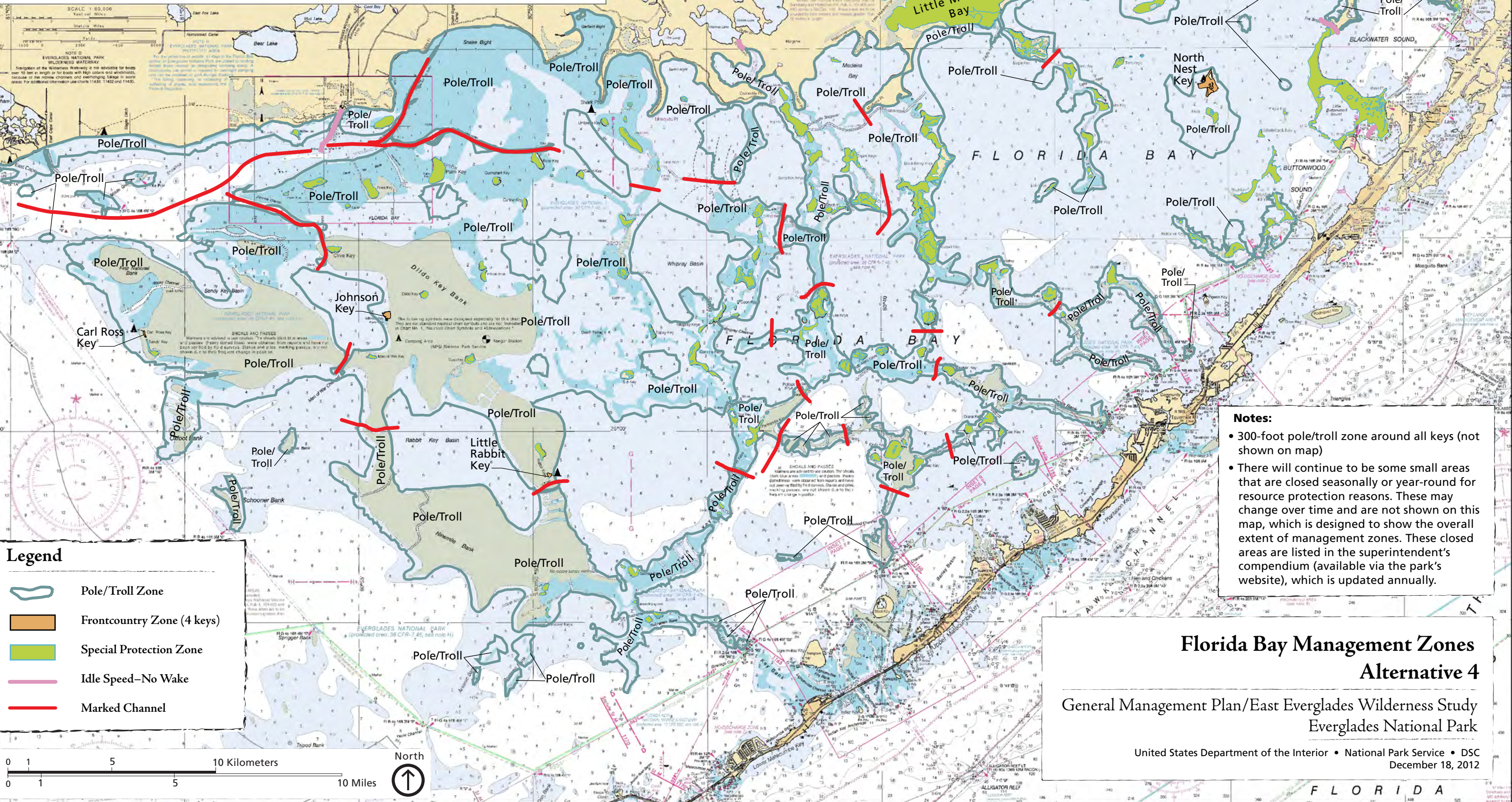
The cost estimates provided here are for comparison to other alternatives only; they are not to be used for budgeting purposes. Although the numbers appear to be absolutes, they represent a midpoint in a possible range of costs.

Presentation of these costs does not guarantee future NPS funding. Project funding would not come all at once; it would likely take many years to secure and may be provided by partners, donations, or other federal sources. Although the National Park Service hopes to secure this funding, the park may not receive enough funding to achieve all desired conditions within the time frame of this general management plan (the next 20 or more years). More information on costs is provided near the end of this chapter.

Rulemaking. The National Park Service can close areas or otherwise regulate specific uses through special regulations published at 36 *Code of Federal Regulations* (36 CFR) when necessary for safety or resource protection. Several closures and use restrictions proposed under this alternative would require rulemaking, and these would be accomplished as described for the NPS preferred alternative.

Note: The management zones for Florida Bay are overlaid on a base map derived from NOAA Nautical Chart 11451. Base map (background) colors, defined immediately below, should not be confused with the management zones shown in the legend at the bottom of the page.

- | | | | |
|---|----------------------|---|--------------------------------------|
|  | Land |  | Banks, Shoals, or Flats |
|  | Deeper water (>6') |  | Banks, Shoals, or Flats (unverified) |
|  | Shallow water (≤ 6') | | |



- Notes:**
- 300-foot pole/troll zone around all keys (not shown on map)
 - There will continue to be some small areas that are closed seasonally or year-round for resource protection reasons. These may change over time and are not shown on this map, which is designed to show the overall extent of management zones. These closed areas are listed in the superintendent's compendium (available via the park's website), which is updated annually.

Florida Bay Management Zones Alternative 4

General Management Plan/East Everglades Wilderness Study
Everglades National Park

United States Department of the Interior • National Park Service • DSC
December 18, 2012

COST SUMMARY OF THE ALTERNATIVES

National Park Service decision makers and the public must consider an overall picture of the complete costs and advantages of the alternatives, including the no-action alternative, to make wise planning and management decisions for Everglades National Park. In estimating the costs of the alternatives, different types of costs need to be taken into account, including one-time and annual operating costs.

The following applies to costs presented in this general management plan:

- Costs are presented as general estimates. They are intended for alternatives comparison purposes only and are not appropriate for budgeting purposes.
- The cost estimates were developed in 2012.
- The cost estimates have been developed using industry standards to the extent possible.
- Actual costs would be determined at a later date and would take into consideration the design of facilities, identification of detailed resource protection needs, and changing visitor expectations.
- Approval of the general management plan does not guarantee that funding or staffing for proposed actions would be forthcoming.
- Project funding may not come all at once; it may take many years to secure and may be provided by partners, donations, or other nonfederal sources.
- Some proposals may not be funded within the life of this general management plan, and full implementation may occur many years into the future.
- The action alternatives propose a range of facility expansions and/or adaptations to address a variety of visitor and resource issues that may be vulnerable to future sea level rise and storm surges. The National Park Service will evaluate proposed facility investments prior to project approvals using the best scientific information available and the climate change strategies described in this document to ensure the long-term sustainability of these investments. Due to the park's location and potential vulnerabilities, it is feasible that the National Park Service may conclude that such financial investments for facilities would be unwise and that other options would be considered or the project potentially would not be pursued or implemented.
- Costs have not been estimated for alternative actions where the terms "pursue" or "seek to" are used in the chapter 2 description of alternatives. For example, "the National Park Service would pursue alternative transportation" or "park managers would pursue a partnership with the Homestead and Florida City area communities to provide a cooperative visitor contact station" for the following reasons:
 - These actions would require partnerships and/or cooperation by other entities.
 - These actions would probably be funded, at least in part, from non-NPS funding sources.
 - These actions are considered less certain, and not enough details are known at this time to estimate costs.

The following explanatory notes pertain to table 2:

- Annual operating costs (ONPS) are the total costs per year for maintenance and operations associated with each alternative, including utilities, supplies, staff salaries and benefits, leasing, and

other materials. Cost and staffing estimates assume that the alternative is fully implemented as described in the narrative. For all alternatives annual operating costs includes staffing and other costs associated with Flamingo improvements.

TABLE 2. ESTIMATED COSTS OF THE ALTERNATIVES (IN 2012 DOLLARS)				
	Alternative 1 (No Action)	NPS Preferred	Alternative 2	Alternative 4
Annual Operating Costs	\$17,000,000	\$22,600,000	\$21,400,000	\$22,700,000
Staffing (FTEs)	214	249	240	251
Total One-time Costs	\$13,300,000	\$42,100,000	\$38,500,000	\$41,100,000
Facility Costs	\$13,300,000	\$38,700,000	\$36,300,000	\$38,400,000
Nonfacility Costs	\$ 0	\$ 3,400,000	\$ 2,200,000	\$ 2,700,000
Other Costs*				
Flamingo Redevelopment	\$13,300,000	\$13,300,000	\$13,300,000	\$13,300,000
(Concessions)	\$ 5,900,000	\$ 5,900,000	\$ 5,900,000	\$ 5,900,000
(NPS)	\$ 7,400,000	\$ 7,400,000	\$ 7,400,000	\$ 7,400,000
Gulf Coast	\$ 0	\$ 7,900,000	\$ 7,900,000	\$ 7,900,000

*Flamingo redevelopment and Gulf Coast costs are included in the total one-time costs for each action alternative.

- The staffing figure (total number of FTE employees) is the number of person-years of staff required to maintain the assets of the park, provide visitor services, protect resources, and generally support park operations. The FTE number indicates ONPS-funded NPS staff only, not volunteer positions or positions funded by partners. FTE salaries and benefits are included in the annual operating costs. There were 214 FTE authorized for the no-action alternative, while the actual staffing

level in 2011 was 181 FTE because funding was insufficient to fill all 214 authorized positions.

- Total one-time costs include facility costs, nonfacility costs, and other costs. They are calculated by summing the rows for facility and nonfacility costs in table 2.
- One-time facility costs include those for the design, construction, rehabilitation, or adaptive use of visitor centers, roads, parking areas, administrative facilities, comfort stations, educational facilities,

entrance stations, fire stations, maintenance facilities, museum collection facilities, and other visitor facilities.

- One-time nonfacility costs include actions for the preservation of cultural or natural resources not related to facilities, the development of visitor use tools not related to facilities, and other park management activities that would require substantial funding above park annual operating costs. Examples include the seagrass restoration program and the boater education / permit program.
- Other costs are for projects that would be partially or wholly funded from other sources. Flamingo costs have been separated out in table 2 because (1) costs for Flamingo redevelopment would be incurred by the concessioner and the National Park Service, (2) Flamingo costs make up a large share of the overall cost, and (3) Flamingo costs are common to every alternative, including the no-action alternative.
- Land acquisition costs are not included in the cost estimates.

USER CAPACITY

OVERVIEW

General management plans for national park system units are required by law to identify and address implementation commitments for user capacity, also known as carrying capacity. The National Park Service defines user capacity as the types and levels of visitor use that can be accommodated while sustaining the quality of park resources and visitor experience consistent with the purposes of the park. Managing user capacity in national parks is inherently complex and depends not only on the number of visitors, but also on where the visitors go, what they do, and the “footprints” they leave behind. In managing for user capacity, park staff and partners rely on a variety of management tools and strategies rather than relying solely on regulating the number of people in a park area. In addition, the ever-changing nature of visitor use in parks requires a deliberate and adaptive approach to managing user capacity.

The foundations for making user capacity decisions in this general management plan are the purpose, significance, special mandates, and management zones associated with the park. The purpose, significance, and special mandates define why the park was established and identify the most important resources and values, including visitor opportunities that would be protected and provided. The management zones in each action alternative describe the desired resource conditions and visitor experiences, including appropriate types of activities and general use levels for different locations throughout the park. The zones, as applied in the alternatives, are consistent with, and help the park achieve, its specific purpose, significance, and special mandates. As part of the NPS commitment to implement user capacity, park staff would abide by these directives for guiding the types and levels of visitor use that would be accommodated while sustaining the quality of

park resources and visitor experience consistent with the purposes of the park.

In addition to these important directives, this plan includes indicators and standards for Everglades National Park. Indicators and standards are measureable variables that would monitor resource conditions and visitor experience. The indicators and standards help the National Park Service ensure that desired conditions are being attained, thereby supporting the fulfillment of the park’s legislative and policy mandates. The general management plan also identifies the types of management actions that would be taken to achieve desired conditions and related legislative and policy mandates.

Table 3 includes the indicators, standards, and potential future management strategies allocated by management zones that would be implemented as a result of this planning effort. The management strategies in table 3 are generally listed in sequential order, i.e., strategies near the top of the list would generally be implemented first; strategies near the bottom are less preferred and might be implemented only if needed. The planning team considered many potential issues and related indicators that would identify impacts of concern, but those described in this section were considered the most significant, given the importance and vulnerability of the resource or visitor experience affected by visitor use. The planning team also reviewed the experiences of other parks with similar issues to help identify meaningful indicators. Standards that represent the minimum acceptable condition for each indicator were then assigned, taking into consideration the qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, staff management experience, and scoping on public preferences.

User capacity decision making is a form of adaptive management (figure 2) in that it is an iterative process in which management decisions are continuously informed and improved. Indicators are monitored and adjustments are made as appropriate. As monitoring conditions continues, managers

may decide to modify or add indicators if better ways are found to measure important changes in resource and visitor experience conditions. Information on NPS monitoring efforts, related visitor use management actions, and any changes to the indicators and standards would be shared with the public.

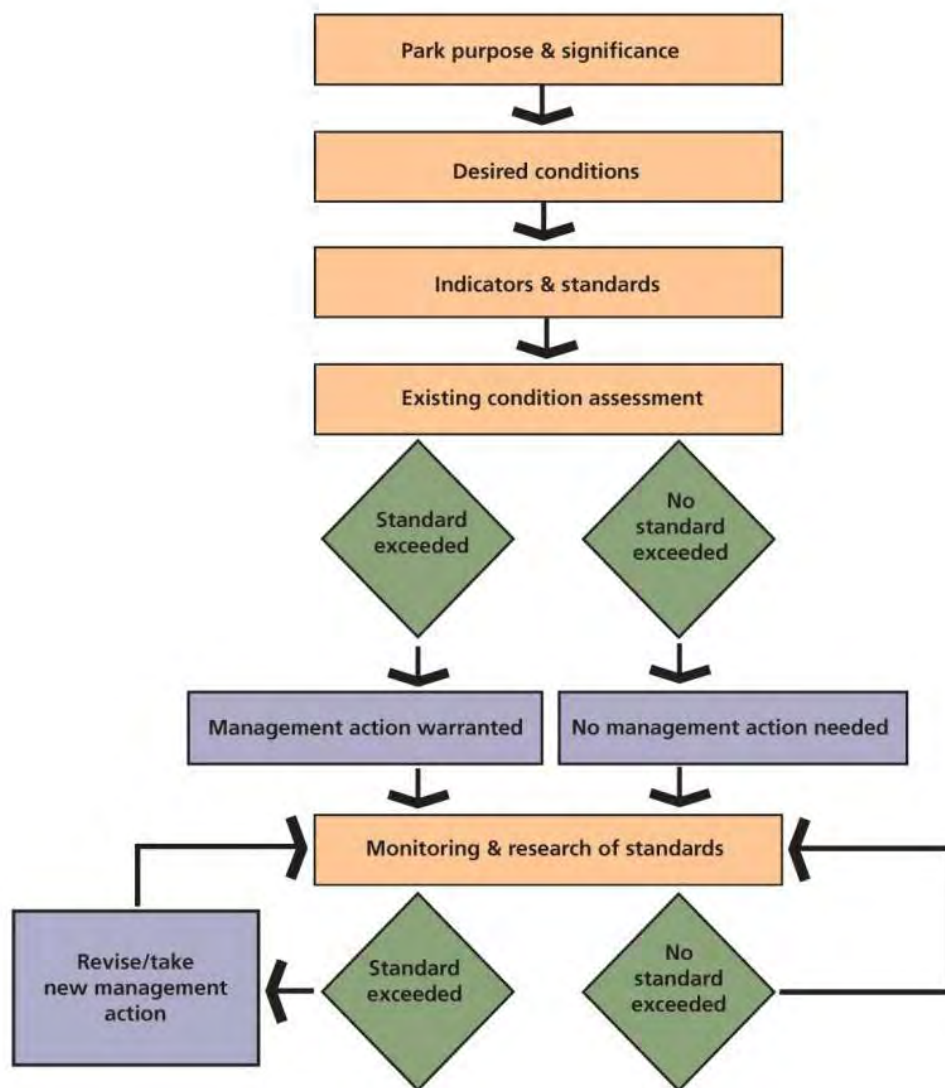


FIGURE 2. USER CAPACITY FRAMEWORK

RESOURCE INDICATORS AND STANDARDS

The priority resource indicators for Everglades National Park are associated with the following issues (not in priority order):

- seagrass scarring from motorboat propellers in Florida Bay
- disturbance of nesting and roosting birds
- creation of new airboat trails
- vegetation and soil impacts on campsites
- changes in cultural resource conditions as a result of visitor impacts

The condition of these resources is already being monitored and managed in various ways, but the indicators described below would help park staff track specific influences to these resources as a result of visitor use.

Impacts on seagrass from visitor activities include scarring from propellers, vessel groundings, and anchoring. These impacts can be widespread with dense scarring found in more shallow depths and near areas that are heavily used by boats (NPS 2008b). Increased boating activity, often by boaters with no or only limited previous experience, makes parts of Florida Bay susceptible to further seagrass scarring. The loss of seagrass from boating activities is a significant concern because seagrass beds in the bay are highly productive and provide vast areas of habitat for recreationally and commercially important fish and invertebrates. Although active restoration of damaged seagrass communities is technically possible, it is expensive and time consuming. Also, recent model estimates for seagrass recovery rates suggest that it may take as long as 60 years for some areas to fully recover (NPS 2008b).

Everglades National Park conducted a study in 2008 that documented the severity and

extent of seagrass scarring in Florida Bay. The study reported that scarring was widespread, and there has been a significant increase in the amount and density of scarring since 1995 (NPS 2008b). Minimizing the extent and severity of impact on the seagrass beds has been the focus of ongoing management strategies, including educating visitors on low-impact boating practices. The indicator included in table 3 for seagrass scarring would encourage the use of adaptive management strategies to reduce impacts in Florida Bay. The goal/standard of these efforts would be to achieve at least a 5% per year reduction in the number and length of scars over baseline conditions. Some of the management strategies being considered in this plan to further manage this impact include relocating routes, pole/troll and pole/troll/idle zone designations, and better channel marking.

The park is home to numerous types of wading birds including the white ibis, wood storks, and several species of egrets and herons. These wading birds are sensitive to human activities during nesting and foraging (Stolen 2003). Areas of special concern are portions of Florida Bay, the East Everglades Addition, and the Gulf Coast areas where visitor use occurs near wildlife nesting and roosting locations. For more than 25 years Everglades National Park biologists have conducted systematic reconnaissance flights to document wading bird abundance and distribution throughout the park. Under the general management plan user capacity program, the park would begin additional wading bird monitoring to support the goal of increased abundance and distribution of these birds in the park. This monitoring program, focused on important bird habitats, would use disturbance to nesting and roosting birds from public use (primarily boating, paddling, airboating) as an indicator. This indicator is supported by scientific literature (Rodgers and Smith 1995) documenting human disturbance from boating and other public use activities. The standard (no more than twice per day that birds are flushed from the roost or nesting colony) would ensure that human

activity is not causing undue levels of disturbance. Some management strategies park staff would use to manage this impact include more visitor education/signs, slower speed zones near roosting locations, and temporary or permanent area closures.

The creation and use of new undesignated airboat trails in the East Everglades Addition is a concern because of their impacts on soils and vegetation, as well as wildlife disturbance (including threatened and endangered species). This plan would determine designated routes in the Addition, consistent with the intent of the Everglades National Park Protection and Expansion Act, section 103(c), see appendix A. Park regulations implemented following this management plan would prohibit off-trail airboat activity; the standard would be zero tolerance for new undesignated airboat trails. The indicators and standards in table 3 would be based on the route system approved in this plan. A baseline for this indicator was established in 2004 through a study conducted by the University of Georgia (2006). Education, increased enforcement, and informational signage are management tools that would be used to address this issue.

Camping is a popular activity in the park that can impact resources. A widely used condition classification system that measures the extent and severity of resource impacts on campsites is the basis of this indicator (Marion 1995). The system uses a scale that ranges from class 0 (zero) where the site is minimally disturbed to class 5 where the site is highly impacted (significant loss of vegetation and signs of soil erosion). The park staff would maintain ground-based campsites to a standard of condition class 3 or better (no more than moderate vegetation loss and minimal signs of soil erosion and shoreline disturbance) and would endeavor to maintain at least 90% of campsites at a class 3 or better standard year-round (and 80% during peak season). NPS staff would employ management strategies such as Leave-No-Trace education programs, group size regulations, and informational signage to achieve this standard.

Visitor use impacts on cultural resources include wear on historic structures and unintentional disturbances and vandalism to archeological resources and historic structures. Cultural resources are nonrenewable, so impacts, especially those resulting from disrespectful behavior, must be minimized to the extent possible. Park staff members are already using internal guidelines to monitor cultural resources. The indicator for human impacts on cultural resources is based on this existing monitoring protocol (documented changes in condition of cultural resources from human-caused threats and disturbance by visitor awareness of characteristics such as loss of artifacts, erosion, wear on structures, new trails, and use of unauthorized areas). Management efforts would be focused on maintaining the integrity and condition of all significant sites to a standard of at least “good” condition. To ensure that this standard is maintained, visitor education and enforcement of federal laws such as the Archaeological Resources Protection Act and park regulations would be continued, and closure of particularly vulnerable areas would be considered.

VISITOR EXPERIENCE INDICATORS AND STANDARDS

The priority visitor experience indicators for Everglades National Park would be associated with the following issues:

- satisfaction with on-the-water experiences
- compliance rate with the backcountry permit system
- number of encounters between boaters
- number of groups encountered along backcountry hiking trails
- crowding and use conflicts at Shark Valley
- wait time at boat launches
- parking in undesignated areas

Similar to the resource indicators, visitors' opportunities and related experiences in the park are already being monitored and managed in various ways, but the indicators described below would help park staff track these specific issues more systematically to ensure that desired conditions are being achieved.

Maintaining high levels of visitor satisfaction with park experiences is an important management goal. Because of the diversity and high levels of uses that occur on the water, use conflicts and crowding can be a problem. The indicator related to these concerns would track trends (through random surveys) in visitor satisfaction levels specific to visitors' on-the-water experiences (through random surveys). The standard would ensure that most visitors (75% during peak visitation times, 85% at all other times) have a high satisfaction level. If satisfaction levels are not meeting the established standard, park staff would further investigate the source of crowding or conflict and implement appropriate management strategies.

In the backcountry, failure to adhere to reservations for designated camping locations as specified in a backcountry permit can also lead to crowding or conflict between users. Sometimes weather conditions may force visitors to stay in a particular location, and this is unavoidable. It is when visitors stray from the conditions of their backcountry permit purely for convenience or preference that is of concern. Park staff would monitor an indicator related to permit compliance (the percentage of visitors compliant with backcountry permit conditions). The standard would ensure that most visitors (70% during peak visitation times, 85% all other times) comply with backcountry permit conditions to minimize conflicts with other visitors. Park staff would use management strategies such as education on park regulations, encouraging use at less busy times, and regular enforcement to maintain high levels of permit compliance.

Many people visit Everglades National Park seeking wilderness and solitude. Crowding and conflicts can be of particular concern for such visitors. A study conducted in 1990 found that 63% of canoeists and 39% of motorboaters reported some degree of crowding along the park's Wilderness Waterway (Stewart and Ivy 1990). An indicator for this concern is the number of vessel groups encountered per day. Because boating visitors expect to see few others in a wilderness setting, the standard was set at no more than four vessel groups encountered per day for 90% of the days during peak season more than 5 miles from marinas, boat ramps, and launch sites in the following areas: Wilderness Waterway, Everglades Paddling Trail, and the East Everglades Addition. This standard is consistent with research on visitor preferences for the levels of encounters with other groups in wilderness, as well as actual encounter rate standards that have been established in many other wilderness areas (Manning 1999).

Similar crowding concerns can occur along backcountry hiking trails. Currently, use levels in these areas are relatively low, and encounters between hiking groups are infrequent. To maintain these conditions long term, an indicator of the number of encounters per day between groups on hiking trails would be monitored. A similar standard of no more than four groups encountered per day (more than 1 mile from trailheads) for at least 95% of the days during the peak use season would help ensure opportunities for solitude in the park's backcountry. For both on-the-water and hiking activities, park staff would continue to educate visitors on times of peak use in hopes of redistributing use to off-peak times. If needed, the park may use other management strategies such as providing alternate trails or routes that can help to disperse use in wilderness and backcountry areas.

At Shark Valley, visitors tour a 15-mile loop road via tram, bicycling, or walking. Because this is such a small area, the measure of people at one time is an important indicator of

crowding, as well as visitor safety. A standard of 400 to 500 people at one time (including those along the loop road, waiting for the tram, and in the parking lot / restroom area) was established based on an assessment of conditions at peak use times and current infrastructure capacity. Another indicator related to crowding and safety is the number of times the Shark Valley tram stops per trip on the loop road for bicycle groups. To minimize the frequency of this conflict, the standard was set at no more than three stops per tram trip (because of bicycles) during peak season, and no more than two times per tram trip during the off-peak season, for 80% of all tram trips. Management strategies for this area of the park would include real time information on current use conditions, visitor education of park regulations, improved parking and traffic management, encouraging use during off-peak times, and managing/regulating the flow of trams and bicycles along the one-way route.

Park boat ramps and launch sites are another location for occasional bottlenecks that create additional crowding, user conflict, and visitor safety concerns. The current wait times to launch and retrieve boats at peak times are generally considered acceptable, but given documented trends of increasing boat use in the park, it is important to monitor to detect a possible trend toward longer wait times. To track this issue over the long term, an indicator for wait times to launch or retrieve watercraft would be monitored. A standard of no more than 30 minutes during peak use times, for at least 90% of visitors, would be maintained. This standard is consistent with recommended national standards (Aukerman and Haas 2004). Crowding and safety concerns can also be a problem associated with visitor parking. An indicator for tracking compliance with designated parking areas has been identified. A standard of at least 90% compliance with parking regulations during peak season days was established. (Peak season is when this parking issue occurs; how peak season is defined may need to continue

to be evaluated based on changing use patterns.) Education about peak use times, real-time information about current use, and enforcement would help park staff maintain desired conditions at high use locations such as Flamingo and the Gulf Coast Visitor Center areas.

LONG-TERM MONITORING

Park staff would continue monitoring use levels and patterns throughout the park. In addition, park staff would monitor these user capacity indicators. The intensity of monitoring the indicators (e.g., frequency of monitoring cycles, amount of geographic area monitored) might vary considerably depending on how close existing conditions are to the standards. If the existing conditions are far from exceeding the standard, the rigor of monitoring might be less than if the existing conditions are close to or trending toward the standard.

Initial monitoring of the indicators would determine if the indicators are accurately measuring the conditions of concern and if the standards truly represent the minimally acceptable condition of the indicator. Park staff might decide to modify the indicators or standards and revise the monitoring program if better ways are found to measure changes caused by visitor use. Most of these types of changes should be made within the first several years of initiating monitoring. After this initial testing period, adjustments would be less likely to occur. Finally, if use levels and patterns change appreciably, park staff might need to identify new indicators to ensure that desired conditions are achieved and maintained. This iterative learning and refining process, a form of adaptive management, is a strength of the NPS user capacity management program. Input from the park advisory committee would also be sought and incorporated as appropriate.

TABLE 3. USER CAPACITY INDICATORS, STANDARDS, AND MANAGEMENT STRATEGIES FOR ACTION ALTERNATIVES

Indicator	Assigned Zone	Standard	Management Strategies
Topic: Visitor-related Resource Impacts			
Percent reduction in number of scars and total length of scars in Florida Bay over baseline conditions.	boat access, pole/troll, pole/troll/idle, backcountry, special protection	Percent decrease in number of scars and total length of scars in Florida Bay equals 5% per year over baseline conditions.	<ul style="list-style-type: none"> ▪ Educate about low impact practices and park regulations (part of mandatory education program). ▪ Increase law enforcement. ▪ Add signs/markings of zones. ▪ Actively restore seagrass. ▪ Apply additional restrictions on boating. ▪ Close areas or banks.
Number of times per day birds are flushed from the roost or nesting colony.	frontcountry, boat access, pole/troll, pole/troll/idle, backcountry, special protection	No more than two times in a 12-hour period (based on observations that are aggregated to equal a 12-hour day such as two days of observation at 6 hours each).	<ul style="list-style-type: none"> ▪ Educate about low impact practices and park regulations. ▪ Add signs. ▪ Implement slower speed zone near roosts. ▪ Apply more restricted type of zoning to area of concern. ▪ Close area around roost. ▪ Implement seasonal closures in targeted areas to prohibit motors and/or human activity.
New, undesig-nated airboat trails.	frontcountry and backcountry	Zero tolerance for new undesig-nated airboat trails (i.e., the authorized airboat trail “routes” are the only trails that are visible based on aerial observation monitoring).	<ul style="list-style-type: none"> ▪ Educate about low impact practices and park regulations. ▪ Better marking/delineation of existing trails. ▪ Increase enforcement. ▪ Add signs. ▪ Close trails/areas.
Number of designated campsites maintained at class 3 standards or better.	developed, frontcountry, boat access, backcountry	Achieve and maintain at least 90% of campsites at class 3 or better standard year-round, and 80 % during peak season.	<ul style="list-style-type: none"> ▪ Educate about low impact practices and park regulations (graduated consequences for noncompliance). ▪ Increase interactions with park law enforcement / resource protection staff. ▪ Add appropriate educational/regulations signs. ▪ Change capacity of designated campsites.
Documented changes in condition of cultural resources from human caused threats and disturbances (by visitors and park management activities), as defined in NPS Archeological Site Management Information System and List of Classified	All management zones—developed, frontcountry, boat access, pole/troll, pole/troll/idle, backcountry, and special protection	<p>Sites are maintained in good condition.</p> <p>Visitor impacts do not exceed threshold of changing overall site condition to a lesser condition (i.e., good to fair, fair to poor, etc.) with emphasis on maintaining sites in good condition.</p> <p>Visitor impacts do not threaten character-defining</p>	<ul style="list-style-type: none"> ▪ Develop new opportunities for active or passive interpretation of sites that include education about low impact practices and park regulations. ▪ Develop site stewardship programs with volunteers and organizations. ▪ Partner with other historic preservation and friends groups to create awareness about archeological and historic sites and public archeology programs. ▪ Mitigate/take corrective action consistent with Secretary of the Interior’s Standards. ▪ Restrict visitor activity at designated areas. ▪ Add signs and/or barriers to better protect resources. ▪ Increase law enforcement. ▪ Establish site/area closures.

TABLE 3. USER CAPACITY INDICATORS, STANDARDS, AND MANAGEMENT STRATEGIES FOR ACTION ALTERNATIVES

Indicator	Assigned Zone	Standard	Management Strategies
Structures (defined as good, fair, poor, or destroyed). Look at characteristics such as loss of artifacts, erosion, wear on structures, new trails, and use of unauthorized areas/sites.		features that make the property eligible for the National Register of Historic Places. At sites in less than good condition, management actions improve condition at least one level.	
Topic: Visitor Experience			
Percent satisfaction with park on-the-water experiences (using random survey instrument).	boat access, pole/troll, pole/troll/idle, backcountry	Achieve and maintain at least 85% year-round satisfaction level, with 75% satisfaction during peak season.	<ul style="list-style-type: none"> ▪ Educate to encourage use at off-peak times. ▪ Educate on park regulations and user group etiquette. ▪ Increase interactions with park staff and/or law enforcement. ▪ Change in use regulations. ▪ Further separate use types (alternative access / launch sites). ▪ Change capacity of designated campsites/build future sites with capacity to achieve desired experiences. ▪ Establish limitations on use levels.
Percentage of visitors compliant with backcountry permit conditions.	frontcountry, boat access, pole/troll, pole/troll/idle, backcountry	Achieve and maintain at least 85% compliance year-round, with at least 70% during peak season.	<ul style="list-style-type: none"> ▪ Educate on park regulations and user group etiquette (graduated consequences for noncompliance). ▪ Encourage use at less busy times. ▪ Increase interactions with park law enforcement / resource protection staff. ▪ Further separate use types (alternative access/ launch sites). ▪ Change capacity of designated campsites / build future sites with capacity to achieve desired experiences.
Number of vessel groups encountered per day (6 hours) more than 5 miles from park marinas, boat ramps, and launch sites on Wilderness Waterway, Everglades Paddling Trail, and East Everglades Addition.	boat access, backcountry	No more than four vessel groups encountered per day, for 90% of the days during peak season.	<ul style="list-style-type: none"> ▪ Continue permitting system for overnight use to these areas of the park. ▪ Make greater efforts toward public education to encourage voluntary redistribution of use to off-peak times or to lesser used areas. ▪ Establish new access points or routes to better distribute use. ▪ Establish limitations on use levels.

TABLE 3. USER CAPACITY INDICATORS, STANDARDS, AND MANAGEMENT STRATEGIES FOR ACTION ALTERNATIVES

Indicator	Assigned Zone	Standard	Management Strategies
Number of groups encountered per day (6 hours) more than 1 mile from trailheads along designated backcountry hiking trails.	backcountry (as applied to land areas)	No more than four groups encountered per day (6 hours) along designated hiking trails, for at least 95% of the days during the peak use season.	<ul style="list-style-type: none"> Make greater efforts toward public education to encourage voluntary redistribution of use to off-peak times or to lesser used areas. Establish new trail opportunities to better distribute use. Establish limitations on use levels.
Number of times the Shark Valley tram stops for bicycle groups per trip on the loop road.	developed, frontcountry	<p>Peak—no more than three times per tram trip, for 80% of the trips.</p> <p>Off-peak—no more than two times per tram trip, for 80% of the trips.</p>	<ul style="list-style-type: none"> Educate to encourage use at off-peak times. Educate on park regulations and trail etiquette. Provide alternate recreational opportunities and direct visitors to those locations. Establish spatial or temporal restrictions by use type.
People at one time at Shark Valley.	developed, frontcountry	No more than 400–500 people at one time within the Shark Valley area (includes people on the loop road, waiting for a tram, in the parking/restroom area).	<ul style="list-style-type: none"> Educate to encourage use at off-peak times (before 11:00 a.m., after 2:00 p.m.). Modify reservation and bike rental system to encourage more off-peak use. Provide real-time information regarding parking and access opportunities. Provide alternate recreational opportunities and direct visitors to those locations. Regulate, improve, and enforce informal/overflow parking. Change the timing of park operations. Establish spatial or temporal restrictions by use type. Initiate alternative transit and/or shuttle to Shark Valley options (at least during peak season).
Wait time to launch, load, and/or take a motorboat, airboat, or canoe/kayak out of the water.	developed, frontcountry	No more than a 30-minute wait to load, unload, and/or take out watercraft during peak use times, for at least 90% of visitors.	<ul style="list-style-type: none"> Make greater efforts toward public education to encourage voluntary redistribution of use to off-peak times or to lesser-used areas. Provide real-time information about ramp use. Add staff to aid facilitation of boat launching and loading. Redesign/configure launch ramp facilities. Further separate by vessel type. Regulate the number of vessels at the park entrance station and at launch site parking facilities.

TABLE 3. USER CAPACITY INDICATORS, STANDARDS, AND MANAGEMENT STRATEGIES FOR ACTION ALTERNATIVES

Indicator	Assigned Zone	Standard	Management Strategies
Percentage of time visitors use designated parking spaces.	developed, frontcountry	Achieve and maintain at least 90% compliance during peak season days.	<ul style="list-style-type: none"> ▪ Make greater public education efforts to encourage voluntary redistribution of use to off-peak times or to lesser used areas. ▪ Post areas as being at capacity (go elsewhere or return at a later, designated time). ▪ Provide real-time information regarding parking and access opportunities. ▪ Provide alternate recreational opportunities and direct visitors to those locations. ▪ Regulate, improve and, enforce informal/overflow parking. ▪ Initiate alternative transit and/or shuttle options (at least during peak season).

[Note: The management strategies in table 3 are generally listed in sequential order, i.e., strategies near the top of the list would be implemented first; strategies near the bottom are less preferred and might be implemented, only if needed.]

MITIGATION MEASURES COMMON TO ALL ACTION ALTERNATIVES

Congress charged the National Park Service with managing the lands under its stewardship “in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (NPS Organic Act, 16 USC 1). As a result, NPS staff routinely evaluate and implement mitigation measures whenever conditions occur that could adversely affect the sustainability of national park system resources.

To ensure that implementation of the action alternatives protects natural and cultural resources and the quality of the visitor experiences, a consistent set of mitigation measures would be applied to actions proposed in this plan, especially for construction-related projects. The National Park Service would prepare appropriate environmental compliance (i.e., that required by the National Environmental Policy Act, National Historic Preservation Act, and other relevant legislation) for these future actions. As part of the environmental compliance, the National Park Service would avoid, minimize, and mitigate adverse impacts when practicable. The implementation of a compliance monitoring program would be within the parameters of NEPA and NHPA compliance documents, U.S. Army Corps of Engineers section 404 permits, etc. The compliance monitoring program would oversee these mitigation measures and would include reporting requirements.

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

NATURAL RESOURCES

General

The park’s resources, including air, water, soils, vegetation, and wildlife, would be periodically inventoried and monitored to provide information needed to avoid or minimize impacts of future development. Any museum collections related to natural resources generated by such activities would be managed according to NPS policies.

Whenever possible, new facilities would be built in previously disturbed areas or in carefully selected sites with as small a construction footprint as possible and with sustainable design. During design and construction periods, NPS natural and cultural resource staff would identify areas to be avoided and monitor activities.

Fencing or other means would be used to protect sensitive resources adjacent to construction areas.

Construction materials would be kept in work areas, especially if construction takes place near streams, springs, natural drainages, or other water bodies.

Visitors would be informed of the importance of protecting the park’s natural resources and leaving them undisturbed for the enjoyment of future generations.

AIR QUALITY

Standard dust abatement measures would be applied if necessary and could include watering or otherwise stabilizing soils, covering haul trucks, employing speed limits on unpaved roads, minimizing vegetation clearing, and revegetating after construction.

SOILS

New facilities would be built on soils suitable for development. Soil erosion would be minimized by limiting the time soil is left exposed and by applying other erosion control measures such as erosion matting, silt fencing, and sedimentation basins in construction areas to reduce erosion, surface scouring, and discharge to water bodies. Once work was completed, construction areas would be revegetated with native plants in a timely manner.

To minimize soil erosion on new trails, best management practices for trail construction would be used. Examples of best management practices include installing water bars, check dams, and retaining walls; contouring to avoid erosion; and minimizing soil disturbance.

An area of land previously used as a dump site at the Gulf Coast Visitor Center area has been identified in the construction area, which comprises approximately 1 acre (based solely on visual and shovel observation). All proposed activities that occur within or adjacent to the old landfill and a 200-foot buffer, which may affect the integrity of any environmental protection measures at the site, are regulated by the FDEP and require meetings with them to discuss the proposed improvements and the potential impacts to the landfill. See the Gulf Coast VA 2012 document for further development requirements.

WATER RESOURCES

To prevent water pollution during construction, erosion control measures would be used, discharges to water bodies would be minimized, and construction equipment would be regularly inspected for leaks of petroleum and other chemicals.

Best management practices, such as the use of silt fences, would be followed to ensure that construction-related effects were minimal and

to prevent long-term impacts on water quality, wetlands, and aquatic species.

Caution would be exercised to protect water resources from activities with the potential to damage water resources, including damage caused by construction equipment, erosion, and siltation. Measures would be taken to keep fill material from escaping work areas, especially near streams, springs, natural drainages, and wetlands.

For new facilities, and to the extent practicable for existing facilities, stormwater management measures would be implemented to reduce nonpoint source pollution discharge from parking lots and other impervious surfaces. Such actions could include use of oil/sediment separators, street sweeping, infiltration beds, permeable surfaces, and vegetated or natural filters to trap or filter stormwater runoff.

The NPS spill prevention and pollution control program for hazardous materials would be followed and updated on a regular basis. Standard measures could include (1) procedures for hazardous materials storage and handling, spill containment, cleanup, and reporting; (2) limitation of refueling and other hazardous activities to upland/nonsensitive sites.

Actions taken by the National Park Service within the context of the plan and in future implementation level planning efforts would comply with the State of Florida, Florida Department of Environmental Protection's regulations and policies regarding water resources.

WETLANDS

Wetlands would be avoided if possible, and protection measures would be applied during construction. Wetlands would be delineated by qualified NPS staff or certified wetland specialists and clearly marked before construction work. Construction activities would be performed in a cautious manner to

prevent damage caused by equipment, erosion, siltation, etc. If it was determined that wetlands would be negatively impacted by construction or other activities, wetland losses would have to be compensated and appropriate compliance documentation, such as a wetlands statement of findings, would be required.

VEGETATION

Areas used by visitors (e.g., areas near trails) would be monitored for signs of native vegetation disturbance. Public education, revegetation of disturbed areas with native plants, erosion control measures, and barriers would be used to control potential impacts on plants from trail erosion or social trailing.

Proposed sites for new trails and other facilities would be surveyed for sensitive species before construction. If sensitive species were present, new developments would be relocated to avoid impacts.

As appropriate, revegetation plans would be developed for disturbed areas. Revegetation plans should specify such features as seed/plant source, seed/plant mixes, soil preparation, fertilizers, and mulching. Salvage vegetation, rather than new planting or seeding, would be used to the greatest extent possible. To maintain genetic integrity, native plants that grow in the project area or the region would be used in restoration efforts whenever possible. Use of invasive nonnative species or genetic materials would be considered only where deemed necessary to maintain a cultural landscape or to prevent severe resource damage. This use must be approved by the NPS resource management staff. Restoration activities would be instituted immediately after construction was completed. Monitoring would occur to ensure that revegetation was successful, plantings were maintained, and unsuccessful plant materials were replaced.

INVASIVE NONNATIVE SPECIES

Special attention would be devoted to preventing the spread of invasive nonnative plants. Standard measures would include the following elements—ensure that construction-related equipment arrives on-site free of mud or seed-bearing material, certify all seeds and straw material as weed-free, identify areas of invasive nonnative plants before construction, treat nonnative plants or nonnative infested topsoil before construction (e.g., topsoil segregation, storage, herbicide treatment), and revegetate with appropriate native species. Under special circumstances, the use of noninvasive, non-indigenous species (e.g., sterile hybrids) may be considered.

WILDLIFE

To the extent possible, new or rehabilitated facilities would be sited to avoid sensitive wildlife habitats, including feeding and resting areas, major travel corridors, nesting areas, and other sensitive habitats.

Construction activities would be timed to avoid sensitive periods such as nesting or spawning seasons. Ongoing visitor use and NPS operational activities could be restricted if their potential level of damage or disturbance warranted doing so.

Measures would be taken to reduce the potential for wildlife to get food from humans. Wildlife-proof garbage containers would be required at sites such as visitor centers, picnic areas, trails, and interpretive waysides. Signs would continue to educate visitors about the need to refrain from feeding wildlife.

Other visitor impacts on wildlife would be addressed through techniques such as visitor education programs, restrictions on visitor activities, and ranger patrols.

SPECIAL STATUS SPECIES

Conservation measures would occur during normal operations as well as before, during, and after construction to minimize long-term, immediate impacts on special status species where they are identified in the national park. These measures would vary by specific project and the affected area of the park. Many of the measures listed above for vegetation and wildlife would also benefit special status species by helping to preserve habitat. Conservation measures specific to special status species would include the following actions:

- Surveys would be conducted for special status species, including rare, threatened, and endangered species, before deciding to take any action that might cause harm. In consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Florida Fish and Wildlife Conservation Commission, appropriate measures would be taken to protect any sensitive species whether identified through surveys or presumed to occur.
- Breeding or nesting areas for threatened and endangered species would be protected from human disturbance.
- New facilities and management actions would be located and designed to avoid adverse effects on rare, threatened, and endangered species. If avoidance of adverse effects on rare, threatened, and endangered species was infeasible, appropriate conservation measures would be taken in consultation with the appropriate resource agencies.
- Restoration or monitoring plans would be developed as warranted. Data analyses and plans should include methods for evaluating impacts to species from plan implementation activities, and identify performance standards. Given the

GMP focus on improved management and protection of marine and coastal shallow water areas, an example could be the development of an aquatic habitat suitability assessment to evaluate changes over time to fish and wildlife species from plan implementation. Plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.

- Measures would be taken to reduce the adverse effects of invasive nonnative plants and wildlife on rare, threatened, and endangered species.

Sea Turtle and Smalltooth Sawfish

The construction supervisor shall comply with the following protected species construction conditions for these species:

- The construction supervisor shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.
- The project manager shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.
- Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without

prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

- All vessels associated with the construction project shall operate at idle speed, no-wake speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance from the bottom. All vessels would preferentially follow deep-water routes (e.g., marked channel/access routes) whenever possible.
- If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-foot radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.
- Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727.824.5312) and the local authorized sea turtle stranding / rescue organization.
- Any special construction conditions, required of a specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Other mitigation measures would be implemented for these species, as identified

through consultation with the National Marine Fisheries Service:

- The park would reduce the likelihood of injury or mortality resulting from hook-and-line capture or entanglement through prominently displaying educational signs providing information about hook-and-line captures of sea turtles and smalltooth sawfish, and by placing monofilament recycling bins at public boat ramps, mooring sites like the Flamingo marina, and other locations frequently used by park anglers. The park would continue to include the National Marine Fisheries Service in the development and maintenance of any educational materials provided to park visitors regarding listed marine species. Biological opinion (SER-2014-14671) provides more detail about procedures (see NMFS letter in appendix G).

Additionally, all in-water projects would comply with the project design criteria identified by the National Marine Fisheries Service in the March 12, 2015 biological opinion (SER-2014-14671). The nature of the in-water activities involved in a proposed project would dictate which of the Project Design Criteria (PDCs) would be applicable to future projects covered by the biological opinion. A list of each of the activities that are covered and the required PDCs necessary to complete the action are described below.

All projects and activities shall meet the following conditions:

- No work shall be authorized which may have direct or indirect adverse effects on the essential features of loggerhead sea turtle critical habitat (e.g., block the migratory pathway of sea turtles).
- For projects in waters accessible to sea turtles and smalltooth sawfish, follow the NMFS's "Sea Turtle and

Smalltooth Sawfish Construction Conditions,” dated March 23, 2006. Under these guidelines, all construction personnel shall be on the lookout for the presence of ESA-listed species and construction activities will cease if sea turtles or smalltooth sawfish are observed in the area.

- Turbidity barriers shall be used to minimize the effects of turbidity during in-water construction.
- To the extent possible, new or rehabilitated facilities would be sited to avoid sensitive wildlife habitats, including feeding and resting areas, major travel corridors, nesting areas, and other sensitive habitats. Specifically, projects must be designed to minimize impacts to seagrasses (i.e., no more than 10 acres of impact per structure).
- Construction activities would be timed to avoid sensitive periods such as nesting or spawning seasons. Ongoing visitor use and NPS operational activities could be restricted if their potential level of damage or disturbance warranted doing so.
- Breeding or nesting areas for threatened and endangered species would be protected from human disturbance.
- All vessels associated with construction projects shall operate at idle speeds, no-wake speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a 4-foot clearance to the bottom.
- Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to NMFS at 727.824.5312 and the local sea turtle stranding / rescue organization.

Installation, maintenance, and removal of ATONs, chickees, mooring pilings,

boardwalks, tie-up docks, and other minor pile-supported structures must meet the following project design criteria:

- Piles are limited to wood piles not greater than 14 inches in diameter or smaller
- New overwater structures do not exceed 500 square feet in size
- No impacts to red mangroves are authorized

Boat ramps must meet the following project design criteria:

- Repair and replacement of existing boat ramps within the Park are limited to the same size and location as the existing boat ramp. No impacts to red mangroves are authorized.

The park shall coordinate with NMFS to develop and maintain educational materials provided to Park visitors as part of their Park pass. These materials shall, at a minimum, include the following information to boaters and anglers regarding how to handle incidental captures of listed species by hook-and-line:

- handling procedures for listed marine species incidentally captured
- reporting requirements and contact information for the sea turtle and smalltooth sawfish hotlines
- requirements for anglers to have line cutting equipment and a dehooking instrument available during fishing
- instructions for hook-and-line captures which must be reported to the Everglades National Park Creel Survey and the Sea Turtle Stranding and Salvage Network or National Sawfish Encounter Database

Educational and Outreach materials must meet the following project design criteria:

- Educational signs must be posted providing procedures to address potential hook-and-line captures of sea turtles and smalltooth sawfish. These signs must be posted in high traffic areas wherever park visitors enter the water to fish (e.g., marinas, boat ramps, popular shore fishing locations). The park will work with the National Marine Fisheries Service on content approval for posted signs. The park may supplement the signs with additional relevant information.
- Develop a means to encourage park visitors to photograph hook-and-line captures of protected species if photos can be taken safely without further harming the animal.

SOUNDSCAPE

Standard noise abatement measures would be followed during construction. Standard noise abatement measures would include the following: a schedule that minimizes impacts on adjacent noise-sensitive resources, the use of the best available noise control techniques wherever feasible, the use of hydraulically or electrically powered tools when feasible, and the location of stationary noise sources as far from sensitive resources as possible. Facilities would be sited and designed to minimize objectionable noise.

SCENIC RESOURCES

Mitigation measures are designed to minimize visual intrusions. These measures could include the following:

- Where appropriate, facilities such as boardwalks and fences would be used to route people away from sensitive natural and cultural resources while still permitting access to important viewpoints.
- Facilities would be designed, sited, and constructed to avoid or minimize

visual intrusion into the natural environment or landscape.

- Vegetation screening would be provided, where appropriate.

CULTURAL RESOURCES

All projects with the potential to affect cultural resources would be carried out in compliance with section 106 of the National Historic Preservation Act to ensure that the effects are adequately addressed. All reasonable measures would be taken to avoid, minimize, or mitigate adverse effects in consultation with the Florida state historic preservation officer and, as necessary, the Advisory Council on Historic Preservation and other concerned parties, including American Indian tribes. In addition to adhering to the legal and policy requirements for cultural resources protection and preservation, NPS staff would also undertake the measures listed below to further protect the park's resources.

- All areas selected for construction (including any trail improvements) would be surveyed to ensure that cultural resources (i.e., archeological, historic, ethnographic, and cultural landscape resources) in the area of potential effects are adequately identified and protected by avoidance or, as appropriate, mitigation.
- Compliance with the Native American Graves Protection and Repatriation Act of 1990 would apply in the unlikely event that human remains believed to be American Indians were discovered during construction or other activities in the park. Prompt notification and consultation with the tribes traditionally associated with Everglades National Park would occur in accordance with the act. If such human remains were believed to be non-Indian, standard reporting procedures to the proper authorities would be followed, as would all

applicable federal, state, and local laws.

- Archeological documentation would be done in accordance with *The Secretary of the Interior's Standards for Archeology and Historic Preservation* (1983, as amended and annotated) and Director's Order 28A: *Archeology*.
- If during construction, previously unknown archeological resources were discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented and, if the resources cannot be preserved in situ, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer, associated Indian tribes, and others, as appropriate.
- Ethnographic resources would be protected and mitigated by such means as identifying and maintaining access for recognized and associated groups to traditional, spiritual/ ceremonial, resource gathering, and other activity areas. As practical, new developments would be screened from these areas, and conflicting uses would be relocated or timed to minimize disruptions.
- Further background research, resource inventories, and National Register of Historic Places evaluation of historic properties would be carried out where management information is lacking. The surveys and research necessary to determine the eligibility of a site, structure, district, or landscape for listing in the national register are a prerequisite (under section 110 of the National Environment Preservation Act) for understanding the resource's significance, as well as the basis of informed future decision making regarding how the resource should be managed. The results of these efforts

would be incorporated into site-specific planning and compliance documents.

- The park would strive to protect and preserve historic properties in accordance with all applicable laws, policies and guidelines. However, instances may occur in which the park cannot reasonably preserve a historic structure because of safety concerns or other conflicting and/or compelling management considerations (e.g., ecosystem restoration requirements). In those instances, the decision to remove or allow a structure to "molder" benign neglect would only be carried out following review and approval by the regional director, and consultation conducted in accordance with section 106 of the National Historic Preservation Act. NPS staff would consult as appropriate with the Florida state historic preservation office, associated tribes, and other interested parties. As part of the mitigation, adversely affected properties would be documented and recorded as appropriate to the standards of the Historic American Buildings Survey / Historic American Engineering Record / Historic American Landscape Survey program.
- All historic structures and cultural landscapes maintained as park assets would follow an approved preservation prescription identified in a historic structure report or cultural landscape report that follows *The Secretary of Interior's Standards for the Treatment of Historic Properties*.
- All treatment of historic structures and cultural landscapes would be done in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties including the standards and guidelines for the treatment of cultural landscapes. Properties that have been determined to be national historic landmarks would be protected to the

highest standards and every effort would be made to avoid, not just mitigate, any adverse effect.

- Visitors would be educated on the importance of protecting the park's historic properties and leaving these undisturbed for the enjoyment of future visitors.

VISITOR SAFETY AND EXPERIENCE

Measures to reduce adverse effects of construction on visitor safety and experience would be implemented, including project scheduling and best management practices.

Visitor safety concerns would be integrated into park educational programs. Directional signs would continue to orient visitors, and education programs would continue to promote understanding among visitors.

SOCIOECONOMIC ENVIRONMENT

During the future planning and implementation of the approved management plan for the park, NPS staff would work with local communities and county governments to further identify potential impacts and mitigation measures that would best serve the interests and concerns of both the National Park Service and the local communities. Partnerships would be pursued to improve the quality and diversity of community amenities and services.

CLIMATE CHANGE

New facilities development in coastal areas:

- All alternatives in this plan propose some development in coastal areas, including at Flamingo and the Gulf Coast. All development within Everglades National Park would adhere to the following guidelines during actual development within the

park. Development would consider the potential impacts that could result from changes in intensity or frequency of tropical storm events (including hurricanes), sea level change, variations in precipitation (droughts or more extreme rain events), and changes in groundwater levels, etc. When Everglades considers development within the park, managers must consider changes to sea level, hardened construction, and mobility of structures in addition to best construction practices.

- For the purposes of this plan, park managers should consider, review, and include the following items when proceeding with design and/or construction:
 - Temporary Structures: This construction type is temporary in nature and is not designed to resist high intensity storm events, which makes them susceptible to failure and could further damage park resources in a high intensity storm event. This type of construction could be used for short durations if needed to meet a temporary park management need, but this construction method is generally not recommended in Everglades National Park.
 - Mobile Structures: Mobile construction must be easily moved within a short time period to a predetermined location of relative safety. Over the life of the structure, it must remain code compliant. It must be clear that this structure is meant to be moved during an expected hazard event. Intact mobile structures, such as trailers and recreational vehicles, fit this description. Although this type of construction is permissible to meet park needs as defined in this plan, it would not withstand a high intensity storm surge event (as defined by

- code and park). All such mobile structures would be removed to a predetermined safe location.
- Elevated/hardened/re-locatable structures: Structures that are permanent-looking facilities shall be designed and sited to withstand hurricane-force winds (class 4) and storm surges, but that could be relocated to a new site at such time as the coastal conditions warrant (long-term climate change, for example).
- Structures: This construction type is considered permanent and nonmovable. At a minimum, this construction type would meet nationally recognized codes.
- Building codes provide guidance on how to appropriately deal with wind, flooding, and storm surge, but current codes do not provide guidance on sea level change. Any new construction at the park would be required to appropriately consider the finished floor elevation of structures using the formula below, which takes into account variables such as predicted sea level change and the wave effect due to sea level change.
- Finished Floor Elevation = Base Flood Elevation + Predicted Sea Level Change + Wave Effect Due to Sea Level Change + Insurance Risk Adjustment + Floor Structure Height.
- The finished floor elevation would change depending on the flood hazard zone in which the structure was built, as delineated on FEMA Flood Insurance Rate Maps (FIRM). As of this writing, and based on a structure with a 50-year life, the finished floor height would be 12.2 feet above sea level in the A-zone and 16.1 feet above sea level in the V-zone.
- Flood Hazard Zone: A and V zones are delineated on FEMA Flood Insurance Rate Maps.
- Base Flood Elevation: 100-year flood elevation determined by FEMA for the area of construction. Obtained from FEMA maps delineating the base flood elevation(s) in the area of construction.
- Predicted Sea Level Change: Current predictive information regarding anticipated sea level change for the life of the structure (for most permanent structures this is 50 years, the sum of the maximum 40-year life for life cycle cost calculations as prescribed by Energy Independence and Security Act of 2007, plus 10 years assumed to account for the process of planning, funding acquisition, design and construction). This is obtained by researching authoritative sources providing sea level change data local to the project site.
- Wave Effect Due to Sea Level Change (applies to V-zone construction): The additional height of storm surge induced waves due to the predicted sea level change. Obtain guidance from the FEMA Flood Insurance Study for the area including the structure to obtain the relationship between still water depth and wave height in storm surge wave-prone areas (V-zones).
- Insurance Risk Adjustment (applies to V-zone construction): A height adjustment to the proposed finished floor elevation in V-zone construction designed to equalize the financial risk to that of construction in an A-zone. Obtain actuarially based flood insurance premiums from FEMA's flood insurance program for construction in flood-prone areas (A and V-zones). Adjust the V-

- zone finished floor height upwards, until the insurance premium for that construction is equal to or lower than the insurance premium for flood insurance program compliant construction in the A-zone.
- Floor Structure Height (applies to V-zone construction): The difference between the finished floor height and the height of the FEMA mandated element prescribed to be at or above the base flood. Obtain current guidance from FEMA's Coastal Construction Manual regarding building element's relationship to design flood level. For instance the current FEMA Coastal

Construction Manual requires the bottom of the lowest horizontal structural member to be at or above flood level in V-zones.

- Examples: The finished floor elevation would change depending on the flood hazard zone in which the structure was built. As of the publication of this document and based on a structure with a 50-year life, the finished floor height would be 12.2 feet above sea level in the A-zone and 16.1 feet above sea level in the V- zone. The actual finished floor elevation would be subject to changes in current code, current scientific data, and best practices in construction.

South Florida, 2012, 50-year Life, A-Zone, AE (EL 11)	South Florida, 2012, 50-year Life, V-Zone, VE (EL 11)
Zone AE Base flood elevation – 11 ft Predicted Sea Level Change – 1.2 ft Wave effect of Sea Level Change – N/A Insurance Risk Adjustment – N/A Floor Structure Height – N/A Finished Floor Elevation = 12.2 ft above sea level	Zone VE Base flood elevation – 11 ft Predicted Sea Level Change – 1.2 ft Wave effect of Sea Level Change – 0.6 ft (0.55*1.2 ft) Insurance Risk Adjustment – 1.3 ft Floor Structure Height – 2 ft Finished Floor Elevation = 16.1 ft above sea level

FIGURE 3. EXAMPLE CALCULATION IN A-ZONE AND V-ZONE

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The National Park Service is required to identify the environmentally preferable alternative in its environmental documents in accordance with National Environmental Policy Act. The environmentally preferable alternative is the alternative that best promotes the national environmental policy expressed in the National Environmental Policy Act (section 101[b]).

This act states that it is the continuing responsibility of the federal government to

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
4. preserve important historic, cultural, and natural aspects of national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choices;
5. achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

After the environmental consequences of the alternatives were analyzed, each alternative was evaluated as to how well the six goals listed above would be met. The following discussion highlights how each alternative would meet or not meet these goals.

Two of the goals listed above did not make a difference in determining the environmentally preferable alternative. Goal number 1 is satisfied by each of the alternatives because Everglades is a national park and as the steward of these units, the National Park Service would continue to fulfill its mandate to protect the resources of Everglades National Park and provide opportunities for enjoyment of those resources for future generations. Goal 6 addresses the quality of renewable resources and recycling of depletable resources, which are not applicable in the scope of a general management plan. However, conservation and recycling of resources is encouraged throughout the National Park Service and, therefore, would be implemented under any alternative.

Alternative 1 (no action) represents a continuation of the present course of park management. Under alternative 1, park staff would continue to respond to resource impacts, visitor demands, and facility maintenance needs as they arise according to existing management direction. Without an updated general management plan, alternative A would lack the range of diversity and individual choices found in the other alternatives; it also does not provide as much resource protection and active, beneficial management as the other alternatives. Thus, the no-action alternative would not meet goal 3, goal 4, and goal 5 to the same extent as the other alternatives.

The NPS preferred alternative would support a high level of both science-based resource restoration activities and visitor experience opportunities, thus fully meeting goals 3, 4, and 5. Implementing user capacity and boater education programs under this alternative would also contribute to meeting goals 2, 3, and 5. Establishing the pole/troll and pole/troll idle zones in Florida Bay and a large area of proposed wilderness in the East

Everglades Addition would help meet goals 2, 3, and 4.

Alternative 2 would provide a high level of visitor experience opportunities, fully meeting goals 2 and 5. Implementing user capacity and boater education programs under this alternative would contribute to meeting goals 2, 3, and 5. This alternative would continue protection of undeveloped areas of the national park, but not to the extent of alternatives 4 and the preferred, so goal 4 would be only partially met.

Alternative 4 would support the highest level of resource protection and active, beneficial management of any of the alternatives. Alternative 4 would provide the highest comparative level of protection for Florida Bay (based on the extent of pole/troll zones) and the most proposed and potential wilderness in the East Everglades Addition, so it would best meet goal 4. Implementing user

capacity and boater education programs under this alternative would contribute to meeting goals 2, 3, and 5. However, the resource protection elements of this alternative would come at some cost to visitor opportunities and flexibility, so goals 3 and 5 would only be partially met.

After evaluation of all the alternatives in this general management plan, the environmentally preferable alternative was determined to be the NPS preferred alternative. This alternative would more fully satisfy all the national environmental criteria than alternatives 1, 2, or 4. The NPS preferred alternative would provide a high level of protection of natural and cultural resources. This alternative would also maintain an environment that supports a diversity and variety of individual choices and would integrate resource protection with an appropriate range of visitor use.

TABLE 4. ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Goal	Alternative 1 (No Action)	NPS Preferred Alternative	Alternative 2	Alternative 4
1	Fully meets goal	Fully meets goal	Fully meets goal	Fully meets goal
2	Fully meets goal	Fully meets goal	Fully meets goal	Fully meets goal
3	Partially meets goal	Fully meets goal	Fully meets goal	Partially meets goal
4	Partially meets goal	Fully meets goal	Partially meets goal	Fully meets goal
5	Partially meets goal	Fully meets goal	Fully meets goal	Partially meets goal
6	Not applicable	Not applicable	Not applicable	Not applicable
Conclusion		Environmentally Preferable		

ALTERNATIVES AND ACTIONS CONSIDERED BUT DISMISSED FROM DETAILED EVALUATION

ALTERNATIVES DISMISSED

The management alternatives in this document were developed over several years, through an iterative process that incorporated public input and new information at every step. This process is described in detail in the “Development of the Alternatives” section near the beginning of this chapter.

Once a preliminary NPS preferred alternative was developed several years into the planning process, the planning team considered the entire set of alternatives that had been carried forward so far and determined that alternative 3 should be dropped from detailed evaluation in this document. The reasons for dropping alternative 3 from detailed evaluation in this plan are as follows:

- The preliminary preferred alternative turned out to be rather similar to alternative 3, so dropping alternative 3 resulted in four distinct alternatives remaining.
- The range of reasonable alternatives could be maintained without alternative 3.
- Having fewer distinct alternatives reduces the potential for confusion as readers try to understand the various alternatives and ideas presented.
- With four rather than five alternatives, the cost of evaluating the alternatives and producing this document could be kept within the project budget.

ACTIONS DISMISSED

Certain actions (elements) from the various alternatives considered during the planning process were dismissed from detailed study in

this plan. These actions are described briefly below, along with the reasons for their dismissal.

- Development of a dedicated multiuse recreational path (parallel to the main park road) from the park entrance to Flamingo or widening of the main park road to add bicycle lanes on the road shoulders for safer, more enjoyable cycling—This action was dismissed from detailed analysis because of the high anticipated costs and potential adverse impacts on wetlands and other natural resources. Adding paved shoulders or a separate bike path would require an increase in pavement of at least 12 feet in width. To properly engineer slopes and meet road and trail safety standards, the amount of fill and the culvert length required could easily exceed twice that, depending on the road segment, adjacent resources, elevation, and other factors. The cost for this action could easily exceed \$60 million, not considering culverts/ bridging and wetland mitigation costs. At least 120 acres of wetlands in the heart of the national park would be directly affected; indirect eco-system and hydrologic impacts (e.g., impacts to surface water sheet flow) would also be expected, although more detailed study would be required to determine the nature and intensity of such impacts.
- Management by boat length in Florida Bay—This idea, proposed in GMP Newsletter 4, would have prohibited motorboats beyond 24 feet in length from portions of Florida Bay. While boat length generally correlates with

boat draft, many shallow draft large boats do exist. In consideration of these exceptions and the fact that boat manufacturing technology may change over time, boat length was

dismissed from detailed evaluation as a management tool.

SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

TABLE 5. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Parkwide Actions				
Overview	<p>As funding permits, Flamingo facilities would be improved or upgraded as outlined in the Flamingo CSP, as would other selected <i>planned</i> and <i>funded</i> facility improvements. Otherwise the built environment would remain at its current level. Existing facilities at the park headquarters area, Long Pine Key, Key Largo, Shark Valley, and Gulf Coast would be maintained and continue to serve operational needs and visitors, in some cases at less than desired levels. As funding permits, Flamingo facilities would be maintained until planned improvements are funded and implemented.</p> <p>Management activities would continue to conserve natural resources and processes while accommodating a range of visitor uses and experiences.</p> <p>Visitors would continue to have access to a wide variety of land- and water-based opportunities and programs, including concessioner trips at Gulf Coast, Shark Valley, and Flamingo, plus self-guided opportunities and guided trips throughout the park.</p>	<p>Using management zoning and collaborative techniques such as adaptive management, user education, and a national park advisory committee, the NPS preferred alternative would support restoration of natural systems while providing improved opportunities for quality visitor experiences. This concept is represented in the management zoning by establishing pole/troll and pole/troll/idle zones over some shallow areas of Florida Bay (submerged marine wilderness) and by designating 27,300 acres in the northwest portion of the East Everglades Addition as the frontcountry zone, where commercial airboat tours and private airboat use by eligible individuals would continue. Much of the East Everglades Addition (the portion where airboat use would not occur) would be proposed for eventual wilderness designation.</p>	<p>Alternative 2 would strive to maintain and enhance visitor opportunities and protect natural systems while preserving many traditional routes and ways of visitor access. This concept is represented in the management zoning by the boat access zone in Florida Bay and a large (56,000-acre) frontcountry zone in the East Everglades Addition. This alternative would rely more on boater education and enhanced ranger patrols to provide some measure of increased protection for seagrass beds, banks, and other submerged marine wilderness values. Like the NPS preferred alternative, alternative 2 would continue visitor opportunities for commercial airboat tours. A modest portion of the East Everglades Addition (the southern portion, where airboat use would not occur) would be proposed for wilderness designation.</p>	<p>Alternative 4 would provide a high level of support for protecting natural systems while improving opportunities for certain types of visitor activities. This concept is represented in the management zoning by establishing pole/troll zones over shallow areas of Florida Bay, and by designating 21,600 acres in the northwest portion of the East Everglades Addition as the frontcountry zone (where private airboating by eligible individuals would continue). Commercial airboat tours in the national park would be discontinued in this alternative. Nearly all of the East Everglades Addition would be proposed for eventual wilderness designation.</p>
Adaptive Management	N/A	<p>Use the adaptive management process to (a) evaluate the success of management actions in achieving desired resource and visitor use conditions, and (b) modify management strategies as needed to improve success at achieving desired conditions.</p>	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Advisory Committee	N/A	<p>Establish an Everglades National Park Advisory Committee composed of diverse stakeholders to help park managers consider various perspectives on issues such as implementation of the general management plan and adaptive management for the park’s marine and shallow-water resources.</p>	Same as NPS preferred alternative.	Same as NPS preferred alternative.
User Capacity Program	N/A	<p>Implement a user capacity program to assist in managing the levels, types, and patterns of visitor use to preserve park resources and quality of the visitor experience. Components would include (a) establish desired conditions for various areas of the park through management zoning, (b) identify indicators to monitor to determine whether desired conditions are being met, (c) identify standards (limits of acceptable change) for the indicators, (d) monitor indicators to determine if there are disturbing trends or if standards are being exceeded, and (e) take management action to maintain or restore desired conditions.</p>	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Cultural Resource Management	<p>As possible with available funding and staffing levels, strive to identify, protect, stabilize, and interpret (as appropriate) significant cultural resources and historic properties such as archeological sites, historic structures, and cultural landscapes in accordance with applicable policies and guidelines.</p>	<p>Establish a comprehensive cultural resource management program that would focus on efforts to inventory, document, and protect all types of cultural resources; regularly monitor archeological sites and other historic properties to assess resource conditions and inform long-term treatment strategies; interpret selected cultural sites for the public; better interpret and protect ethnographic resources in consultation with associated American Indian tribes and other peoples traditionally associated with the park.</p>	Same as NPS preferred alternative.	Same as NPS preferred alternative.

TABLE 5. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Natural Resource Management Program	As possible with available funding and staffing levels, strive to protect and restore natural resources and systems. Continue park managers’ participation in large-scale watershed and ecosystem restoration projects.	Develop a vigorous natural resource management program to support implementation of desired conditions described in this general management plan, implement natural resource components of this plan, and contribute to the adaptive management and user capacity components of this plan.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Boater Education Permit Requirement	N/A	Implement a mandatory boater education permit program to promote shared stewardship for marine resources, including the shallow sea bottom areas, seagrasses, and wildlife. Operators of motorboats and nonmotorized boats (including paddled craft) would complete a mandatory education program to obtain a permit to operate vessels in the park. Program information would be tailored to the type of craft and/or type of trip and would be widely available at the park; on the Internet; in gateway communities, marinas, hotels; from guides; etc.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Boating Safety and Resource Protection Plan	N/A	Develop a boating safety and resource protection plan. This plan would address boating in marine waters of Florida Bay, the Gulf Coast, and Ten Thousand Islands in more detail as it relates to visitor safety and resource protection. It would consider how to further avoid/minimize the risk of boat-boat collisions, boat-wildlife collisions, groundings, and other impacts on the sea bottom, which is federally designated wilderness. This study would address how to minimize risks to wildlife (including the manatee and other marine endangered species), so a separate manatee management plan would be unnecessary. The plan has been identified as a more effective way to protect threatened and endangered species and other important resources in the park, rather than addressing issues in a narrower way through the development of separate management plans for resources. The plan would study in more detail the Florida Bay channel/access routes shown on the “NPS Preferred Alternative” map and make more detailed decisions about how/if channel/access routes would be marked and accessed. This plan would be developed with public input and would be updated regularly.	N/A	N/A
Manatee Protection	The manatee speed zones depicted in figure 5b, along with signage, law enforcement commitments, and small, short, idle speed, no-wake areas for safety purposes would remain within the Gulf Coast / Ten Thousand Islands area.	Same as alternative one plus, additional manatee protection would be addressed by the boating safety and resource protection plan (see row immediately above.)	Same as alternative one, plus develop a manatee management plan to identify additional ways to improve manatee protection within the national park while maintaining as many existing recreational boating opportunities as possible. This effort would include participation by staff from partner agencies having manatee management responsibilities. Protection measures would be implemented using management tools that are as flexible as possible such as the Superintendent’s Compendium.	Same as alternative 2.
Paddling Trail Accessibility	N/A	Paddling trail accessibility would be improved, including for persons with disabilities.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Headquarters / Pine Island / Royal Palm / Main Park Road				
Long Pine Key	The Long Pine Key area would continue to offer a picnic area and campground, and the Long Pine Key nature trail would be maintained for hiking and bicycling through the pinelands.	Same as alternative 1, plus at Long Pine Key campground electric hookups and solar hot-water showers would be provided. Bicycle rentals, snacks, and basic camping supplies would be provided seasonally by a concessioner.	Same as alternative 1, plus at Long Pine Key campground, electric hookups and solar hot-water showers would be provided.	Same as alternative 1.

TABLE 5. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Royal Palm Area	The Royal Palm visitor contact station would continue to provide functional interpretive office and storage space and a cooperating association bookstore. The Anhinga and Gumbo Limbo trails would continue to provide opportunities for interpreting the Everglades ecosystem.	Interpretive programs and media would be expanded and updated at the Royal Palm area, including integrating prehistoric and historic themes into these programs. Where the road portion of the Anhinga Trail has created an impediment to water movement, more natural water flow would be restored by installing bridges or culverts.	Interpretive programs and media would be expanded and updated at the Royal Palm area.	Interpretive programs and media would be expanded and updated at the Royal Palm area, including integrating prehistoric and historic themes into these programs.
Visitor Orientation and Information	The Ernest F. Coe Visitor Center, near the east entrance of the park in the park headquarters area, would remain the primary park visitor center and would continue to provide visitor orientation, films, exhibits, and a cooperating association bookstore.	To enhance pre-visit information and orientation for visitors, park managers would pursue a partnership with the Homestead and Florida City area communities to provide a cooperative visitor contact station in this gateway area. As a short-term solution, develop an unstaffed orientation kiosk there and provide web-based information.	Same as alternative 1.	To enhance pre-visit information and orientation for visitors, park managers would pursue a partnership with the Homestead and Florida City area communities to provide a cooperative visitor contact station in this gateway area.
Alternative Transportation	N/A	NPS staff would pursue the goal of providing some form of alternative transportation from gateway communities to destinations along the Main Park Road and the Tamiami Trail, such as from south Miami-Dade County to the national park’s Ernest F. Coe Visitor Center / Royal Palm area and all the way to Flamingo. (Ideally the system would allow visitors to spend time at key interpretive stops along the way). Options could include simple transit and dedicated guided interpretive tours. The service would probably be offered during the high visitor use winter months at first and would be implemented incrementally based on economic viability, potential partnerships, funding sources, etc.	Same as the NPS preferred alternative except the terminus of the service would be Long Pine Key.	Same as the NPS preferred alternative.
Hole-in-the Donut	Ecological restoration of the Hole-in-the Donut area would continue, as would seasonal, guided interpretive tours of the Nike Missile Base site. Buildings associated with the historic Nike complex would continue to be used for park purposes such as administrative and storage space.	Same as alternative 1, except that new interpretation of ongoing restoration and daytime hiking opportunities would be provided, and this could include spur overlook trails to one or two mounds.	Same as alternative 1, except that new interpretation of restoration activities for visitors and daytime hiking opportunities would be provided, as would primitive camping and evening programs at one or two mounds.	Same as alternative 1, except that that areas zoned backcountry would be restored to natural conditions and would be converted to designated wilderness during the life of this plan.
Beard Center, Robertson Building, and South Florida Collections Management Center	The Daniel Beard Center and Robertson Building would continue to serve as administrative facilities for park resource managers, fire and aviation operations, and cooperating researchers. The Daniel Beard Center and Robertson Building also would continue to house the South Florida Collections Management Center.	<p>The Daniel Beard Center and Robertson Building would continue to be used for park administrative purposes, and this would include space vacated by the South Florida Collections Management Center (see below).</p> <p>The South Florida Collections Management Center, currently housed in the Daniel Beard Center and Robertson Building, would be relocated to a new museum in this area that meets NPS collections standards. Museum collections would continue to be acquired, preserved, and accessible to researchers, and the public would have its first opportunity to experience the center’s vast resources and collections. Part of this new facility could be used to support interpretation and public use (e.g., interpretation and public tour staging space) of the Nike Missile Base site.</p>	<p>The Daniel Beard Center and Robertson Building would continue to be used for park administrative purposes, and this would include space vacated by the South Florida Collections Management Center (see below).</p> <p>The South Florida Collections Management Center, currently housed in the Daniel Beard Center and Robertson Building, would be relocated to a new museum in this area that meets NPS collections standards. Museum collections would continue to be acquired, preserved, and accessible to researchers. The public would have opportunities to experience the center’s vast resources and collections.</p>	<p>The Daniel Beard Center and Robertson Building would continue to be used for park administrative purposes. Space in these buildings vacated by the South Florida Collections Management Center (see below) would serve interpretive/educational needs related to the Nike Missile Base site.</p> <p>The South Florida Collections Management Center, currently housed in the Daniel Beard Center and Robertson Building, would be relocated to a new museum centrally located in the Homestead-Florida City area. The new facility, which could be a partnership with a university or other public institution, would meet NPS collections standards. Museum collections would continue to be acquired, preserved, and accessible to researchers, and the public would have access, as appropriate, to the collection.</p>
Nike Missile Base Site	The historic integrity of the national register district would be maintained, and historic buildings at the missile site would continue to be used for park administrative purposes.	Guided interpretive tours of the Nike Missile Base site would be expanded into the shoulder seasons. Significant cultural resources would be preserved, site interpretation would be enhanced, and site improvements for access and circulation, parking, etc., would be made. A tram or shuttle for guided tours would be pursued. The historic integrity of the national register district would be maintained, and historic buildings at the missile site would continue to be used for park administrative purposes.	<p>Seasonal, guided interpretive tours of the Nike Missile Base site would continue.</p> <p>The historic integrity of the national register district would be maintained, and historic buildings at the missile site would continue to be used for park administrative purposes.</p>	Same as NPS preferred alternative except no tram or shuttle for guided tours would be pursued.

TABLE 5. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Bicycling and Hiking Opportunities	Bicycling on the main park road from the park entrance to Flamingo would continue to be allowed. Bicycling would continue to be permitted on other park roads where motor vehicles are allowed and on a few trails where bicycling is specifically permitted (e.g., Long Pine Key trail).	Same as alternative 1 plus connections with nearby trails comprising the South Dade Greenway Network, including the proposed Biscayne–Everglades Greenway, would be provided where feasible. The park would also pursue development of some additional hiking/bicycling trails in frontcountry zones at Long Pine Key and Flamingo.	Same as alternative 1 plus connections with nearby trails comprising the South Dade Greenway Network, including the proposed Biscayne–Everglades Greenway, would be provided where feasible.	Same as NPS preferred alternative.
Paddling Opportunities	Established paddle launch sites along the main park road (e.g., Nine Mile Pond, West Lake, and Hells Bay) would continue.	Paddle launch sites along the main park road would be improved, including opportunities for persons with disabilities.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Flamingo				
Commercial Services and Facilities	<p>A new, long-term concession contract for Flamingo would be awarded. Concession services would include overnight accommodations, food service, a marina with boat rentals, the campground, and guided boat tours operated by a park concessioner. See chapter 1, the section titled “Ongoing Projects and Projects Planned for the Near Future, Flamingo Area Improvements” for more background information on this topic.</p> <ul style="list-style-type: none">▪ New facilities at Flamingo would be designed to be sustainable, elevated/hardened/relocatable structures.▪ The existing gas station would be renovated to accommodate lodging reception.▪ New overnight guest accommodations provided via concessioner operations would include cabins, houseboats, and seasonal ecotents.▪ The visitor center would be rehabilitated to meet visitor information, orientation, lodging, tour, and rental needs.▪ The historic Mission 66 visitor center would be rehabilitated, preserved, and adaptively reused to enhance visitor services and administrative workspace.▪ Increased education and recreational opportunities would be based out of Flamingo and may include more guided tours and land and water livery services.▪ Food and beverage service to accommodate park visitors would be provided by the concessioner.▪ Concessions housing would be rehabilitated, and some additional units of NPS and concessions housing would be provided to serve peak season operations.▪ The NPS/concessions maintenance area would be improved (a few replacement buildings would be provided; workspaces would be reorganized, etc.).▪ Restoration would occur restoration at camping loops B and C (approximately 50 acres).	Same as alternative 1.	Same as alternative 1.	Same as alternative 1.
Florida Bay				
Boat Access Points	Flamingo would remain the only Florida Bay boat access point within Everglades National Park. All other access to the bay would originate from outside the park such as from the Intracoastal Waterway in the upper keys that shares a 40-mile boundary with the park.	<p>Flamingo would remain the main boat access point to Florida Bay within Everglades National Park. A new car-top boat launch point would be established near Long Sound on the 18-mile length of U.S. 1 (in partnership with the Florida Department of Transportation and others).</p> <p>The National Park Service would pursue partnership</p>	Flamingo would remain the main boat access point to Florida Bay within Everglades National Park. A new launch point for carry-in boats would be established near Long Sound on the 18-mile stretch of U.S. 1.	Same as NPS preferred alternative.

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PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
		opportunities for additional public boating (motorized and nonmotorized) access sites onto Florida Bay.		
Channel/Access Routes for Boat Access in Florida Bay	NPS boundary and channel markers for established channel/access routes would remain in use. Marked channels/access routes would continue to be identified on NOAA maps, commercially offered charts, and the <i>Florida Bay Map and Guide</i> .	<p>Established channel/access routes would remain in use. Future refinements to this system would be based on the boating safety and resource protection plan effort described in the first section of this table.</p> <p>New idle-, slow-speed, and on-plane corridors would be added to improve visitor enjoyment and safety, while protecting shallow-water resources. Idle- and slow-speed corridors would allow motorized access to important destinations. These corridors would also provide access across sensitive resource areas, as water depth and other conditions permit. On-plane corridors occur in areas of the bay with sufficient water depth to allow boats to operate at faster, but safe speeds. For locations of these corridors, please see “Florida Bay Management Zones – NPS Preferred Alternative” map.</p>	Same as alternative 1.	Compared to the no-action alternative, fewer channel/access routes would remain in use to reduce bottom impacts from propeller scarring and groundings. Channel/access routes would continue to be identified on NOAA maps, commercially offered charts, and the <i>Florida Bay Map and Guide</i> .
Boating Management of Florida Bay	There would be no change in how boaters use or access Florida Bay. Boating would remain relatively unrestricted throughout most of the bay.	<p>Much of Florida Bay would be in the boat access zone.</p> <p>Pole/troll and pole/troll/idle zones (about 127,400 acres or 32% of Florida Bay waters within the park) would be established to better protect designated submerged marine wilderness, vegetation, and wildlife resources while allowing for a wide range of recreational opportunities and reasonable access. The pole/troll and pole/troll/idle zones in this alternative were developed with public input and are based on science and expert on-the-water knowledge of where boats can be operated with reduced likelihood of damaging seagrass beds and other shallow water habitats. The zone locations would be fine-tuned over time through the adaptive management process.</p> <p>The pole/troll and pole/troll/idle zones would be minimally marked to preserve the scenery and aesthetics of Florida Bay and minimize maintenance requirements, so boaters would rely primarily on navigation skills, GPS technology, marine charts, and materials developed for the boater education program to comply with the zone requirements. Within pole/troll and pole/troll/idle zones, boats would have to be propelled using push poles, electric trolling motors, or paddles. However, within pole/troll/idle zones water depths may occasionally be suitable for certain types of boats to be propelled using internal combustion engines operated at idle speed. Internal combustion engines could also be used in designated channels / access routes. To access the majority (63%) of pole/troll zones, visitors would need to pole or troll 0.25 mile or less. Less than 25% of the pole/troll zones would require visitors to pole or troll between 0.26 to .5 mile, and about 2% of pole/troll areas would be more than 1 miles away from traditional boat access zones. The majority of the bay would still be open to motorboat access and most pole/troll distances would be relatively short. The Pole/Troll Distance Analysis map, Pole/Troll Vessel Density Analysis map, and the Pole/Troll Analysis: Flamingo Area map for the NPS preferred alternative follow table 6.</p>	Nearly all of Florida Bay waters would be in the boat access zone, so boating would remain relatively unrestricted throughout most of the bay. The few established short, idle speed, no-wake areas would remain.	<p>Much of Florida Bay would be in the boat access zone.</p> <p>Pole/troll zones (about 159,564 acres or 41% of Florida Bay waters within the park) would be established to better protect designated submerged marine wilderness, vegetation, and wildlife resources. The pole/troll zones in this alternative cover the shallowest areas of Florida Bay (basically, mean depth 2 feet or less, based on the propeller scarring study’s (NPS 2008b) prediction of areas at risk of propeller and grounding damage).</p> <p>The pole/troll zones would be marked and also shown on marine charts and GPS maps. Within pole/troll zones, boats would have to be propelled using push poles, electric trolling motors, or paddles. Internal combustion engines could be used in designated channel/access routes. The emphasis on preservation resulted in longer distances when compared to the NPS preferred alternative—boaters would have to pole or troll to reach their desired water destination (in some cases, exceeding 5 miles). The majority of the pole/troll zones (61.0%) would require visitors accessing these areas to pole or troll up to 0.5 mile. Visitors accessing the next tier of these zones (23% of pole/troll areas) would have to pole or troll between 0.5 and 1.0 mile. Under this alternative, 16% of pole/troll zones would require visitors to pole or troll more than 1.01 miles from motorboat access zones, as compared to less than 5% of pole/troll zones over 1.01 miles in the NPS preferred alternative. Under alternative 4, more than half of Florida Bay would still be open to motorboat access. The Pole/Troll Distance Analysis map, Pole/Troll Vessel Density Analysis map, and the Pole/Troll Analysis: Flamingo Area map for alternative 4 follow table 6.</p>

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PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Idle Speed, No-wake Areas	The few existing small idle speed, no-wake areas in Florida Bay would remain.	The few existing small idle speed, no-wake areas in Florida Bay would remain. A 300-foot-wide idle speed, no-wake area would be designated along the mainland shoreline from Middle Cape eastward to Shell Creek (west end of Long Sound) to reduce shoreline erosion from motorboat wakes, improve safety and experiences for those on the shoreline or boating close to the shoreline, and better protect wildlife. This zone would also serve as a buffer that would improve the natural soundscapes in the adjacent backcountry and wilderness areas. In places where this idle speed, no-wake designation near shoreline would fall within a pole/troll designation due to shallow water depth, the pole/troll designation would prevail.	Same as alternative 1.	Same as NPS preferred alternative except the 300-foot-wide idle speed, no-wake area would be designated along the mainland shoreline between East Cape and Middle Cape and around the keys in Florida Bay.
Seagrass Restoration	Small-scale seagrass restoration and monitoring efforts (for selected areas badly damaged by propeller scarring and groundings) would continue.	A comprehensive seagrass restoration plan that would allow the park and partners to efficiently implement actions to address damage to submerged marine and wilderness resources from boat groundings and propeller scarring would be established.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Little Madeira Bay, Joe Bay, and Adjacent Water Bodies	All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to public access.	Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Little Madeira Bay and adjacent smaller water bodies would be in the special protection zone, remaining closed to public access. These water bodies would continue to serve as a baseline area for long-term ecological monitoring and restoration studies.	After being closed for more than 20 years, Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Other parts of Crocodile Sanctuary (including Little Madeira Bay) would be in the pole/troll zone. Fishing would be allowed in these areas.	Same as NPS preferred alternative.
Long Sound	Public boating access in Long Sound would continue.	Long Sound would be managed as boat access zone, idle speed-no wake, to improve paddling experiences. Additional paddling access would be provided via a car-top boat launch along the 18-mile stretch of U.S. 1, in partnership with the Florida Department of Transportation and others.	Long Sound would be zoned boat access, meaning public boating access would continue.	Same as alternative 2.
Keys and Chickees in Florida Bay	Two keys in Florida Bay (Little Rabbit and North Nest) would continue to be open to visitors for day use and camping. These sites, plus the two chickees at Johnson Key and Shark Point, would be managed in accordance with the park’s backcountry permit program and backcountry management plan as updated. Bradley Key and Carl Ross Key would remain open to visitor use during daylight hours. Other keys in the bay would remain closed to public use to protect bird nesting and rookery areas.	As in alternative 1, Little Rabbit, North Nest, Carl Ross, and Bradley keys would remain open. All other keys would be in the special protection zone and remain closed to public use to protect nesting and roosting birds. <i>Three</i> additional chickees (platform campsites) would be built in Florida Bay.	Same as NPS preferred alternative except <i>five</i> additional chickees would be built in Florida Bay.	Same as NPS preferred alternative except <i>four</i> additional chickees would be built in Florida Bay.
Key Largo				
NPS Site and Tarpon Basin	Facilities at the 20-acre NPS site in Key Largo (ranger station and Florida Bay Interagency Science Center) would continue to provide a base of operations for NPS law enforcement, interpretation, and ecological research activities. The Key Largo ranger station would continue to serve primarily park operations, with limited visitor services.	Facilities at the 20-acre NPS site in Key Largo would remain. Improvements would include a new visitor information kiosk and a venue to support the boater education/permit program, a paddler launch, and an interpretive trail through the site’s upland hammock. Both the existing site in Key Largo and the new Tarpon Basin property would be considered to meet resource protection, interpretive, and recreational needs.	Same as NPS preferred alternative without the paddler launch and interpretive trail.	Same as alternative 2.
Visitor Information/Orientation	N/A	NPS staff would pursue an interagency visitor information / orientation facility in the upper keys with other agencies. To allow maximum flexibility, existing facilities or a new facility in Key Largo would be used for this purpose.	Same as NPS preferred alternative but only existing facilities in Key Largo would be pursued for this purpose.	Same as the NPS preferred alternative but only a new facility or expansion of an existing facility in Key Largo would be pursued for this purpose.

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PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
East Everglades Addition				
Overview	In 1989 the Everglades National Park Protection and Expansion Act added 109,506 acres of the northeast portion of Shark River Slough (the “East Everglades Addition”) to the park. Although the 1979 <i>Master Plan</i> does not address management of the East Everglades Addition, the 1991 land protection plan for the East Everglades Addition identified that all lands in the East Everglades were needed for ecosystem restoration, set priorities for acquisition, and gave examples of compatible and incompatible land uses. The East Everglades Addition would continue to be managed under guidance provided in the Expansion Act and the land protection plan.	The northwest portion of the East Everglades Addition, where much of the private and commercial airboat use typically occurs, would be managed as frontcountry zone (see “NPS Preferred Alternative” map). The remaining area would be managed as backcountry (nonmotorized), providing the classic Everglades wilderness experience of solitude and quiet.	The northern half of the East Everglades Addition (except for the easternmost part, which is mostly marl prairie and inaccessible to airboats) would be in the frontcountry zone (see “Alternative 2” map). Most of the rest of the Addition would be in the backcountry (nonmotorized) zone, providing classic Everglades wilderness experiences.	The northwest portion of the East Everglades Addition would be managed as the frontcountry zone (see “Alternative 4” map). Most of the remaining area would be managed as backcountry (nonmotorized), providing the classic Everglades wilderness experience of solitude and quiet.
Wilderness	No wilderness is proposed, but wilderness-eligible lands (most of the East Everglades Addition) would be managed to preserve their eligibility for preservation until the legislative process of wilderness designation has been completed.	Proposed wilderness: about 42,200 acres Proposed potential wilderness: <u>about 43,100 acres</u> Total: 85,300 acres	Proposed wilderness: about 39,500 acres Proposed potential wilderness: <u>0 acres</u> Total: 39,500 acres	Proposed wilderness: about 42,700 acres Proposed potential wilderness <u>about 59,400 acres</u> Total: 102,100 acres
		Potential wilderness would become designated wilderness once nonconforming uses such as private airboat use and ongoing restoration efforts have ended and/or private property came into federal ownership.		Potential wilderness would become designated wilderness once nonconforming uses such as private airboat use have ended and/or private property came into federal ownership.
Private Airboating	According to the 1989 East Everglades Expansion Act, private airboat operators who were owners of record of registered airboats in use within the East Everglades Addition on January 1, 1989, may continue using airboats in the East Everglades Addition during their lifetimes. Most private airboat use would probably remain on commonly used airboat trails or routes, although there is currently no such requirement.	A private airboat permit system would be implemented. Private airboating by those eligible individuals would continue within the frontcountry zone. Airboats would be required to stay on designated routes, and other regulations could be established to protect resources. New and/or improved airboat launch sites would be established north of Chekika and along Tamiami Trail.	Same as NPS preferred alternative except the frontcountry zone (where airboats could operate) would be larger.	Same as NPS preferred alternative except the shape of the frontcountry zone would be slightly different because of the elimination of commercial airboat tours.
Commercial Airboating	Four commercial airboat tour operators based along Tamiami Trail would continue to provide guided trips into the East Everglades Addition (plus food/beverage service, wildlife shows, gift shops, etc.) for visitors with little input or oversight from the National Park Service; these businesses would continue to operate at their own discretion without a permit from the National Park Service.	Authorized commercial airboat operations would continue and would be placed under concessions contracts with the park. To support park and ecosystem restoration goals, the park would seek to minimize/consolidate the number of commercial airboat facilities shared by as many as four operators. The concessions contract(s) would include several provisions, as follows: <ul style="list-style-type: none">Only services that are necessary and appropriate to Everglades National Park would be provided (airboat tours, food service, and appropriate merchandise sales are examples of these types of services). Activities that could continue under the no-action alternative but that may no longer be allowed under this alternative include wildlife shows, animals held in cages or pens, and sales of some items such as animal objects).Airboat concessions contracts would require that airboat properties meet applicable local, state, and federal laws, regulations, and codes.Interpretive and educational information for airboat tour visitors would be guided by park interpretive/educational standards and coordinated with the park’s interpretive staff, as is already done at the Shark Valley, Gulf Coast, and Flamingo areas.A variety of airboat tours would be provided (not necessarily all by the same operator).Consistent with Public Law 101-229, commercial airboats	Same as NPS preferred alternative except that: <ul style="list-style-type: none">A wider range of airboat tours, including specialized tours to more destinations, would be provided.Livery services for transportation of paddlers and campers to designated locations in the East Everglades would be provided.	Commercial airboat operations within the park would end in this alternative, so visitors would no longer have the opportunity to take a commercial guided airboat tour. One fill site that is now used as commercial airboat base of operations would be used instead for visitor activities and programs such as picnicking, wildlife viewing, a canoe/kayak launch, and camping. If not needed for other purposes, the sites would be restored to natural conditions.

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PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
		would travel on designated routes and in a manner that protects biological resources.		
Paddling and Camping	Backcountry paddling would remain an option for visitors (with a special use permit required for overnight visits), but with no paddling trails or designated primitive campgrounds, such use would likely remain at very low levels.	Canoe/kayak launches would be provided along Tamiami Trail, allowing for both short- and long-distance paddling opportunities. The locations of these access points would be coordinated with Tamiami Trail Modifications: Next Steps. Permits would be required for overnight use in the East Everglades Addition, as is the case in other areas of the park. Long-distance paddling routes (unmarked) would allow visitors to connect through Shark River Slough to the main park road, Everglades Paddling Trail, or Whitewater Bay / Gulf of Mexico. Tree islands in both the frontcountry and backcountry zones would be identified for day and camping use. To protect wetlands and wildlife, including threatened and endangered species, routes and sites might be periodically closed or have limited access during nesting seasons or low water periods. Other tree islands not specifically identified for visitor use would be closed. Public use areas could be maintained cooperatively via contractual agreements with commercial airboat concessioners or other stakeholder organizations.	Same as the NPS preferred alternative except that long-distance paddling opportunities would not be provided, and public use areas on tree islands would not be maintained via contractual agreements with commercial airboat concessioners or other stakeholder organizations.	Same as the NPS preferred alternative except that public use areas on tree islands would not be cooperatively via contractual agreements with commercial airboat concessioners or other stakeholder organizations.
Administrative and Operational Facilities	East Everglades administrative and operational activities would continue to operate out of adapted former residences within the East Everglades Addition, which are not well suited to park operational uses. This situation leads to operational inefficiencies and is inconsistent with the intent of the Everglades Expansion Act.	A new East Everglades administrative/operations center would be built near, but outside the park boundary near Chekika but outside the East Everglades district consistent with Public Law 108-483. This center would include a ranger/visitor contact station, a fire management station, equipment and vehicle storage, wayside/exhibit kiosks, and offices. Residences in the park that were being used for these purposes would be demolished once the operations center is functional and the sites restored to natural conditions.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Other Management Considerations	There are nine former hunting camps of various ages and conditions on tree islands in the East Everglades Addition. Use of such sites would continue without permits or regulations (aside from the permit requirement for overnight use).	East Everglades cultural sites would be maintained and protected through a site stewardship program. Shark River Slough cultural/archeological resources would be integrated into interpretive programs.	N/A	Some East Everglades Addition cultural sites would be maintained and protected through a stewardship program. Shark River Slough cultural/archeological resources would be integrated into interpretive programs.
Chekika	Chekika, a former state recreation area, would remain open for day use on a seasonal basis. Other area infrastructure, such as trails, roads, and borrow pits, would be informally used by the public for activities such as wildlife viewing, bicycling, and fishing.	Chekika would remain open at least seasonally as a day use area, with education and recreation programs focused on park natural and cultural resources and ecosystem restoration efforts. Borrow pits/ponds at Chekika would be filled in and restored to allow for more natural conditions.	Chekika would remain open at least seasonally as a day use area and for primitive camping. The level of education and resource-based programs would be increased.	Chekika would remain open at least seasonally for day use and would also serve as one of the park’s environmental education venues; this could include overnight programs.
Other Visitor Opportunities	N/A	Education and recreational opportunities (e.g., hiking, bicycling, wildlife viewing, and learning about Everglades restoration and history) would be expanded along Tamiami Trail, around SW 237th Avenue near Chekika, at some tree islands, and near the park’s eastern boundary. This would be accomplished in cooperation with public and private entities that are involved in Tamiami Trail modification projects, eastern boundary water modification projects, restoration of natural flows into the park, and regional greenway efforts near the park. Previously disturbed sites would be used to the maximum extent possible.	Same as NPS preferred alternative.	Same as NPS preferred alternative.

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PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Tamiami Trail / Shark Valley				
Alternative Transportation	N/A	NPS staff would pursue alternative transportation options (probably during the high visitor use season to start) from the Miami area to visitor destinations along Tamiami Trail (e.g., to commercial airboat tour sites and Shark Valley). Such options would likely involve cooperation and/or partnerships with other entities.	N/A	Same as the NPS preferred alternative.
Visitor Orientation/ Visitor Opportunities along Tamiami Trail	Many travelers along Tamiami Trail would remain unaware of their proximity to the national park and the educational and recreational opportunities available along the more than 20 miles of the road that borders the park.	A visitor information kiosk and a series of turnouts would be provided along Tamiami Trail for visitor orientation and an overview of natural and cultural resource issues, including ecosystem restoration. Locations would be coordinated with Tamiami Trail modifications related to ecosystem restoration.	Same as NPS preferred alternative.	NPS staff would pursue with other partners (e.g., local, state, and federal management entities involved in Everglades restoration and Tamiami Trail rebuilding) a new multiagency visitor contact facility near the intersection of Tamiami Trail and Krome Avenue to provide a centralized location for visitors to get information about outdoor recreational and educational opportunities, resource issues, and ecosystem restoration efforts throughout the Tamiami Trail corridor.
Shark Valley	Shark Valley would remain the primary area of park orientation and interpretation along the northern boundary of the park. Visitors would continue to hike, bike, or ride an interpretive tram on the 15-mile Shark Valley loop road and visit the Shark Valley observation tower at the halfway point. Vehicular congestion, long waiting lines, and unsafe parking conditions along Tamiami Trail would continue many days each year.	Same as alternative 1 plus: <ul style="list-style-type: none">▪ Additional evening programs would be established.▪ Two shelters/rest stops would be added along the loop road within the footprint of existing development.▪ The reservation system for tram tours and bicycles would be expanded to minimize parking and congestion in this area.▪ Pre-trip information would also be expanded to encourage visitation during off-peak hours, spread use out throughout the day, and inform visitors about what to expect.▪ Pursue on-site options for improved parking and traffic conditions (e.g., using a portion of Old Tamiami Trail for overflow parking).	Same as alternative 1 except: <ul style="list-style-type: none">▪ Additional evening programs would be established.▪ Several shelters/rest stops would be added along the loop road within the footprint of existing development.▪ Use current administrative area as overflow and/or bicyclist parking area.	Same as alternative 2.
Administrative and Operational Facilities	Law enforcement, interpretation, and maintenance operations for the Tamiami Trail District would remain in existing facilities.	Law enforcement, maintenance operations for the park’s Tamiami Trail District, along with some resource management administrative facilities and housing for several law enforcement rangers, would be relocated and centralized at a new operations facility at a previously disturbed site within the national park, e.g., a portion of the Gator Park site after NPS acquisition of the land. A ranger residence and interpretive operations would remain at Shark Valley. Current facilities would be removed once the new district facility is operational.	Same as NPS preferred alternative.	Same as alternative 1.
Partnerships	N/A	The National Park Service would coordinate with other land management agencies along Tamiami Trail to identify and pursue cooperative projects for improved operational efficiency. Park staff would pursue working cooperatively with the Miccosukee Tribe to integrate education programs and opportunities offered by both entities and to determine the feasibility of sharing resources and facilities to meet park and tribal goals.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Gulf Coast / Ten Thousand Islands / Everglades City				
NPS Facilities at Gulf Coast	Everglades City would continue to serve as the western gateway to the park. The 20 acres of NPS land in Everglades City would remain as the center for visitor services and park operations for the Gulf Coast. Visitor services include visitor information and orientation at the small Gulf Coast Visitor Center, concessioner-operated boat tours, and a small concessions store. Space is very tight in the small boat basin that is used for NPS maintenance and ranger operations and	Visitor and administrative facilities at Gulf Coast would be in the developed zone. The Marjory Stoneman Douglas Visitor Center would be constructed to replace existing facilities, as required in the Everglades National Park Protection and Expansion Act of 1989. Operation of the visitor center would focus on interpretation, orientation to address visitor opportunities available in the western portion of the park, protection of resources, and issuing backcountry permits. The size and the scope of the \$7.9 million facility improvements	Same as NPS preferred alternative.	Same as NPS preferred alternative.

TABLE 5. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
	concessions tours. An NPS canoe launch is available near the visitor center, but it is in poor condition. The NPS structures at Everglades City would continue to serve park interpretive, resource management, law enforcement/protection, and maintenance operations. These facilities have very limited work and storage space. This site would also continue to support concessions operations.	would be consistent with the value analysis performed in 2012 to address the scaled-down version of improvements at the Gulf Coast. A modest-sized visitor center would be constructed on currently disturbed land while other areas of the site would be reclaimed and rehabilitated. All nonessential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. This would serve to minimize the administrative and maintenance footprint at Everglades City and to improve visitor experience in that area by removing visual clutter and noise associated with park maintenance functions. New parking would be constructed at the boat basin. A new canoe/kayak ramp and launch would be constructed to support both NPS and concessions operations.		
Boat Access	Boat access to marine waters, at marinas and ramps in the local/regional community, would remain limited.	NPS staff would pursue working cooperatively with public and private interests to provide improved boat access outside the park to Gulf Coast waters.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Visitor Opportunities	Boat tours, canoe/kayak rentals, interpretive tours, fishing tours, and paddling tours would continue to be offered in the Gulf Coast and Ten Thousand Islands area via commercial service providers.	The concession operation at Everglades City would offer expanded opportunities to visit Ten Thousand Islands, the Gulf Coast, and Wilderness Waterway through boat tours and canoe/kayak rentals. Other commercial services would be pursued to provide visitors with more opportunities such as interpretive, fishing, and paddling tours. Additional land-based interpretive programs and activities would link the park and neighboring communities. A cultural heritage interpretive water trail would be established in the Ten Thousand Islands area.	Same as NPS preferred except that a cultural heritage trail would not be established.	Same as NPS preferred alternative.
Everglades Paddling Trail	N/A	A new Everglades Paddling Trail would be established to provide enhanced opportunities for a quieter, more tranquil experience. This route would be minimally marked to preserve scenery and minimize maintenance requirements. The route would be marked by GPS waypoints. Most segments of the Everglades Paddling Trail would be in the boat access zone and continued relatively infrequent use of these segments by motorboats would be expected. To provide wilderness paddling experiences, a few segments would be in seasonal backcountry (nonmotorized) zones based on narrowness or shallowness of the water, low clearance to mangroves, and available alternate routes for motorboats; additionally, a seasonal idle speed segment would be implemented on the Turner River; seasonal restrictions would likely fall during the peak season during winter and early spring. See “NPS Preferred Alternative” map.	As in the NPS preferred alternative, a new Everglades Paddling Trail would be established. However, in this alternative the route would be unmarked, but highlighted in the mandatory boater education program, marine navigation charts, GPS systems, etc. Also, except for existing idle speed, no-wake areas, the entire Everglades Paddling Trail would be in the boat access zone (meaning no new boating restrictions). Continued relatively infrequent use of these segments by motorboats would be anticipated.	As in the NPS preferred alternative, a new Everglades Paddling Trail would be established. Some segments would be in the boat access zone and continued relatively infrequent use of these segments by motorboats would be anticipated. Some segments would be designated idle-speed, no-wake areas or backcountry (nonmotorized) zones; see “Alternative 4” map.
Chickees and Campsites	Visitors could continue to camp at backcountry chickees and campsites along the Gulf Coast and interior waterways.	Same as NPS alternative 1 plus as many as eight new backcountry chickees would be provided.	Same as NPS preferred alternative.	Same as NPS preferred alternative.
Gopher Creek	At Gopher Creek, the existing idle speed, no-wake designation along the first (easternmost) mile or so would remain.	At Gopher Creek, the existing idle speed, no-wake designation would remain, as in alternative 1. Additional study of this area would be undertaken to inform future adaptive management of this area.	Same as alternative 1.	Manage Gopher Creek as a backcountry (paddle only zone to better protect resources and enhance wilderness opportunities.

TABLE 5. SUMMARY OF KEY DIFFERENCES AMONG THE ALTERNATIVES

PLANNING UNIT / TOPIC	ALTERNATIVE 1 (NO ACTION)	NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Rulemaking				
	Existing closures and restrictions would be retained. The closure of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would be made permanent with a special regulation in the <i>Code of Federal Regulations</i> (36 CFR 7).	<p>Implementing the pole/troll and pole/troll idle zones and identifying designated airboat routes in the East Everglades Addition would restrict uses of these areas and so would require special regulations under 36 CFR 1.5, 3.8(b)(2). Closure of Crocodile Sanctuary and other special protection zones would be made permanent with a special regulation. Joe Bay would be opened to paddling and managed as a backcountry zone.</p> <p>Closures or use restrictions deemed necessary under adaptive management or user capacity programs (to protect cultural or natural resources or desired visitor experiences) would be accomplished through the rulemaking process.</p> <p>The closure of some tree islands in the East Everglades Addition to protect cultural and natural resources would be accomplished through the authority under 36 CFR 1.5 (Superintendent’s Compendium) because it would not likely be a substantial alteration of public use patterns.</p> <p>Implementing the idle and slow-speed corridors would be accomplished under the discretionary authority of the park superintendent to set speed limits (36 CFR 3.8).</p> <p>Establishing the mandatory boater education/permit process is authorized under 36 CFR 1.6, 3.3.</p> <p>Where allowed under 36 CFR, the implementation of these actions would occur initially through changes to the superintendents compendium to provide a reasonable assessment period of several years to better understand their effectiveness. The rulemaking process would be undertaken following the initial assessment period.</p>	Same as the NPS preferred alternative.	Same as the NPS preferred alternative.
Costs and Staffing				
Staffing	The NPS staffing level under the no-action alternative would be FTE staff members. Volunteers and partnerships would continue to be key contributors to NPS operations.	The staffing level needed to implement the NPS preferred alternative would be 249 FTE staff members—35 positions more than under the no-action alternative. Volunteers and partnerships would continue to be key contributors to NPS operations.	The NPS staffing level needed to implement alternative 2 would be 240 FTE staff members—26 more positions than under the no-action alternative. Volunteers and partnerships would continue to be key contributors to NPS operations.	The NPS staffing level needed to implement alternative 4 would be 251 FTE staff members—37 more positions than under the no-action alternative. Volunteers and partnerships would continue to be key contributors to NPS operations.
Costs	<p>Annual operating costs of this alternative would be \$17 million.</p> <p>One-time capital costs (for Flamingo improvements) would be \$13.3 million.</p>	<p>Annual operating costs for this alternative would be \$22.6 million.</p> <p>One-time costs (including new construction and nonfacility costs such as major resource plans and projects) would be \$42.1 million, inclusive of Flamingo improvements.</p>	<p>Annual operating costs for this alternative would be \$21.4 million.</p> <p>One-time costs (including new construction and nonfacility costs, such as major resource plans and projects), would be \$38.5 million, inclusive of Flamingo improvements.</p>	<p>Annual operating costs for this alternative would be \$22.7 million.</p> <p>One-time costs (including new construction and nonfacility costs such as major resource plans and projects) would be \$41.1 million, inclusive of Flamingo improvements.</p>

SUMMARY OF IMPACTS OF IMPLEMENTING THE ALTERNATIVES

[Note: this table focuses on impacts of the GMP alternatives. Cumulative impacts (those resulting from the incremental impact of the GMP alternative when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions) are discussed in chapter 5.]

TABLE 6. SUMMARY OF THE IMPACTS OF IMPLEMENTING THE ALTERNATIVES

ALTERNATIVE 1: NO ACTION		NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Natural Resources				
Hydrologic Resources	No aspects of the no-action alternative would appreciably affect surface waters (timing, distribution, amount of flow, or water quality) or wetlands. Propeller scarring and boat groundings in Florida Bay would likely continue to be relatively widespread, resulting in short-term, minor, adverse water quality impacts from increased turbidity.	The impacts of the NPS preferred alternative on water resources would be long term, localized, minor to moderate, and beneficial (e.g., decreased turbidity) in Florida Bay, and short term, localized, negligible to minor, and adverse (e.g., turbidity, sedimentation) during construction projects.	The impacts of alternative 2 on water resources would be long term, localized, minor, and beneficial (e.g., slightly lower incidence of sea bottom disturbance that increases turbidity), and short term, localized, minor, and adverse (e.g., turbidity, sedimentation).	The impacts of alternative 4 on water resources would be long term, localized, moderate, and beneficial (e.g., decreased turbidity) in Florida Bay, and short term, localized, negligible to minor, and adverse (e.g., turbidity sediment resuspension) during construction projects.
Landscape and Soils	Long-term impacts on soils (from facility upgrades and visitor use) would be localized, negligible to minor, and adverse.	Impacts on soils under the NPS preferred alternative would be long-term localized, minor, and adverse. These impacts would result from visitor use and construction.	Impacts on soils under alternative 2 would be long-term localized, minor to moderate, and adverse. These impacts result from visitor use and construction.	Impacts on soils under alternative 4 would be long-term localized, minor to moderate, and adverse. These impacts result from visitor use and construction.
Vegetation	Short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Impacts from continuing current management in Florida Bay would be long term, baywide, moderate, and adverse.	Short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Construction of new and expanded facilities would result in long-term, localized, and negligible to minor, adverse impacts. New programs and changes in motorboat access in Florida Bay would result in long- term, baywide, moderate, beneficial impacts.	Short-term adverse impacts on vegetation under alternative 2 (from facility upgrades or construction) would be localized and minor to moderate. Beneficial impacts would be short and long term and negligible to minor. Long-term impacts (from visitor use and construction) would be localized, negligible to moderate, and adverse.	Short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Construction of new and expanded facilities would result in long-term, localized, minor to moderate, adverse impacts. New programs and changes in motorboat access in Florida Bay would result in long-term, baywide, moderate to major beneficial impacts.
Wildlife	Effects of the no-action alternative on wildlife, primarily resulting from visitor and operational activities, would be long-term, localized, moderate, beneficial impacts and long-term, moderate, adverse impacts.	The NPS preferred alternative would have short- and long-term, moderate, adverse impacts, and short- and long-term, minor to moderate, beneficial impacts.	Alternative 2 would have short- and long-term, moderate, adverse impacts, and long-term, negligible to minor, beneficial impacts	Alternative 4 would have short- and long-term, minor to moderate, adverse impacts, and short- and long-term, minor to moderate, beneficial impacts.
Fisheries	Long-term impacts on fish and fish habitat under the no-action alternative would be localized, negligible to minor, and adverse, mostly from continued visitor use.	Under the NPS preferred alternative, most adverse impacts on fish and fish habitat would be short and long term, localized, and negligible to minor, mostly from continued visitor activities and during construction. Additionally, there would be long-term, moderate, beneficial impacts on the fisheries because of increased refuge (reduced fishing pressure), more informed/ responsible behavior by boaters, and recovery and restoration of damaged seagrass beds resulting from the establishment of pole/troll zones.	Under alternative 2, adverse impacts on fish and fish habitat would be short and long term, localized, and moderate from continued visitor activities (including continued full access by motorboats to Florida Bay) and from construction.	Under alternative 4, some adverse impacts on fish and fish habitat would be short and long term, localized, and negligible to minor; however, the implementation of alternative 4 would have long-term, moderate benefits for the fisheries in the park due to increased refuge (reduced fishing pressure), more informed/responsible behavior by boaters, and the recovery and restoration of damaged seagrass beds resulting from the establishment of pole/troll zones
Essential Fish Habitat	Implementing the no-action alternative would not change existing use or management of essential fish habitats and, therefore, would not result in any new impacts. However, there would be the continuation of long-term; minor to moderate, adverse impacts on shallow-water habitats from boat groundings and propeller scarring (other sections in this chapter include more details on specific resource impacts). As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be a continuation of adverse effects on essential fish habitat under the no-action alternative.	Implementing the NPS preferred alternative would result in long-term, moderate, beneficial impacts on shallow-water habitats. Other sections in this chapter include more details on specific effects on resources. As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be no adverse effects on essential fish habitat under the NPS preferred alternative.	Implementing alternative 2 would result in long-term, negligible, beneficial impacts on shallow-water habitats. Other sections in this chapter include more details on specific effects on resources. As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be no adverse effects on essential fish habitat under this alternative.	Implementing alternative 4 would result in long-term, moderate, beneficial impacts on shallow-water habitats. Other sections in this chapter include more details on specific effects on resources. As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be no adverse effects on essential fish habitat under this alternative.

TABLE 6. SUMMARY OF THE IMPACTS OF IMPLEMENTING THE ALTERNATIVES

ALTERNATIVE 1: NO ACTION		NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Federal Special Status Species				
Florida Panther	Continued airboat activity and visitor use of tree islands and the backcountry of the park would continue to result in short-term impacts on Florida panther habitat and behavior. These activities would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	The NPS preferred alternative would have long-term, minor benefits on panthers, primarily as a result of constraining private airboat use to designated routes within the frontcountry zone in the East Everglades Addition. Continued visitor activities in habitat used by panthers have discountable short-term effects on panther habitat and foraging behavior. Activities implemented under the NPS preferred alternative would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Continued visitor activities in habitat used by panthers would have discountable short- and long-term consequences on the panther. Actions under alternative 2 would result in long-term, minor, adverse impacts and long-term, minor, beneficial impacts and would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 4 would result in long-term, minor, beneficial impacts on panthers and their habitat as a result of constraining private airboat use to designated routes within the frontcountry zone in the East Everglades Addition and from discontinuing commercial airboat operations. Continued visitor activities in habitat used by panthers would have short-term, adverse, effects on panther behavior, namely denning and foraging. Activities implemented under alternative 4 would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
Key Largo Woodrat and Key Largo Cotton Mouse	Overall, continued current management would have discountable effects on the Key Largo woodrat and Key Largo cotton mouse as a result of human activities at the ranger station and areas surrounding the Tarpon Basin. This would result in a <i>may affect, not likely to adversely affect</i> finding for the Key Largo woodrat and Key Largo cotton mouse under section 7 of the Endangered Species Act.	Overall, the NPS preferred alternative would have negligible adverse effects on the woodrat and cotton mouse. This would result in a <i>may affect, not likely to adversely affect</i> finding for the woodrat and cotton mouse under section 7 of the Endangered Species Act.	Under alternative 2, some continuing negligible, adverse, impacts on woodrats and cotton mice may occur. This would result in a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Under alternative 4 some continuing, negligible, adverse impacts on woodrats and cotton mice may occur. This would result in a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
Manatee	Motorboat activity and visitor access in the park’s marine waters would result in the continuation of long-term adverse effects on manatee and critical habitat for manatee from boat and propeller strikes and habitat disturbance and would constitute a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for both the manatee and critical habitat for manatee.	Motorboat activity and visitor access in the park’s marine waters would result in continued, long-term, minor, adverse effects on the manatee and critical habitat for manatee from boat and propeller strikes and habitat degradation. Changes to the management of recreational boating in Florida Bay (more pole/troll and pole/troll idle zones, restricted motorboat access in places, etc.), combined with a boater safety and resource protection plan, improved boater education, increased on-the-water law enforcement, and seagrass restoration, would result in reduced boat strikes, decreased underwater noise from motorboats, improved habitat, and moderate benefits. This would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for both the manatee and critical habitat for manatee.	Continued motorboat activity and visitor access in the park’s marine waters would result in long-term, moderate, adverse effects on the manatee and critical habitat for manatee from boat and propeller strikes and habitat disturbance. Improved boater education, increased on-the-water law enforcement, seagrass restoration, and a manatee management plan would result in reduced boat strikes and improved habitat and create minor benefits. This would constitute a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for both the manatee and critical habitat for manatee.	Motorboat activity and visitor access in the park’s marine waters would result in continued, long-term, minor, adverse effects on the manatee and critical habitat for manatee from boat and propeller strikes and habitat degradation. Changes to the management of recreational boating in Florida Bay (pole/troll zones, restricted motorboat access in places, etc.), combined with manatee management plan, improved boater education, increased on-the-water law enforcement, seagrass restoration, and boating restrictions along the newly established Everglades Paddling Trail, would result in reduced boat strikes, decreased underwater noise from motorboats, improved habitat, and moderate benefits. This would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for both the manatee and critical habitat for manatee.
Bottlenose Dolphin	Continued human and boat access in the park’s marine waters would present minimal continued hazards to bottlenose dolphins in bays and estuaries in the park, resulting in a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	The NPS preferred alternative would reduce impacts on the bottlenose dolphin, their food sources, and their habitats, producing long-term, minor beneficial impacts—a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 2 would have long-term negligible beneficial effects on bottlenose dolphin, a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 4 would reduce impacts on bottlenose dolphins, resulting in long-term, minor, beneficial impacts, equating to a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
Wood Stork	Any adverse effects from the no-action alternative on wood storks would be continued, long term, minor, and adverse as a result of visitor activities. This would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	The NPS preferred alternative would have localized, long-term, minor beneficial effects on wood storks from reduced potential for human disturbance. This would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Any adverse effects from alternative 2 on wood storks would be continued, long term, minor, and adverse as a result of visitor activities. This would still constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 4 would have long-term, minor to moderate, beneficial effects on wood storks from reduced potential for human disturbance on roosting, nesting, and foraging habitat. This would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
Piping Plover, Roseate Tern, and Red Knot	The no-action alternative would have both beneficial and adverse continuing effects on piping plovers, roseate terns, red knots, and critical habitat for piping plovers. Any adverse impacts from the no-action alternative would be minor and insignificant, resulting in a <i>may affect, not likely to adversely affect</i> finding for the piping plover, roseate tern, red knot, and critical habitat for the piping plover under section 7 of the Endangered Species Act.	Overall, the NPS preferred alternative would benefit the piping plover, roseate tern, red knot, and piping plover critical habitat with limited, localized, minor benefits compared to continued current management. This would result in a <i>may affect, not likely to adversely affect</i> finding for the piping plover, roseate tern, red knot, and critical habitat for the piping plover under section 7 of the Endangered Species Act.	Overall, alternative 2 would contribute long-term, minor, adverse impacts to piping plovers, roseate terns, red knots, and critical habitat for piping plovers. This would result in a <i>may affect, not likely to adversely affect</i> finding for the piping plover, roseate tern, red knot, and critical habitat for the piping plover under section 7 of the Endangered Species Act.	Overall alternative 4 would benefit the piping plover, roseate tern, red knot, and critical habitat for the piping plover, with limited minor benefits compared to continuing current management. This would result in a <i>may affect, not likely to adversely affect</i> finding for the piping plover, roseate tern, red knot, and critical habitat for the piping plover under section 7 of the Endangered Species Act.

TABLE 6. SUMMARY OF THE IMPACTS OF IMPLEMENTING THE ALTERNATIVES

ALTERNATIVE 1: NO ACTION		NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Everglade Snail Kite	The no-action alternative would have a continued minor adverse effect on snail kites from airboating in the East Everglades Addition. This would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act. Additionally, because the designated critical habitat for the Everglade snail kite lies outside of East Everglades, there are no proposed actions in the no-action alternative that will affect critical habitat for the Everglade snail kite.	Overall, the NPS preferred alternative would have minor adverse and beneficial impacts on the Everglade snail kite. This would result in a <i>may affect, not likely to adversely affect</i> finding for the Everglade snail kite under section 7 of the Endangered Species Act. Additionally, because the designated critical habitat for the Everglade snail kite lies outside of East Everglades, there are no proposed actions in the NPS preferred alternative that will affect critical habitat for the Everglade snail kite.	Alternative 2 would have long-term, minor, adverse and beneficial effects on the Everglade snail kites in the East Everglades Addition resulting in a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act. Additionally, because the designated critical habitat for the Everglade snail kite lies outside of East Everglades, there are no proposed actions in alternative 2 that will affect critical habitat for the Everglade snail kite.	Alternative 4 would have long-term beneficial effects on Everglade snail kite from changes in airboat use in the East Everglades Addition. This would result in a <i>may affect, not likely to adversely affect</i> finding for the Everglade snail kite under section 7 of the Endangered Species Act. Additionally, because the designated critical habitat for the Everglade snail kite lies outside of East Everglades, there are no proposed actions in alternative 4 that will affect critical habitat for the Everglade snail kite.
Eastern Indigo Snake	Continued visitor activities in habitat used by the eastern indigo snake under the no-action alternative would have short-term, minor, adverse effects that would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	The NPS preferred alternative would have long-term, minor, beneficial effects on the eastern indigo snake populations, primarily as a result of changes in private airboat use in the East Everglades Addition. Continued visitor activities in habitat used by the eastern indigo snake and proposed construction activities would have short-term, minor, adverse effects. Activities implemented under the NPS preferred alternative would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 2 would have short- and long-term, minor (mostly continuing), adverse effects on indigo snakes. Activities implemented under alternative 2 would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 4 would have long-term, moderate beneficial effects on eastern indigo snake populations primarily as a result of changes in private airboat use and discontinuation of commercial airboat use in the East Everglades Addition. Continued visitor activities in habitat used by the eastern indigo snake and proposed construction activities would have short-term minor adverse effects on the snake and its habitat. Activities implemented under alternative 4 would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
American Alligator	The park would continue to protect American alligators and their habitat, a long-term beneficial impact. However, visitor and management activities in alligator habitat under the no-action alternative would have minor, adverse effects that would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Overall, the NPS preferred alternative actions would improve protection of American alligators and their habitat. Visitor and management activities in alligator habitat under the NPS preferred alternative would have short- and long-term minor adverse effects that would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Overall, the park would continue to protect American alligators and their habitat. However, visitor and management activities in alligator habitat under alternative 2 would have minor, adverse effects, constituting a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Overall, the park would continue to protect American crocodiles and their habitat. However, visitor access to and activities in habitat used by the American crocodile under alternative 4 would have long-term, negligible, adverse effects and long-term minor benefits that would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
American Crocodile	The park would continue to provide protection of American crocodiles and their designated critical habitat, although some continuing minor adverse effects from visitor and administrative uses would be expected. Impacts from the no-action alternative would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act to the American crocodile and designated critical habitat for the American crocodile.	Under the NPS preferred alternative the park would continue to protect American crocodiles and their designated critical habitat and would reduce the likelihood of human-related disturbance in crocodile habitat. Any adverse minor impacts would be insignificant, resulting in a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act to the American crocodile and designated critical habitat for the American crocodile.	The park would continue to provide protection of American crocodiles and their designated critical habitat, although some minor adverse effects from visitor and administrative uses would be expected. Impacts from alternative 2 would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act to the American crocodile and designated critical habitat for the American crocodile.	Overall, the park would continue to protect American crocodiles and their designated critical habitat. However, visitor access to and activities in habitat used by the American crocodile under alternative 4 would have long-term, negligible, adverse effects and long-term minor benefits that would constitute a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act to the American crocodile and designated critical habitat for the American crocodile.
Sea Turtles	<p>The no-action alternative would benefit sea turtles through habitat protection, but it would also result in some continued long-term, moderate, adverse effects from human activities (primarily motorboating and recreational fishing). This alternative would result in moderate, adverse impacts and a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for sea turtles.</p> <p>This alternative would also result in moderate, adverse impacts and a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for NOAA and USFWS proposed critical habitat for the loggerhead sea turtle.</p>	<p>The NPS preferred alternative would reduce impacts on sea turtles and their habitats, resulting in some long-term, minor benefits to sea turtles. However, the NPS preferred alternative would also result in some continued long-term, moderate, adverse effects to sea turtles from human activities (primarily motorboating and recreational fishing). This alternative would result in a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for sea turtles. The NMFS determined that the NPS preferred alternative was not likely to jeopardize the continued existence of sea turtles.</p> <p>The alternative would result in minor, beneficial impacts and a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for NOAA and USFWS proposed critical habitat for the loggerhead sea turtle.</p>	<p>Alternative 2 would reduce impacts on sea turtles and their habitats, resulting in some long-term, minor benefits to sea turtles. However, alternative 2 would also result in some continued, long-term, moderate, adverse effects to sea turtles from human activities (primarily motorboating and recreational fishing). This alternative would result in a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for sea turtles.</p> <p>The alternative would result in minor, adverse impacts and a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for NOAA and USFWS proposed critical habitat for the loggerhead sea turtle.</p>	<p>Alternative 4 would reduce impacts to sea turtles and their habitats, resulting in some long-term, minor benefits to sea turtles. However, alternative 4 would also result in some continued long-term, moderate, adverse effects to sea turtles from human activities (primarily motorboating and recreational fishing). This alternative would result in a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act for sea turtles.</p> <p>The alternative would result in minor, beneficial impacts and a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for NOAA and USFWS proposed critical habitat for the loggerhead sea turtle.</p>

TABLE 6. SUMMARY OF THE IMPACTS OF IMPLEMENTING THE ALTERNATIVES

ALTERNATIVE 1: NO ACTION		NPS PREFERRED ALTERNATIVE	ALTERNATIVE 2	ALTERNATIVE 4
Smalltooth Sawfish	The no-action alternative would result in moderate, adverse effects on the smalltooth sawfish from human activities (primarily recreational fishing)—a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	The NPS preferred alternative would result in minor, beneficial effects and moderate, adverse impacts to the smalltooth sawfish from human activities (primarily recreational fishing)—a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act. The NMFS determined that the NPS preferred alternative was not likely to jeopardize the continued existence of the smalltooth sawfish.	Alternative 2 would result in minor, beneficial impacts and moderate, adverse impacts to the smalltooth sawfish from human activities (primarily recreational fishing)—a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	Alternative 4 would result in minor, beneficial effects and moderate, adverse impacts to the smalltooth sawfish from human activities (primarily recreational fishing)—a <i>may affect, likely to adversely affect</i> finding under section 7 of the Endangered Species Act.
	The no-action alternative would also result in minor, adverse effects on the designated critical habitat for the smalltooth sawfish—a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act.	The alternative would also result in minor, beneficial impacts and a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for designated critical habitat for the smalltooth sawfish.	The alternative would result in minor, adverse impacts and a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for designated critical habitat for the smalltooth sawfish.	The alternative would result in minor, beneficial impacts and a <i>may affect, not likely to adversely affect</i> finding under section 7 of the Endangered Species Act for designated critical habitat for the smalltooth sawfish.
Natural Soundscape	The no-action alternative would have localized, long-term, minor to moderate, adverse impacts on the soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (such as automobiles, buses, motorboats, airboats, or aircraft).	The NPS preferred alternative would have long-term, local, minor to moderate, adverse, as well as minor to moderate beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, aircraft).	Alternative 2 would have long-term, local, minor to moderate, adverse as well as negligible to minor, beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, and aircraft).	Alternative 4 would have long-term, local, minor to moderate, adverse as well as minor to moderate, beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, and aircraft).
Wilderness Character	Management actions and visitor use would have a variety of impacts on wilderness character under the no-action alternative. For both the main portion of the wilderness and the East Everglades Addition eligible wilderness, the alternative would have a long-term, minor adverse impact primarily due to continuing motorboat and airboat use, and resource management/research activities in the areas. In the Florida Bay submerged wilderness, adverse impacts to wilderness character would be moderate to major, and long term due to continuing scarring of the water bottom.	Management actions and the wilderness proposal for the Everglades Addition in the NPS preferred alternative would have a variety of impacts on wilderness character. For the main portion of the existing wilderness, excluding Florida Bay, the alternative would have a minor, long-term, adverse impact due to the development and use of several chickees. In the Florida Bay submerged wilderness, the preferred alternative would have a moderate, long-term, beneficial impact to wilderness character due to the pole/troll and pole/troll/Idle zones and the mandatory boat education program/permit system. In the East Everglades Addition, the NPS preferred alternative would have a major, long-term (in perpetuity), beneficial impact on wilderness character, primarily due designating wilderness and potential wilderness over a large area and eventually eliminating private airboats in the area.	Under alternative 2, management actions and the wilderness proposal for the East Everglades Addition would have a variety of impacts on wilderness character. For the main portion of the wilderness, excluding Florida Bay, the alternative would have a minor, long-term, adverse impact primarily due to the development and use of several chickees. In the Florida Bay submerged wilderness, alternative 2 would have a minor to moderate, long-term, beneficial impact to wilderness character primarily due to management actions that would reduce bottom scarring. In the East Everglades Addition, alternative 2 would have a major, long-term, beneficial impact on wilderness character, primarily due to the designation of wilderness over a large area.	Under alternative 4, management actions and the wilderness proposal for the East Everglades Addition would have a variety of impacts on wilderness character. For the main portion of the wilderness, excluding Florida Bay, the alternative would have a minor, long-term, adverse impact due to the development and use of several chickees. In the Florida Bay submerged wilderness, the preferred alternative would have a moderate, long-term, beneficial impact to wilderness character due to the pole/troll zones and the mandatory boat education program/permit system. In the East Everglades Addition, alternative 4 would have a major, long-term (in perpetuity), beneficial (in perpetuity) impact on wilderness character, primarily due to the designation of wilderness over a large area and eventual elimination of private airboats in the area.
Cultural Resources				
Archeological Resources	Implementation of the no-action alternative would have permanent, negligible to minor, adverse impacts on the park’s prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places.	Implementation of actions proposed by the NPS preferred alternative would have long-term beneficial impacts, and permanent, negligible to minor, adverse impacts on the park’s prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, <i>Assessment of Adverse Effects</i>), the National Park Service concludes that implementing the NPS preferred alternative would result in <i>no adverse effect</i> on archeological resources.	Implementation of actions proposed by alternative 2 would have long-term beneficial impacts, and permanent, negligible to minor, adverse impacts on the park’s prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, <i>Assessment of Adverse Effects</i>), the National Park Service concludes that implementing alternative 2 would result in <i>no adverse effect</i> on archeological resources.	Implementation of actions proposed in alternative 4 would have long-term beneficial impacts, and permanent, negligible to minor, adverse impacts on the park’s prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, <i>Assessment of Adverse Effects</i>), the National Park Service concludes that implementing alternative 4 would result in no adverse effect on archeological resources.

TABLE 6. SUMMARY OF THE IMPACTS OF IMPLEMENTING THE ALTERNATIVES

ALTERNATIVE 1: NO ACTION		NPS PREFERRED ALTERNATIVE		ALTERNATIVE 2		ALTERNATIVE 4	
Historic Structures, Sites, and Districts	Implementation of the no-action alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places.	Implementation of actions proposed by the NPS preferred alternative would result in long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing the NPS preferred alternative would result in <i>no adverse effect</i> on historic structures, sites, and districts.	Implementation of actions proposed by alternative 2 would result in long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 2 would result in <i>no adverse effect</i> on historic structures, sites and districts.	Implementation of actions proposed by alternative 4 would have long-term beneficial impacts, and long-term or permanent, minor to major , adverse impacts on the park’s historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 4 could result in determinations of <i>no adverse effect</i> on historic structures, sites, and districts slated for preservation, and <i>adverse effect</i> on historic structures, sites and districts that may possibly be removed or substantially altered.			
Cultural Landscapes	Implementation of the no-action alternative would have long-term beneficial impacts and negligible to minor adverse impacts on the park’s cultural landscapes.	Implementation of actions proposed in the NPS preferred alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s cultural landscapes. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing the NPS preferred alternative would result in <i>no adverse effect</i> on cultural landscapes.	Implementation of actions proposed in alternative 2 would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s cultural landscapes. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 2 would result in <i>no adverse effect</i> on cultural landscapes.	Implementation of actions proposed in alternative 4 would have long-term beneficial impacts, and long-term or permanent, minor to major, adverse impacts on the park’s cultural landscapes. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 4 would result in <i>no adverse effect</i> on cultural landscapes slated for preservation, and <i>adverse effect</i> on cultural landscapes that have structures and character-defining features that may be removed or substantially altered.			
Ethnographic Resources	Implementation of the no-action alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s ethnographic resources.	Implementation of actions proposed by the NPS preferred alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s ethnographic resources. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing the NPS preferred alternative would result in <i>no adverse effect</i> on ethnographic resources.	Implementation of actions proposed by alternative 2 would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s ethnographic resources. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 2 would result in <i>no adverse effect</i> on ethnographic resources.	Implementation of actions proposed in alternative 4 would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park’s ethnographic resources. Section 106 Summary —After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 4 would result in <i>no adverse effect</i> on ethnographic resources.			
Museum Collections	Implementation of the no-action alternative would have long-term or permanent, minor to moderate, adverse impacts on museum collections.	Implementation of actions proposed by the NPS preferred alternative would have long-term beneficial and short-term negligible impacts on museum collections.	Implementation of actions proposed in alternative 2 would have long-term beneficial and short-term, negligible impacts on museum collections.	Implementation of actions proposed in alternative 4 would have long-term beneficial and short-term negligible impacts on museum collections.			

TABLE 6. SUMMARY OF THE IMPACTS OF IMPLEMENTING THE ALTERNATIVES

ALTERNATIVE 1: NO ACTION		NPS PREFERRED ALTERNATIVE		ALTERNATIVE 2		ALTERNATIVE 4			
Other Topics									
Visitor Use		Maintaining the current access; scenic resources; range of visitor opportunities; experience; and recreation-oriented facilities, including those associated with implementation of the <i>Flamingo Commercial Services Plan</i> , would have a long-term, minor to moderate impact in promoting increased visitor use, although construction activities would have short-term, limited, adverse impacts. To the extent that increased use could be accommodated while achieving the park’s other environmental, ecological and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact on visitor use.		Increases in visitor opportunities related to additional visitor services and recreation-oriented facilities, off-site information and education opportunities, and access under the NPS preferred alternative would have a long-term, minor, beneficial impact on visitor use. Implementation of boating management actions in Florida Bay (e.g., pole/troll and pole/troll/idle zones) would result in short- and long-term changes in boating use, including the type and distribution and potentially the level of use. Establishing long-term concession contracts with commercial airboat operators might result in long-term changes in visitor use, but the timing, magnitude, and increase or decrease in visitation are uncertain. The net effect is anticipated to be a minor to moderate increase in visitor use. To the extent that increased use can be accommodated while achieving the park’s other environmental, ecological and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact.		Increases in visitor opportunities related to additional visitor services and recreation-oriented facilities, off-site information and education opportunities, and access under the alternative 2 would have a long-term, minor, beneficial impact on visitor use. Alternative 2 would open Little Madeira Bay and Joe Bay to fishing and to visitors, providing an opportunity to explore a new area and increasing use. Boating use in Florida Bay would remain similar to current trends and patterns. Establishing long-term concession contracts with commercial airboat operators might result in long-term changes in visitor use, but the timing, magnitude, and increase or decrease in visitation are uncertain. The net effect is anticipated to be a minor to moderate increase in visitor use. To the extent that increased use could be accommodated while achieving the park’s other environmental, ecological and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact.		Increases in visitor opportunities related to additional visitor services and recreation-oriented facilities, off-site information and education opportunities, and access under alternative 4 would have a long-term, minor, beneficial impact on visitor use. Implementation of boating management in Florida Bay would result in short- and long-term changes in boating use, including the type and distribution and potentially the level of use, with an anticipated net effect of less boating than under the no-action alternative. Despite elimination of commercial airboat tours in the park, the net effect of alternative 4 is anticipated to be a minor to moderate increase in visitor use compared to the no-action alternative because commercial airboat patrons would remain uncounted in the no-action alternative. To the extent that increased use could be accommodated while achieving the park’s other environmental, ecological and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact.	
Visitor Experience and Opportunities		The no-action alternative would result in the continuation of long-term, minor to moderate, adverse impacts as well as long-term, minor to moderate, beneficial impacts. The other plans and projects in and around the park collectively would have a long-term, minor to moderate, beneficial impact on the visitor experience at the park.		The NPS preferred alternative would have long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts.		Alternative 2 would have long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts.		Alternative 4 would have long-term, moderate to major, adverse impacts as well as long-term, moderate to major, beneficial impacts.	
Regional Socioeconomic Environment		The economic and social effects of the no-action alternative include minor, short- and long-term economic benefits and negligible indeterminate effects on population growth and demands on community services and facilities. Long-term consequences on attitudes and lifestyle are indeterminate, but in general more likely to be adverse than beneficial.		The economic effects of the NPS preferred alternative would include negligible short-term and negligible to minor long-term economic benefits, the latter due to increased visitation expected under this alternative. Short- and long-term consequences include a negligible contribution to population growth and demands on community infrastructure and services and indeterminate consequences on lifestyles and attitudes.		The economic and social effects of implementing alternative 2 would include negligible to minor short-term and minor long-term economic benefits comparable to those under the no-action alternative. Short- and long-term effects on lifestyles and attitudes would be indeterminate. Long-term social consequences would include a negligible contribution to long-term population growth and demands on community infrastructure and services.		The economic and social effects of alternative 4 include long-term adverse economic effects on owners of the real property and business interests associated with commercial airboating. Long-term social consequences would include a negligible to minor contribution to long-term population growth and demands on community infrastructure and services. Overall, the cumulative social and economic effects associated with alternative 4 would be minor, short and long term, and indeterminate because they include effects that might be concurrently viewed as beneficial or adverse.	
Park Operations		The park continues to operate well, however, continuation of the no-action alternative would have beneficial and adverse effects on park operations. Overall, the no-action alternative would have long-term, minor, adverse impacts on NPS operations.		As elements of the NPS preferred alternative are implemented the park would be expected to function more effectively than it would under the no-action alternative. The NPS preferred alternative would result in long-term, moderate, beneficial impacts on park operations.		As elements of alternative 2 are implemented, the park would be expected to function more effectively than it would under the no-action alternative. Alternative 2 would result in long-term, minor to moderate, beneficial impacts on park operations.		As elements of Alternative 4 are implemented the park would be expected to function more effectively than it would under the no-action alternative. The NPS preferred alternative would result in long-term, moderate, beneficial impacts on park operations.	

Everglades National Park

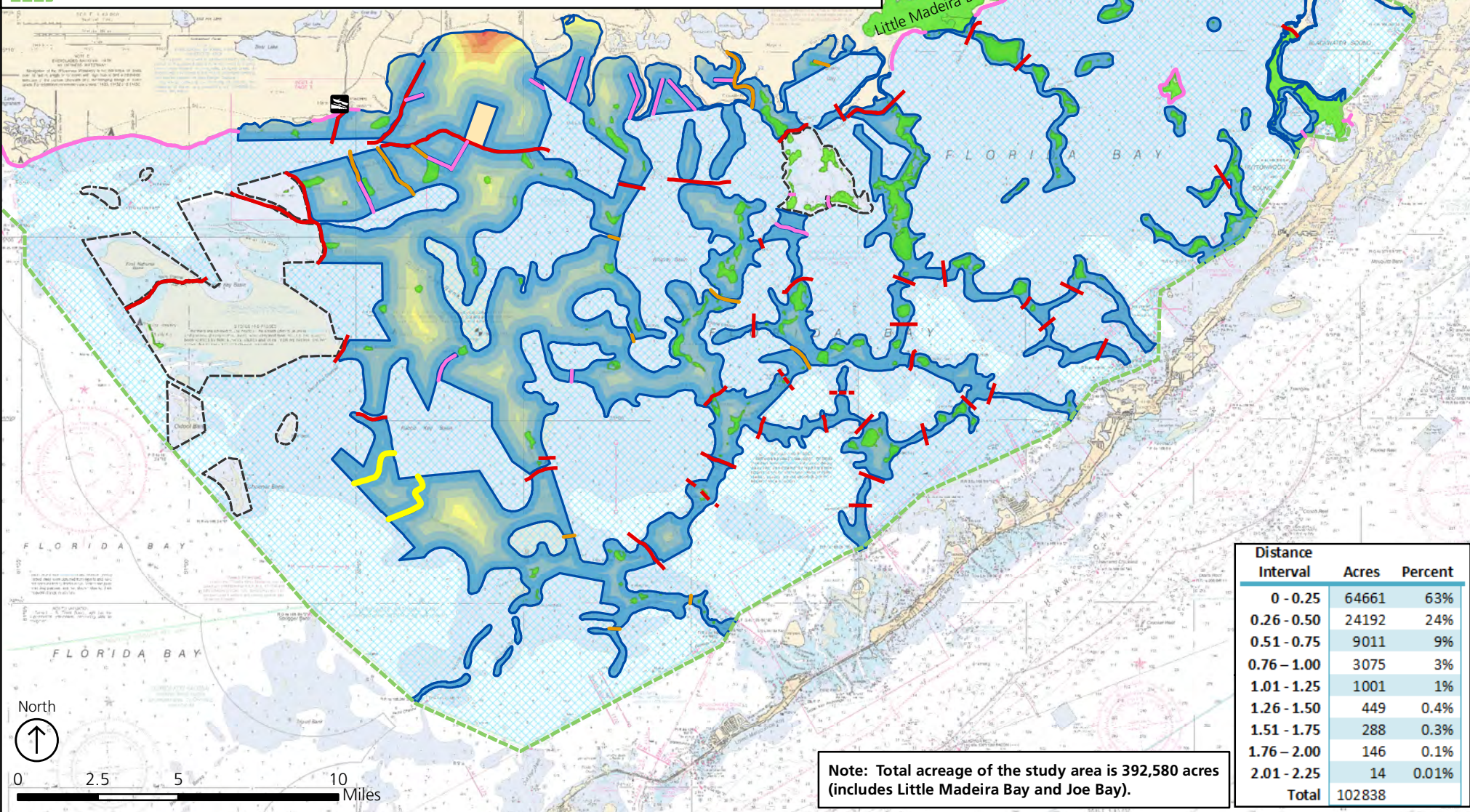
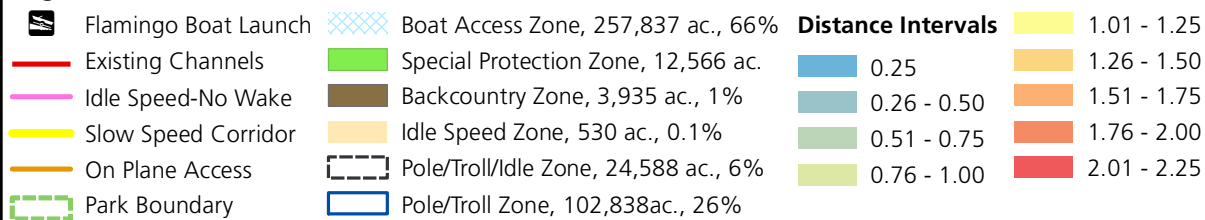
Preferred Alternative Pole/Troll Distance Analysis

Revised 3/11/14

National Park Service
U.S. Department of the Interior



Legend



Note: Total acreage of the study area is 392,580 acres (includes Little Madeira Bay and Joe Bay).

Distance Interval	Acres	Percent
0 - 0.25	64661	63%
0.26 - 0.50	24192	24%
0.51 - 0.75	9011	9%
0.76 - 1.00	3075	3%
1.01 - 1.25	1001	1%
1.26 - 1.50	449	0.4%
1.51 - 1.75	288	0.3%
1.76 - 2.00	146	0.1%
2.01 - 2.25	14	0.01%
Total	102838	

Everglades National Park

Preferred Alternative Pole/Troll Vessel Density Analysis Florida

National Park Service
U.S. Department of the Interior



Legend

Number of Vessels per Square Mile

- 0-5 Vessels per Square Mile
- 5.1-25 Vessels per Square Mile
- 25.1-100 Vessels per Square Mile
- Aerial Vessels (Small)



Flamingo Boat Launch



Park Boundary



On Plane Access



Idle Speed-No Wake



Slow Speed Corridor

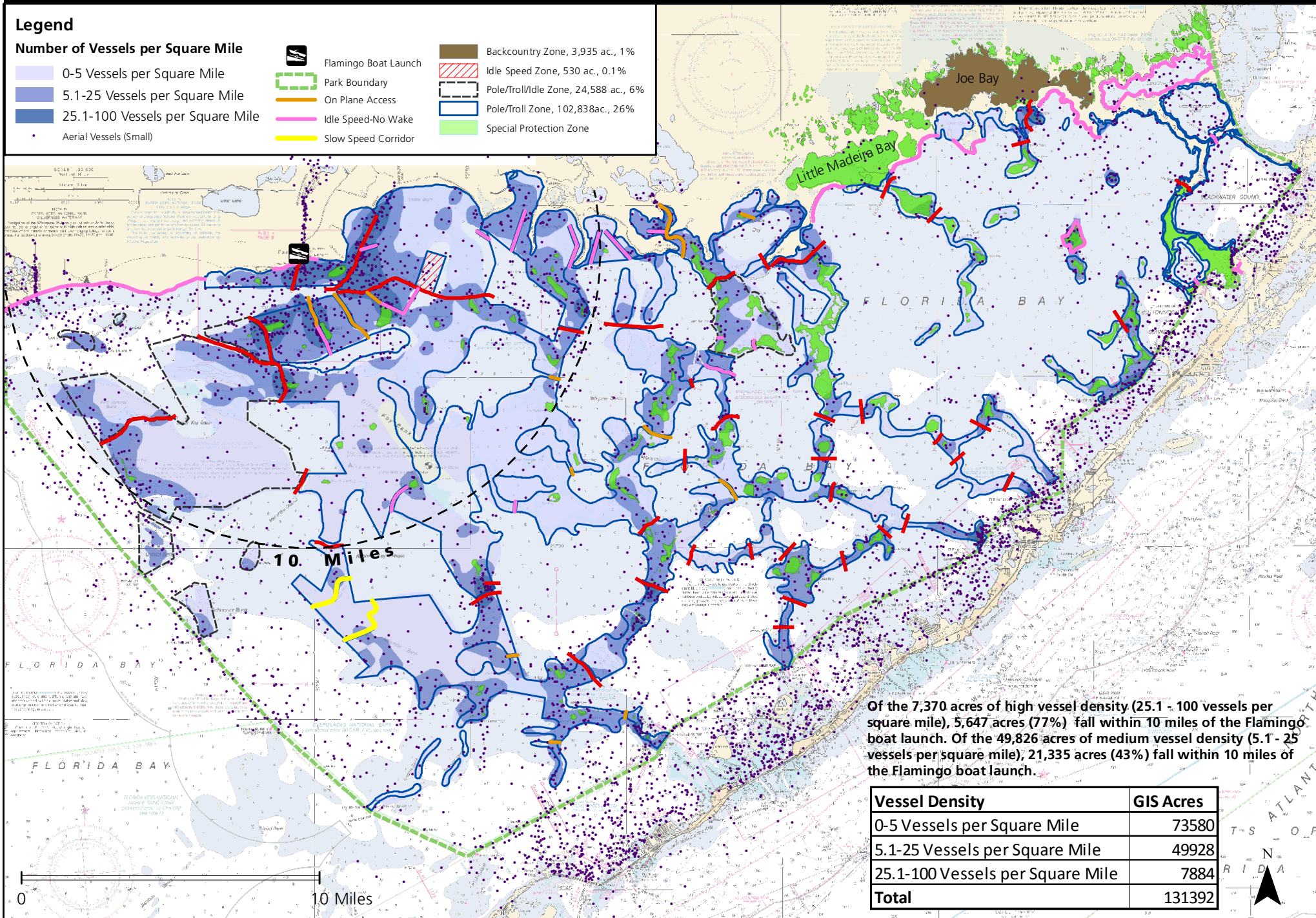
Backcountry Zone, 3,935 ac., 1%

Idle Speed Zone, 530 ac., 0.1%

Pole/Troll/Idle Zone, 24,588 ac., 6%

Pole/Troll Zone, 102,838ac., 26%

Special Protection Zone



Of the 7,370 acres of high vessel density (25.1 - 100 vessels per square mile), 5,647 acres (77%) fall within 10 miles of the Flamingo boat launch. Of the 49,826 acres of medium vessel density (5.1 - 25 vessels per square mile), 21,335 acres (43%) fall within 10 miles of the Flamingo boat launch.

Vessel Density	GIS Acres
0-5 Vessels per Square Mile	73580
5.1-25 Vessels per Square Mile	49928
25.1-100 Vessels per Square Mile	7884
Total	131392

Everglades National Park

Preferred Alternative Pole/Troll Analysis: Flamingo Area Florida

National Park Service
U.S. Department of the Interior

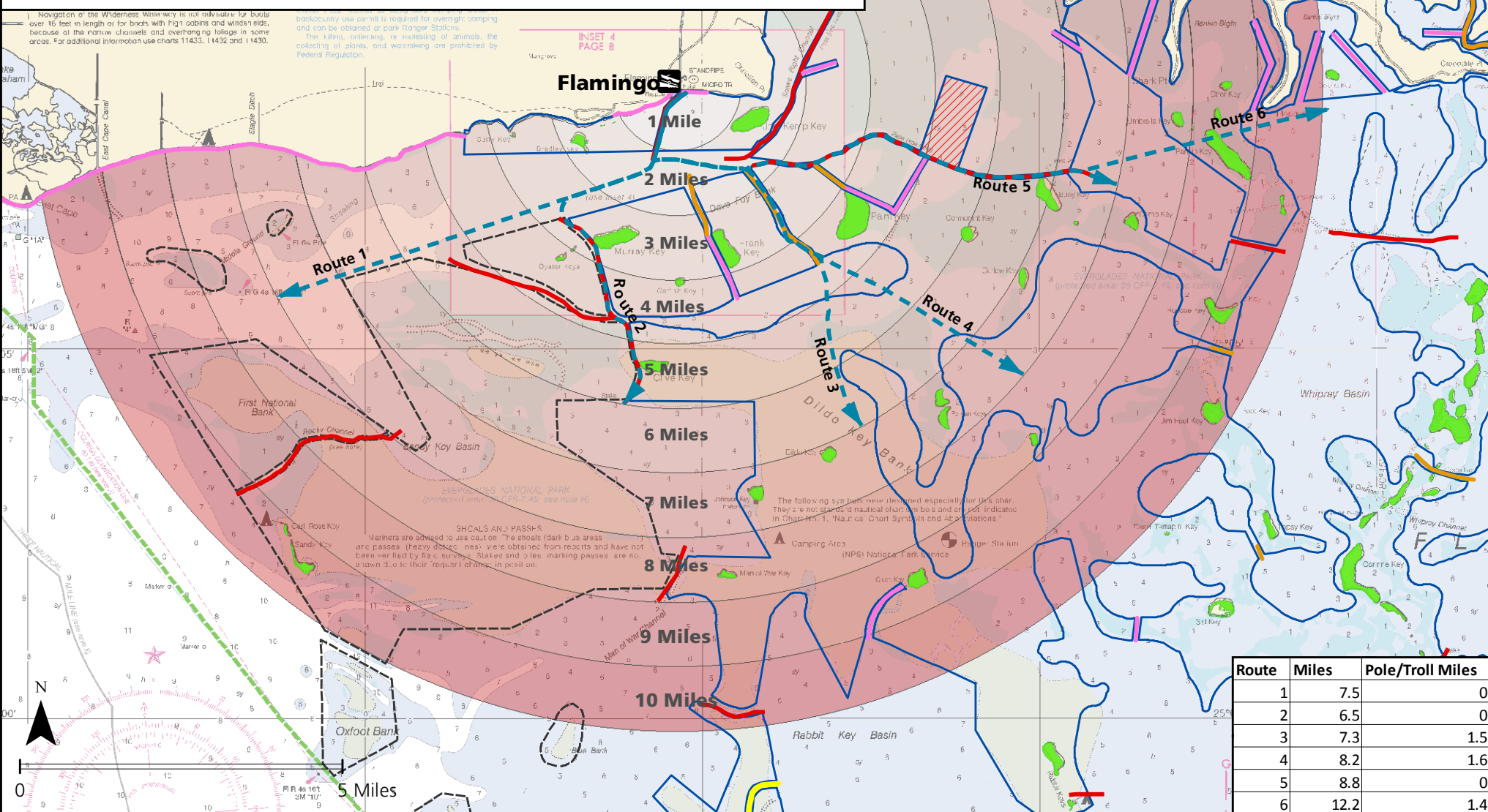


Legend

- Flamingo Boat Launch
- Potential Boat Routes
- Backcountry Zone, 3,935 ac., 1%
- Idle Speed Zone, 530 ac., 0.1%
- Pole/Troll/Idle Zone, 24,588 ac., 6%
- Pole/Troll Zone, 102,838 ac., 26%
- Special Protection Zone
- On Plane Access
- Idle Speed-No Wake
- Slow Speed Corridor
- Existing Channels
- Zone Divisions

Distance from Flamingo (miles)

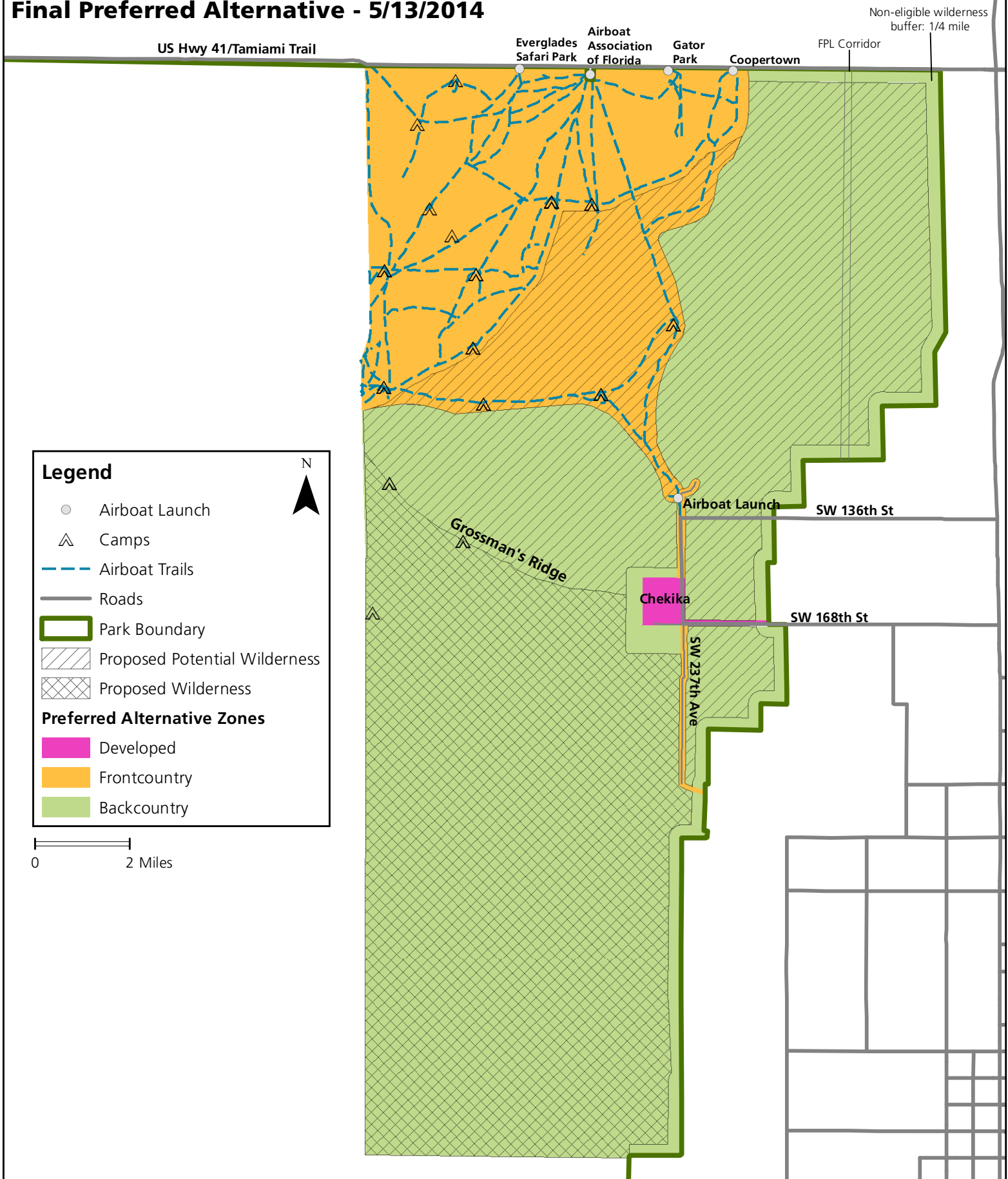
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10



Route	Miles	Pole/Troll Miles
1	7.5	0
2	6.5	0
3	7.3	1.5
4	8.2	1.6
5	8.8	0
6	12.2	1.4



East Everglades GMP Zoning and Wilderness Proposal: Final Preferred Alternative - 5/13/2014



Everglades National Park

Alternative 4 Pole/Troll Distance Analysis

National Park Service
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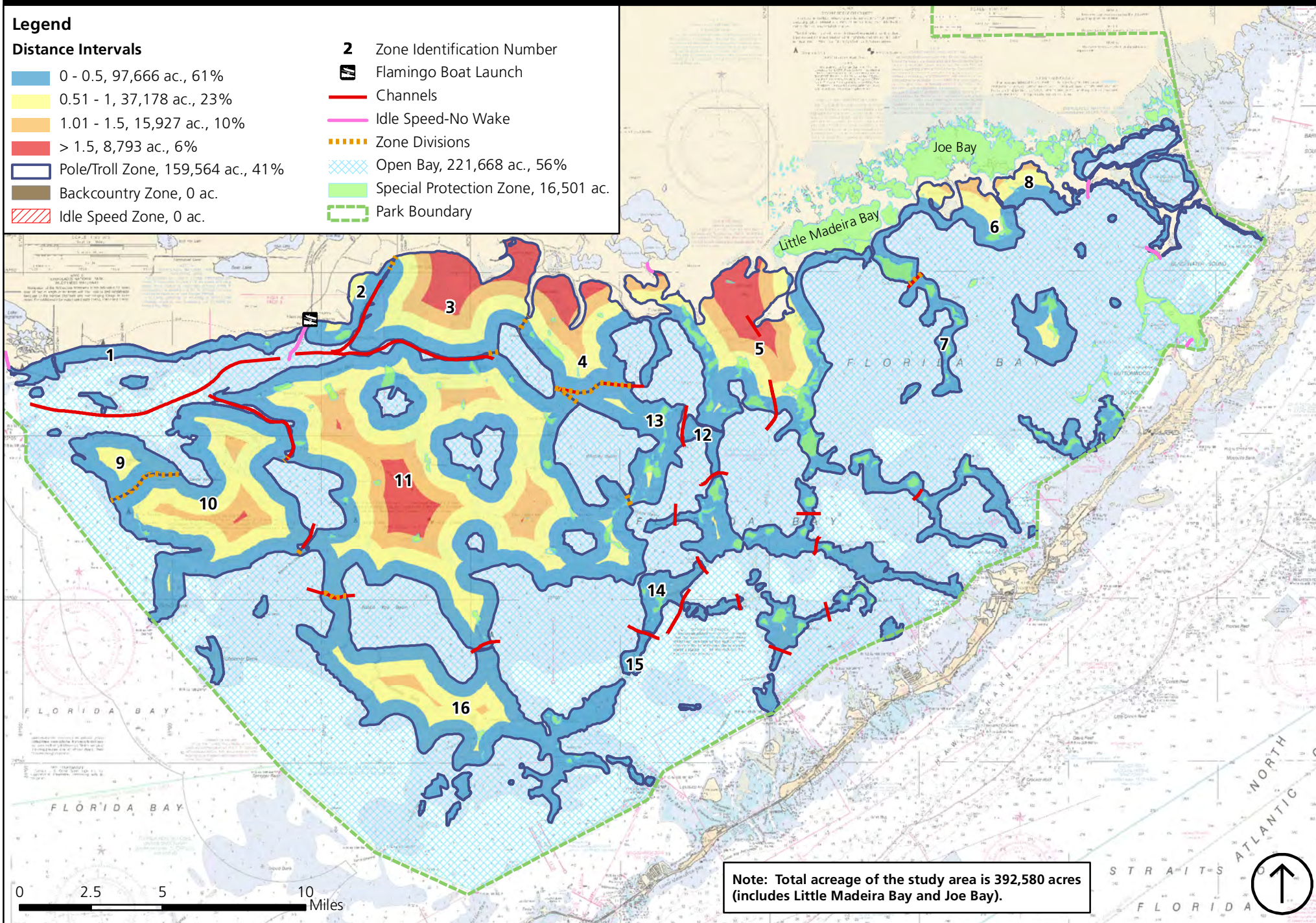


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Distance Intervals

- 0 - 0.5, 97,666 ac., 61%
- 0.51 - 1, 37,178 ac., 23%
- 1.01 - 1.5, 15,927 ac., 10%
- > 1.5, 8,793 ac., 6%
- Pole/Troll Zone, 159,564 ac., 41%
- Backcountry Zone, 0 ac.
- Idle Speed Zone, 0 ac.

- 2 Zone Identification Number
- Flamingo Boat Launch
- Channels
- Idle Speed-No Wake
- Zone Divisions
- Open Bay, 221,668 ac., 56%
- Special Protection Zone, 16,501 ac.
- Park Boundary



Note: Total acreage of the study area is 392,580 acres (includes Little Madeira Bay and Joe Bay).

Everglades National Park

Alternative 4 Pole/Troll Vessel Density Analysis Florida

National Park Service
U.S. Department of the Interior



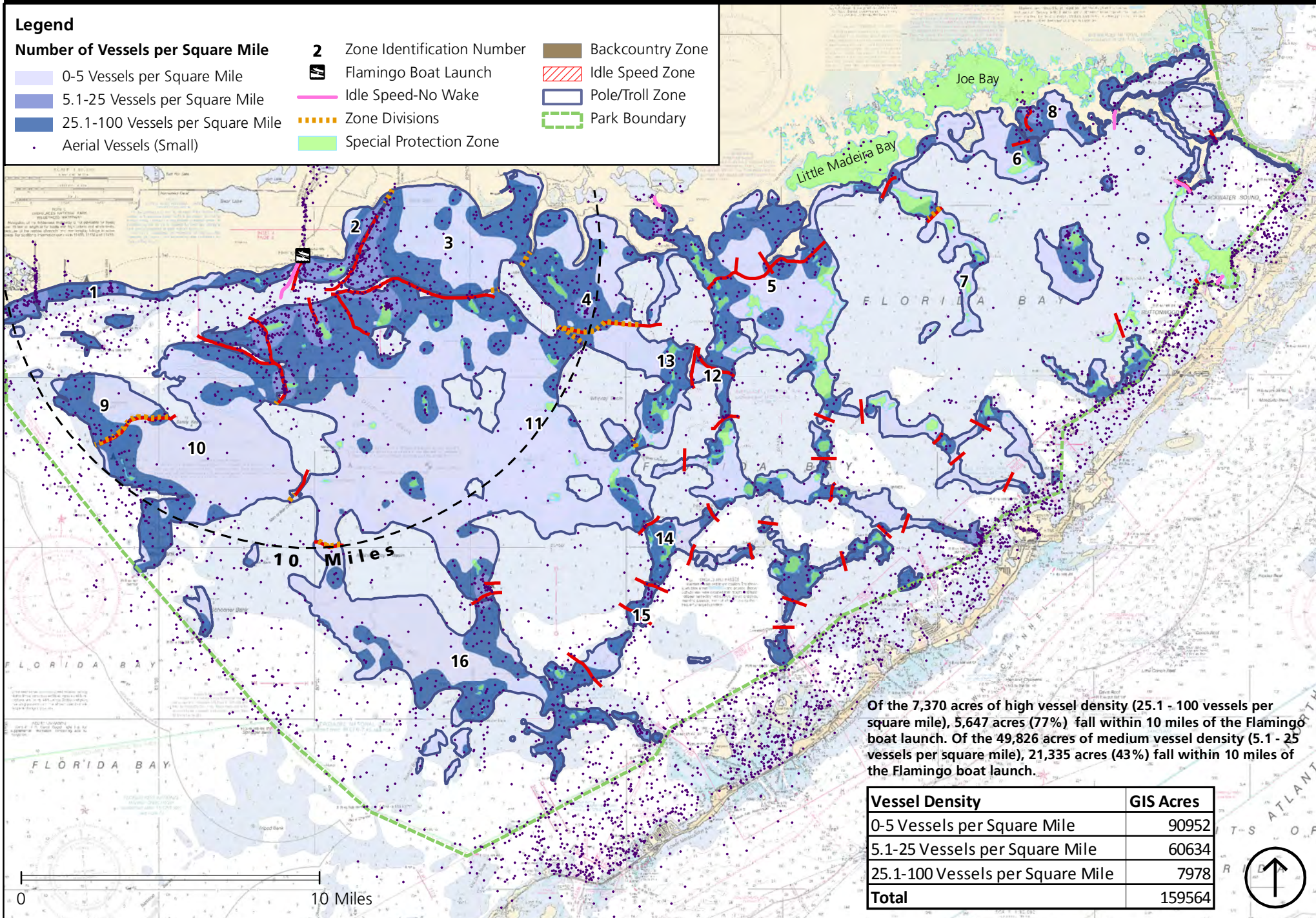
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Number of Vessels per Square Mile

- 0-5 Vessels per Square Mile
- 5.1-25 Vessels per Square Mile
- 25.1-100 Vessels per Square Mile
- Aerial Vessels (Small)

- 2** Zone Identification Number
- Flamingo Boat Launch
- Idle Speed-No Wake
- Zone Divisions
- Special Protection Zone

- Backcountry Zone
- Idle Speed Zone
- Pole/Troll Zone
- Park Boundary



Everglades National Park

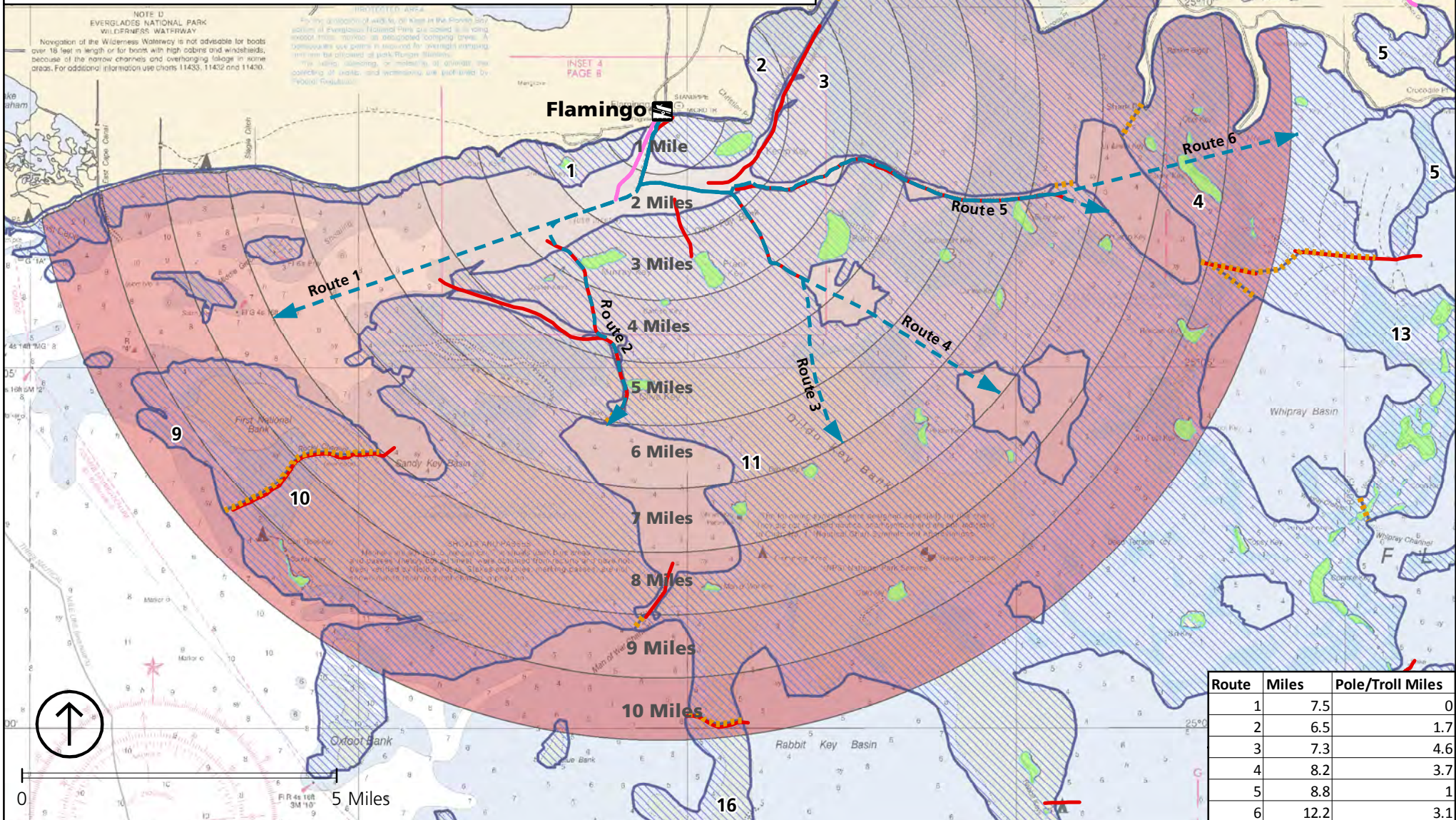
Alternative 4 Pole/Troll Analysis: Flamingo Area
Florida

National Park Service
U.S. Department of the Interior



Legend

- Flamingo Boat Launch
 - Potential Boat Routes
 - Pole/Troll Zone (PTZ)
 - Channels
 - Idle Speed-No Wake
 - Zone Divisions
 - Park Boundary
 - Special Protection Zone
- Distance from Flamingo (miles)**
- | | |
|---|----|
| 1 | 6 |
| 2 | 7 |
| 3 | 8 |
| 4 | 9 |
| 5 | 10 |





Purple Aster

EAST EVERGLADES WILDERNESS STUDY AND PROPOSAL 3



Slough and Sawgrass Prairie, East Everglades

INTRODUCTION

This chapter focuses on the wilderness study and proposal for the East Everglades Addition within Everglades National Park. The first part of this chapter provides background information on the overall wilderness circumstances at Everglades National Park so that readers can better understand the context for the East Everglades Wilderness Study and proposal. The purpose and need for the East Everglades wilderness study is discussed in chapter 1 of this document. The second part of this chapter discusses the wilderness study and proposal for the East Everglades Addition; options vary by alternative.

Originally, this general management planning effort did not include the East Everglades Wilderness Study. However, in 2006 the scope of the general management plan was expanded to include the wilderness study. This made sense from an efficiency and cost standpoint because the two processes have similar environmental compliance and public involvement needs.

In July 2006, the NPS planning team published a newsletter to inform the public that the scope of the general management plan had been expanded to include the East Everglades Wilderness Study. In August 2006, the National Park Service hosted a wilderness study public workshop in Miami, Florida. The purpose of the meeting was to introduce the public to the wilderness study and to gather initial input about the possibility of designating wilderness in the East Everglades Addition.

PURPOSE AND DEFINITION OF WILDERNESS

The purpose of wilderness designation is to preserve and protect wilderness characteristics and values in perpetuity, including opportunities for solitude or

primitive and unconfined recreation. With the passage of the 1964 Wilderness Act (16 USC 1131 et seq.), the guiding piece of legislation for all wilderness areas, Congress declared that it is national policy to secure for present and future generations the benefits of an enduring resource of wilderness. Wilderness can be officially designated only through congressional action.

The Wilderness Act of 1964 defines wilderness as follows:

- “lands designated for preservation and protection in their natural condition (section 2(a))
- an area where the earth and its community of life are untrammelled by man (section 2(c))
- an area of undeveloped federal land retaining its primeval character and influence, without permanent improvement or human habitation (section 2(c))
- generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable (section 2(c))
- has outstanding opportunities for solitude or a primitive and unconfined type of recreation (section 2(c))
- shall be devoted to the public purposes of recreation, scenic, scientific, educational, conservation and historic use (section 4(b))
- may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value”—section 2(c)

SUMMARY OF USES, DEVELOPMENTS, AND MANAGEMENT ACTIONS PERMITTED AND PROHIBITED IN WILDERNESS

This section is a brief summary of what is and is not allowed in designated wilderness areas.

The Wilderness Act and agency policies identify uses, facilities, and management actions that are and are not permitted in wilderness areas. Note that submerged marine wilderness (discussed in a separate section below) is a special case in that motorboats are allowed on the water in the national park.

Recreational uses, management actions, and facilities permitted in wilderness areas under the Wilderness Act and NPS policies include the following:

- nonmechanized recreational uses (e.g., hiking, backpacking, picnicking, canoeing/kayaking, camping)
- hunting and trapping (where otherwise permitted by law) and fishing
- American Indian religious activities and other actions recognized under treaty-reserved rights
- guided interpretive walks and on-site talks and presentations
- wheelchair use by individuals whose disability requires its use
- scientific activities, research, and monitoring (provided the activities are appropriate and use the minimum requirement to accomplish project objectives)
- management actions taken to address impacts of human use; examples of such actions include restoration of extirpated species, controlling invasive nonnative species, managing endangered species, and protection of air and water quality
- fire management activities (including fire suppression and prescribed fire)

as approved in the fire management plan

- preservation of historic properties eligible for listing in the National Register of Historic Places
- trails necessary for resource protection or for providing visitor safety
- campsites where essential for resource protection and preservation or to meet other specific wilderness management objectives
- toilets that would resolve health and sanitation problems or prevent serious resource impacts
- signs (such as those identifying routes and distances) and other infrastructure necessary for visitor safety or to protect wilderness resources
- certain administrative facilities if necessary to carry out wilderness management objectives (e.g., storage or support structures, ranger station)
- uses and facilities permitted for landowners with valid property rights in a wilderness area

Certain uses and developments are prohibited under the Wilderness Act. Under the definition of wilderness in section 2(c) of the act, permanent improvements or human habitation are prohibited. Section 4 (c) specifically prohibits the following:

- commercial enterprises
- permanent roads
- temporary roads
- use of motor vehicles
- use of motorized equipment, motorboats, and airboats
- landing of aircraft
- other forms of mechanical transport (e.g., bicycles)
- structures or installations

With the exception of permanent roads and commercial enterprises, the Wilderness Act recognizes that the above uses may be permitted if necessary to meet the minimum requirements necessary for the administration of the area as wilderness or for emergency purposes. Other sections of the Wilderness Act also provide for some exceptions, including the preservation of features of historical value in section 2(c) and commercial services necessary for activities that are appropriate for realizing the recreational or other wilderness purposes of the area in section 4(d)(6).

Additionally, NPS policies prohibit some other developments as follows:

- new utility lines
- permanent equipment caches (unless necessary for health and safety or determined to be the minimum requirement)
- improvements for nonemergency use
- borrow pits (except for small quantity use of borrow material for trails)
- new shelters for public use (unless determined to be the minimum facility necessary for the health and safety of wilderness users or for the preservation of wilderness resources and values)
- picnic tables
- interpretive signs

Because the National Park Service manages proposed wilderness similar to designated wilderness, these prohibited uses are also prohibited within areas identified as proposed wilderness.

WILDERNESS AT EVERGLADES NATIONAL PARK

Marjory Stoneman Douglas Wilderness

Nearly 87% of Everglades National Park is currently designated wilderness. This wilderness area, originally named “Everglades Wilderness,” was created by Congress in 1978, and it comprises nearly 1.3 million acres of Everglades National Park’s 1.5 million acres (see “Wilderness Status” map). In 1997, the name was changed to “Marjory Stoneman Douglas Wilderness.” The Marjory Stoneman Douglas Wilderness includes most of the park’s undeveloped lands and inland waters, and it also includes submerged marine lands, which are a special case (see the “Submerged Marine Wilderness” section below).

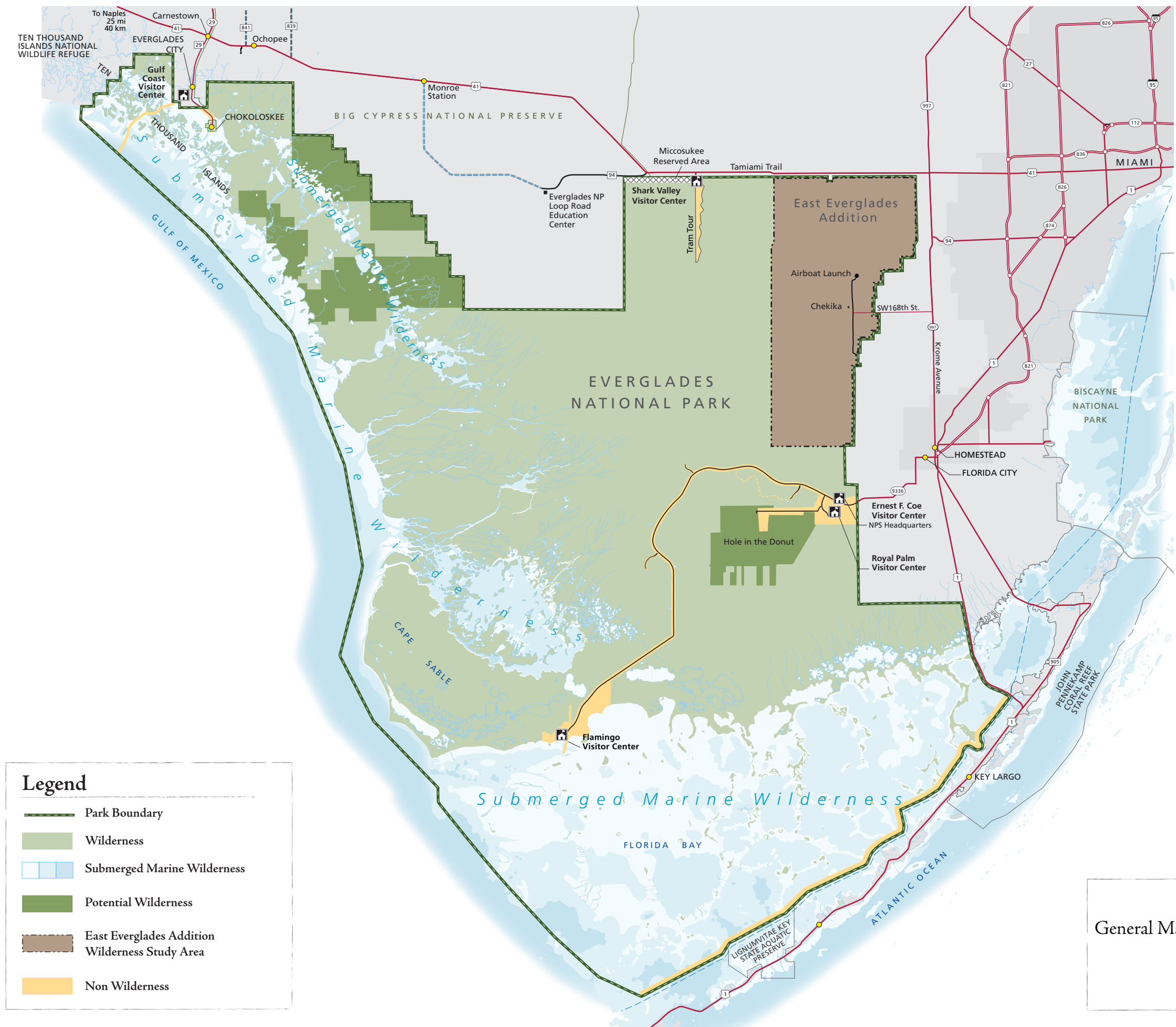
At the same time that wilderness was originally designated within Everglades National Park, 82,000 acres in several locations were designated “potential wilderness,” meaning they would be converted to wilderness if or when nonconforming uses end. In the interim, these lands are managed as if they were wilderness, to the extent that is legal and practical to do so. Examples include the Hole-in-the-Donut area in the center of the park, which would become wilderness when restoration efforts are complete, and some parcels in the northwestern part of the park that contain nonfederal mineral rights. Existing wilderness and potential wilderness areas are managed under the Wilderness Act of 1964, NPS *Management Policies* 2006, and the *Everglades National Park Backcountry Management Plan* (1981).

Submerged Marine Wilderness (Marine Waters)

The submerged marine (marine waters) portion of the Marjory Stoneman Douglas Wilderness, approximately 530,000 acres in extent, is unusual in that it includes the marine

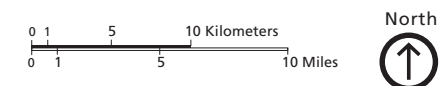
bottom (benthic surface), but not the water column or the water surface. This distinction, which allows motorboating on the water

surface, was included in the original wilderness recommendation and was carried forward by designation of Congress.



Legend

- Park Boundary
- Wilderness
- Submerged Marine Wilderness
- Potential Wilderness
- East Everglades Addition
- Wilderness Study Area
- Non Wilderness



Wilderness Status

General Management Plan/East Everglades Wilderness Study
Everglades National Park

EAST EVERGLADES WILDERNESS STUDY AND PROPOSAL

BRIEF DESCRIPTION OF THE STUDY AREA

In 1989, 109,600 acres were added to Everglades National Park as part of the Everglades National Park Protection and Expansion Act of 1989 (16 USC 410r-5). This area is known as the East Everglades Addition. The purposes of the 1989 act were to (1) increase the level of protection of the outstanding natural values of Everglades National Park and enhance and restore the ecological values, natural hydrologic conditions, and public enjoyment of such area by adding the area commonly known as the Northeast Shark River Slough and the East Everglades to Everglades National Park; and (2) assure that the park is managed to maintain the natural abundance, diversity, and ecological integrity of native plants and animals, as well as the behavior of native animals as a part of their ecosystem.

The northeast part of the East Everglades Addition consists primarily of the eastern part of the Shark River Slough, with hammocks or tree islands scattered throughout. Chekika (a former state recreation area) is in the east-central portion. The eastern and southern portions are freshwater marl prairie that is mostly inaccessible because of shallow water and rocky conditions.

The East Everglades Addition is bordered on the north by Tamiami Trail (Highway 41); on the east by residential, commercial, and agricultural lands of Miami-Dade County; on the south by freshwater marl prairie and pinelands of Everglades National Park; and on the west by freshwater slough (Shark River Slough of Everglades National Park). See “Ecosystems” map in chapter 4. More than 99% of the area is federally owned. Six properties along Tamiami Trail are still in private ownership, and a narrow north-south corridor is owned by Florida Power & Light.

The park’s 1991 Land Protection Plan provides management guidance for implementing the 1989 act and establishes priorities for land acquisition.

WILDERNESS ELIGIBILITY

The first step in the wilderness study was to evaluate the eligibility of lands within the East Everglades for wilderness designation. Wilderness, as defined by the Wilderness Act, is where

- the earth and its community of life are untrammeled by humans, where humans are visitors and do not remain
- the area is undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions
- the area generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable
- has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- the area may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

The Wilderness Act also says that wilderness areas shall be devoted to the public purposes of recreation, scenic, scientific, educational, conservation, and historic use. Using this guidance from the Wilderness Act, together with additional considerations as outlined in NPS management policies, the interdisciplinary planning team evaluated the East Everglades Addition in 2006.

The wilderness eligibility determination associated with this plan was combined with the Wilderness Study in accordance with established NPS policy (Director's Order 41: *Wilderness Stewardship*). The number of acres identified as eligible for wilderness designation in the draft GMP/East Everglades Wilderness Study in 2012 (102,100 acres) was amended in 2015 to reflect the results of the Wilderness Study as described in the preferred alternative. The amended wilderness acreage was based on continued internal staff analysis of existing conditions and wilderness characteristics along with public comment received on the draft plan.

Of the 109,600 acres within the East Everglades Addition, the final Wilderness Study determined that approximately 85,300 acres meet wilderness eligibility criteria (see "East Everglades Eligibility Assessment" in appendix H). This determination considered the natural resource protection and restoration goals for the area as defined in the purpose of the 1989 act and the long-term continuation of commercial airboating in approximately 16,400 acres (zoned frontcountry) in the northwestern portion of the East Everglades Addition as is described in the NPS preferred alternative.

About 24,300 acres were determined to be ineligible because of long-term nonconforming uses or the presence of infrastructure such as improved roads and/or structures. The following areas were determined to be ineligible:

- the Chekika area (former state recreation area) and a 300-foot buffer
- near Chekika, SW 168th Street and SW 237th Avenue and a 150-foot corridor on either side of the road centerline
- areas of existing development associated with the commercial airboat operations and radio transmission buildings along the south side of Tamiami Trail

- 0.25 mile (1,320 feet) south of the Florida Department of Transportation right-of-way along Tamiami Trail (where the right-of-way meets the park boundary), and east of the area determined ineligible as wilderness where concession airboat tours would operate
- 0.25 mile (1,320 feet) west of the park's eastern boundary for the length of the East Everglades Addition
- a 150-foot corridor on either side of the SW 237 Avenue right-of-way
- approximately 16,400 acres (zoned frontcountry) in the northwestern portion of the East Everglades Addition where airboat tours for visitors, to enhance their understanding and enjoyment of the park, would be provided by NPS concessioners in the long term.

OPTIONS ANALYZED IN THIS WILDERNESS STUDY

This wilderness study evaluates whether, and if so where, wilderness should be designated within the East Everglades Addition, given the best available information about wilderness character, public review and comment, and practical considerations. As the terms are used in this document, proposed wilderness is an area that has wilderness characteristics and would be proposed by the National Park Service for designation. Proposed potential wilderness is an area that has wilderness characteristics but had temporary nonconforming conditions or uses. If these areas were designated by Congress as potential wilderness, they would be converted to designated wilderness once the nonconforming conditions have been rectified.

Using the overall vision for each action alternative and public comment, the planning team developed a range of possibilities for proposed wilderness that would meet the

park's purpose. Each wilderness option is included as part of one of the general management plan alternatives; see "Chapter 2: Alternatives, Including the Preferred Alternative." The environmental impact statement included in this document analyzes the consequences of these four wilderness options.

Alternative 1, the no-action alternative, describes continuation of existing management at Everglades National Park. This alternative provides a baseline for evaluating changes and impacts of the three action alternatives. In keeping with the intent of this alternative, none of the East Everglades would be proposed for designation as wilderness.

Under the NPS preferred alternative, approximately 42,200 acres of the East Everglades Addition would be proposed for wilderness designation and about 43,100 acres would be proposed as potential wilderness. Potential wilderness would be converted to designated wilderness once nonconforming uses (primarily private airboat use, activities related to ecosystem restoration efforts, and projects to restore disturbed sites) were discontinued and/or private property comes into federal ownership. In addition to the five ineligible areas described above, 16,400 additional acres in the northwest portion of the East Everglades Addition would not be proposed for wilderness designation to accommodate concessioner airboat tours for park visitors. See the inset on the "NPS Preferred Alternative" map for the visual depiction of these areas.

Under alternative 2, about 39,500 acres in the southern portion of the East Everglades Addition would be proposed for wilderness designation. This southern portion, south of Grossman's Ridge, is marl prairie and is often too dry to accommodate airboat use. See the

inset on the "Alternative 2" map for the visual depiction of these areas.

Under alternative 4, approximately 42,700 acres would be proposed for wilderness designation and 59,400 acres would be proposed as potential wilderness. Potential wilderness would be converted to designated wilderness once nonconforming uses (primarily private airboat use and restoration of disturbed sites) ended and/or private property comes into federal ownership. All of the East Everglades Addition, except areas identified as ineligible on the previous page, would be proposed as wilderness or potential wilderness. See the inset on the "Alternative 4" map for the visual depiction of these areas.

WILDERNESS PROPOSAL (FROM NPS PREFERRED ALTERNATIVE)

The majority of lands south of Grossman's Ridge and west of SW 237th Avenue in the East Everglades Addition (totaling about 42,200 acres) would be proposed as wilderness. The following areas (totaling about 43,100 acres) in the Addition would be proposed potential wilderness: (1) the portion of the East Everglades Addition within which private airboat use would likely continue beyond the life of this plan (zoned frontcountry), and (2) the majority of areas north of Grossman's Ridge and east of SW 237th Avenue, including the north-south corridor owned by Florida Power & Light. Proposed wilderness plus proposed potential wilderness would together make up approximately 78% of the East Everglades Addition. The northwestern portion of the East Everglades Addition, within which airboat tours for park visitors provided under NPS concession contracts would be provided over the long term (about 16,400 acres zoned frontcountry), would not be proposed for wilderness.

TABLE 7. WILDERNESS OPTIONS EVALUATED IN THIS WILDERNESS STUDY

Alternative	Wilderness Proposal for East Everglades	% of East Everglades
Alternative 1: No Action	None	0% total
NPS Preferred Alternative	Proposed wilderness: 42,200 acres Proposed potential wilderness: <u>43,100 acres</u> Total wilderness proposal: 85,300 acres	78% total
Alternative 2	Proposed wilderness: 39,500 acres Proposed potential wilderness: <u>0 acres</u> Total wilderness proposal: 39,500 acres	38% total
Alternative 4	Proposed wilderness: 42,700 acres Proposed potential wilderness: <u>59,400 acres</u> Total wilderness proposal: 102,100 acres	93% total

[Note: acreage figures and percentages are approximate.]

Exclusions to the wilderness proposal would total approximately 24,300 acres and include the following:

- An east-west strip of 0.25 mile (1,320 feet wide) along the park boundary south of Tamiami Trail east of the 16,400-acre area determined ineligible as wilderness where concessioner airboat tours would operate.
 - The 0.25 mile (1,320-foot) exclusion along the south side of Tamiami Trail is to allow for
 - appropriate resource management activities associated with ecosystem restoration projects (e.g., scientific research, monitoring, and analysis to improve natural hydrologic conditions and protect threatened and endangered species habitat)
 - activities associated with Northeast Shark River Slough hydrologic restoration projects (e.g., Modified Water Deliveries Project, Tamiami Trail Modifications: Next Steps, and CERP Decentralization Project)
 - Specific management actions that would typically occur in this corridor include road maintenance and improvements including culvert clean-out and maintenance, road/bridge alterations and other work with heavy equipment related to restoring and managing water flow, managing concession airboat sites, and resource management activities such as removal and management of invasive nonnative vegetation.
 - This distance is similar to the distance authorized near nonwilderness areas of the park that are adjacent to the 1,296,000-acre Marjory Stoneman Douglas Wilderness such as near the main park road and Long Pine Key Road.
- A 0.25-mile (1,320-foot) strip along the entire length of the eastern boundary. [Note: before the wilderness proposal is forwarded for approval by the National Park Service, the width of this strip would be fine-tuned based on the best available information.]
 - This exclusion along the eastern boundary of the East Everglades

- area is to allow for resource management and maintenance activities associated with ecosystem restoration projects designed to minimize groundwater seepage eastward out of the park and maintain higher water levels within the park.
- Projects intended to provide these benefits include the C-111 component of the Modified Water Deliveries Project and the L31N Seepage Management Project that is part of the Comprehensive Everglades Restoration Project.
- The developed Chekika area (former state recreation area) and a 300-foot strip around it.
 - The 300-foot corridor around Chekika and adjacent roads (SW 168th Street and SW 237th Avenue (including 150 feet from either side of the center line) is to provide a transition zone to allow for the following activities:
 - road and utility maintenance, invasive nonnative vegetation and fish removal and management, fire management activities and fuel break clearing around visitor use areas
 - providing and maintaining parking/trailhead areas for private airboating and providing and maintaining opportunities for hiking/bicycling and equestrian trips
 - This distance is consistent with the distance authorized near similar moderately developed areas of the park that are adjacent to the 1,296,000-acre Marjory Stoneman Douglas Wilderness such as Shark Valley and the Research Road / Hole-in-the-Donut area.
- Approximately 16,400 acres (zoned frontcountry) in the northwestern portion of the East Everglades

Addition where airboat tours provided under NPS concession contracts would be provided in the long term.

- This area has historically been used for commercial airboating. For the first time, this visitor opportunity would be provided under NPS concessions contracts with up to four eligible companies, consistent with the 1989 act. If this activity were ever to cease, the area would likely recover its wilderness character over time and possibly be eligible as wilderness at some future time. Should that use end the National Park Service would reevaluate the eligibility of these lands consistent with *NPS Management Policies 2006* (6.2.1: “Additionally, lands originally assessed as ineligible for wilderness because of nonconforming or incompatible uses must be reevaluated if the nonconforming uses have been terminated or removed.”) However, the preferred alternative of the final General Management Plan calls for concessioner airboat tours continuing in this area over the long term (20 years or more). Therefore, the imprint of human activity and impact on solitude would be substantial for the foreseeable future, leaving these lands ineligible as wilderness.

The wilderness proposal for the NPS preferred alternative is illustrated on the East Everglades Addition enlargement on the “NPS Preferred Alternative” map (see chapter 2). Please note that the acreage figures for the various wilderness proposals are estimates based on small-scale maps; the acreage for the approved wilderness proposal would be refined through more specific GIS mapping prior to legislation, using detailed, large-scale maps.

The Record of Decision for the final GMP/East Everglades Wilderness Study will

serve as the formal approval of the lands identified as proposed wilderness. Ultimately, wilderness studies typically result in a recommendation to Congress to designate all, some, or none of the lands possessing wilderness character as part of the wilderness preservation system. On the basis of the wilderness study in this document, the National Park Service anticipates forwarding a wilderness proposal to the U.S. Department of the Interior at the conclusion of this planning effort. The Secretary of the Interior is then responsible for reviewing this proposal and either approving or revising it before forwarding it on to the president as recommended wilderness. The president then formally transmits this recommendation to both houses of Congress for action.

Public Comment on Wilderness

During public scoping for the East Everglades wilderness study and during public review of the *Draft General Management Plan / East Everglades Wilderness Study / Environmental Impact Statement*, a variety of perspectives on wilderness were expressed. Most people who supported wilderness did so because they value natural conditions; primitive recreation; and opportunities for solitude, particularly as portions of south Florida become more developed. Some who opposed wilderness designation did so because many areas in the East Everglades have some human imprint; others opposed wilderness because of concerns that certain activities (such as airboating and ongoing restoration activities) would be restricted or eliminated. These public comments were considered in the determination of eligible wilderness acres in the Wilderness Study.

Implications of Managing Lands Proposed for Wilderness and Proposed for Potential Wilderness

Lands within the East Everglades Addition that are proposed for wilderness designation in the “Record of Decision” for the final

GMP/East Everglades Wilderness Study will be managed as wilderness until such time as Congress specifically decides whether or not to include them in a formal wilderness designation (NPS *Management Policies* 2006). Lands identified as potential wilderness will also be managed as wilderness to the extent that existing nonconforming conditions allow.

As noted above, much of the northern portion of the East Everglades Addition would be proposed as potential wilderness in the NPS preferred alternative. The wilderness character of this area has been and is continuing to be degraded by the presence of nonnative species, both vegetation (e.g., melaleuca, Australian pine, Brazilian pepper, Old World climbing fern) and animals (e.g., Burmese pythons, Mayan cichlids), altered hydrology (due to extensive regional flood protection and water supply actions over many decades, the wrong timing and distribution of freshwater delivery to the park in less than desired quality and amounts has been occurring, resulting in ongoing adverse natural resource impacts), and other evidence of past human manipulation (e.g., dredging canals and establishing an extensive airboat trail network in sawgrass and marsh habitats, manipulating the landscape of naturally formed tree islands in the ridge and slough physiographic region). Park managers recognize that a substantial amount of research and resource management activity is needed to restore the ecosystem of this area, and that motorized vehicle access to sites, use of motorized and mechanized equipment, installation of monitoring devices, and other activities normally prohibited under the Wilderness Act will be required to meet this need. Management actions proposed to address these nonconforming conditions and generally prohibited activities will be subject to a minimum requirements analysis (MRA) as explained below.

The 43,100 acres identified as potential wilderness will be subject to management actions to mitigate or eliminate longstanding impacts and disturbances to the natural environment that have degraded wilderness

character, many natural and cultural resource features, and generally prevented the park from fully meeting its mission. This potential wilderness area in the northern portion of the East Everglades is one of the most critical locations of a multidecade, multibillion dollar interagency effort to restore the Everglades ecosystem (as discussed in chapter 1 of the GMP), and there will be substantial management action taken that in the long term will result in restoring wilderness character, natural habitats, and resource conditions not only in this area, but that will extend through the East Everglades and to other areas of Everglades National Park.

With this long-term vision comes the recognition that park and partner managers will rely on restoration strategies and techniques that have been most successful over time, while also seeking new approaches that can achieve the desired outcomes in less impacting ways. Those strategies and techniques sometimes include the use of motorized and mechanized equipment to achieve long-term success in restoring wilderness and ecosystem resource conditions. In addition, approximately 9,000 acres of the potential wilderness area would allow limited individual, private airboat use as provided for in section 103(c)(2) of the 1989 act (although airboat use is an otherwise prohibited use in wilderness).

It is recognized that these management actions and allowances will be in place for many years. When restoration efforts are successful or wilderness character is sufficiently improved, the lands will be advanced as proposed wilderness or converted to designated wilderness if there has been supporting wilderness legislation passed.

Planning and Management

A wilderness or backcountry management plan is typically developed to guide preservation, management, and use of NPS wilderness areas. Such a plan would be developed with public involvement and would

contain measurable objectives for preservation of wilderness values as specified in the Wilderness Act and NPS *Management Policies 2006*. Wilderness management plans, which are often combined with backcountry management plans, articulate management actions such as regulations, monitoring, and permit systems—such as those currently in place for backcountry camping in the park. Such a plan would be developed for any new wilderness areas within the East Everglades Addition. Management of the existing Marjory Stoneman Douglas Wilderness is addressed by the 1981 Backcountry Management Plan.

The proposed management actions in the areas proposed for wilderness designation and as potential wilderness in the Record of Decision for this plan are subject to a minimum requirements analysis. Minimum requirements analyses will take into consideration the concept of wilderness character, which includes the combination of biophysical, experiential, and symbolic ideals that distinguish wilderness from other lands. The five qualities of wilderness character are (1) untrammeled, (2) undeveloped, (3) natural, (4) offers outstanding opportunities for solitude, or primitive and unconfined recreation, and (5) other features of scientific, educational, scenic, or historical value.

Minimum Requirements Analysis

The Wilderness Act of 1964 prohibits certain activities in designated wilderness that detract from wilderness character. Prohibited activities include such actions as installing structures or using motorized equipment. However, the act and NPS policy recognize an exception to this rule: otherwise prohibited activities may be allowed in proposed, potential, and designated wilderness if it can be demonstrated that the activity in question is “the minimum necessary” for administration of the area as wilderness, and that the activity will not cause a significant impact to wilderness resources and character. This showing is made via a Minimum Requirements Analysis.

The nature and scope of the minimum requirements analysis would vary depending on the nature of the activity. For some activities that are short term, reversible in nature, and would not have the potential to degrade long-term wilderness character, a programmatic minimum requirements analysis may be prepared. A programmatic minimum requirements analysis could cover such activities as helicopter landings, minor installations that would be removed within one year, hand-held motorized or mechanized equipment, airboating on existing routes/trails, and limited short-term airboating off existing routes/trails. For activities that would have the potential to result in long-term degradation of wilderness character, an individual or project-specific minimum requirements analysis would be prepared (e.g., for installations that are expected to last more than one year, for creation of new routes/trails to access field sites, for any motorized vehicle use in areas without existing trails or developed roads, or repeated airboat use that departs from the network of existing routes/trails).

Where practical alternatives do not exist, maintenance or other activities may occasionally be accomplished through the use of motorized equipment. The use of motorized equipment should be based on the minimum requirement analysis. Motorized equipment need not be allowed for activities that can reasonably be accomplished using nonmotorized means.

In all cases, the intent of preparing the minimum requirements analysis is to avoid or minimize as much as possible short-term impacts to the area's wilderness character while still allowing needed research, resource management, and restoration activities in proposed designated wilderness and potential wilderness that ultimately would benefit the area's overall wilderness character.

Private Rights

Wilderness designation does not extinguish valid existing private rights such as land or right-of-way ownership or valid mineral interests. Valid private rights in wilderness are administered in keeping with the specific terms and conditions of each right.

Recreational Use

Recreational uses of NPS wilderness are to be of a type and nature that enable the areas to retain their undeveloped primeval character and influence, protect and preserve natural conditions, leave the imprint of man's work substantially unnoticeable, provide outstanding opportunities for solitude or primitive and unconfined types of recreation, and preserve wilderness in an unimpaired condition. Hiking, canoeing, kayaking, and fishing are appropriate uses of wilderness at Everglades National Park. Public use of motorized equipment or any form of mechanical transport such as bicycles is prohibited, except as provided for in specific legislation (e.g., motorboat use is permitted on the waters above (or overlying) submerged marine wilderness areas of the Marjory Stoneman Douglas Wilderness). Wheelchair use is allowed in wilderness. Service animals accompanying persons with disabilities are also allowed in wilderness.

Emergency Services

In emergency situations involving human health and safety, the use of aircraft, motorboats, and other motorized or mechanical equipment is allowed in wilderness. Wildfires would be controlled as necessary to prevent loss of life, damage to property, the spread of wildfire to lands outside wilderness, or unacceptable loss of wilderness values or natural or cultural resources. The use of tool caches, aircraft, motorboats, and motorized firefighting equipment may be permitted for such control. Prescribed fire and hazard fuel reduction

programs may be implemented according to approved plans. The minimum requirement analysis would be followed for all fire activities in wilderness.

Resource Management and Research

Wilderness designation does not prevent the National Park Service from protecting and maintaining historic and other cultural resources within wilderness areas. Using the minimum requirement analysis, cultural resource surveys will be conducted as needed in wilderness areas, and identified resources will be protected and maintained according to the pertinent laws, policies, and plans governing cultural resources. Natural resource management activities, including management of endangered species and critical habitat, may be carried out in a similar fashion under the minimum requirement analysis as addressed by the Carhart National Wilderness Training Center's Minimum Requirements Decision Guide, and will

generally be undertaken only to address the impacts of past and current uses or influences originating outside wilderness boundaries. Natural processes will be allowed, insofar as possible, to shape and control wilderness ecosystems. To allow natural processes to be effective in Everglades wilderness, restoration of natural water flow patterns and invasive nonnative species control (plant and animal) would be necessary (e.g., the removal of vegetation accumulation within downstream outlets of culverts to improve natural water flow patterns and mitigation invasive plant species).

Scientific activities are appropriate in wilderness. Even scientific activities (including inventory, monitoring, and research) that involve a potential impact to wilderness resources or values are allowed when the benefits of what can be learned outweigh the impacts on wilderness resources or values. However, all such activities must be evaluated using a minimum requirement analysis.



Exploring the sawgrass and freshwater

AFFECTED ENVIRONMENT 4



Snake Bight Trail

INTRODUCTION

This chapter describes the existing environment of Everglades National Park. The focus is on elements (natural and cultural resources, visitor opportunities, socioeconomic characteristics, etc.) that would be affected by the actions proposed in the alternatives, should they be implemented. These topics were selected on the basis of federal law, regulations, executive orders, NPS expertise, and concerns expressed by other agencies or members of the public during project scoping.

The first section in this chapter discusses impact topics that are analyzed in detail in this General Management Plan / Wilderness Study / Environmental Impact Statement. The next section discusses impact topics that are not analyzed in detail and explains why they were excluded. The table below identifies topics considered for detailed analysis and those topics dismissed.

TABLE 8. IMPACT TOPICS CONSIDERED AND DISMISSED

Impact Topics Considered in this Plan	Impact Topics Dismissed from Detailed Analysis in this Plan
<i>Alternatives in this plan have potential to affect these resources or topics.</i>	<i>These resources or topics are important, but alternatives in this plan would have only positive impacts on them, and/or any adverse impacts would be negligible to minor.</i>
Hydrologic Resources	Air Quality
Landscape and Soils	Federal Special Status Species (selected species)
Vegetation	Night Skies
Wildlife	Prime and Unique Farmlands
Fisheries	Floodplains
Federal Status Species (selected species)	Energy Efficiency and Conservation Potential
Natural Sounds	Indian Trust Resources
Wilderness Character	Environmental Justice
Archeological Resources	Ecologically Critical Areas, Wild and Scenic Rivers, and Other Unique Natural Areas
Historic Structures, Sites, and Districts	Carbon Footprint
Cultural Landscapes	Conformity with Land Use Plans
Ethnographic Resources	Public Health and Safety
Museum Collections	
Visitor Use	
Visitor Experience and Opportunities	
Regional Socioeconomic Environment	
Park Operations and Management	

IMPACT TOPICS CONSIDERED AND ANALYZED IN DETAIL

HYDROLOGIC RESOURCES

Everglades National Park is part of a large, interconnected freshwater system called the Kissimmee-Lake Okeechobee-Everglades Watershed. This watershed covers almost 11,000 square miles in south-central Florida (NPS 1997). Hydrology in the watershed is dominated by a dry season from December to May and a wet season from June to November when 75% of the annual precipitation falls (Duever et al. 1994; Lodge 2005). Rain falls across roughly 14,000 square miles in central and south Florida, which is nearly flat (there is about an inch per mile elevation change from Lake Okeechobee to Florida Bay) (Davis 1994; NPS 2008d).

Historically, the Everglades system was fed by sheet flow from lakes and wetlands in the northern reaches of the watershed during seasonal rainy periods. This surface flow moved slowly south into the extensive wetlands that define the Everglades, through the “river of grass,” and on to Florida Bay or Ten Thousand Islands (SFWMD 2000a). This flow was as much as 50 miles wide and ranged from 6 inches to 3 feet in depth, moving about 100 feet per day from May to October (Obeysekera et al. 1999). During the wet season, the landscape was nearly covered with water. Much of the water flows through the unique ridge-and-slough habitat of south Florida. This landscape is characterized by elongated ridges and troughs of limestone and peat. Average water depth is about 1 foot but can be as deep as 3 feet during the rainy season (Lodge 2005). In other areas, wet season flows inundate marl prairie habitat and encroach upon pinelands, hardwood hammocks, and other tree islands. As winter approaches, water slows and then ceases for the annual dry season. Although most habitats dry completely during winter, the ridge-and-slough landscape usually retains some of its water, sometimes in shallow pools and

sometimes as deep pools, both of which provide valuable aquatic habitat into which many animals retreat until the next rainy season (Gunderson and Loftus 1993).

The watershed has been highly engineered and managed for agriculture, flood control, and supplying water for a growing population (Fourqurean and Robblee 1999). The region is now characterized by large urban centers and highly productive agricultural areas, which have been made possible by the dramatic alterations of the natural hydrology. Beginning in the 1880s, development was assisted by the large-scale drainage of wetlands, construction of channels to carry water to the population centers of the east, and flood control structures. These efforts would eventually create an extensive system of levees, canals, and water control structures. Direct effects on the park’s hydrology include disruption or elimination of overland sheet flows, changes in the location and timing of flows, and permanent flooding in some areas and permanent drainage of others (SFWMD 2000a; Sklar et al. 1999; SCT 2003). Portions of the park now flood more deeply during the rainy season and are drier during the winter. Indirect effects include land subsidence, abnormal fire patterns, and widespread changes in vegetation and animal communities (Gunderson and Snyder 1994; Sklar et al. 1999; USFWS 1999h). Canals can also serve as habitats and movement corridors for invasive nonnative plants (e.g., hydrilla and water hyacinth) and animals (e.g., cyclids and sailfin catfish) that impact Everglades ecosystems (ECISMA 2010).

Water Quality

Before regional urban and agricultural development, south Florida waters were low in nutrients (oligotrophic) such as nitrogen and phosphorus (SFWMD 2000a).

Historically, phosphorus content was approximately 10 parts per billion or less (Lodge 2005), 90% of which was contributed through wind-borne particles and rain (Davis 1994). The water was also generally highly oxygenated and ranged from “soft” (low in dissolved minerals) and slightly acidic in peat-dominated areas to “hard” (high in dissolved minerals, especially calcium) and alkaline where it came into contact with limestone bedrock such as in southern portions of the Everglades (Noe et al. 2001; Lodge 2005). This high-quality water fed the interior wetland systems and supplied Florida Bay with seasonal flushing that moderated the salinity of this large estuary (SFWMD 1992).

Today, water quality in some parts of the Everglades is dramatically different than it was before 1900. Surface water entering the park is almost completely controlled and, having drained from agricultural and developed areas, is periodically laden with nutrients, dissolved solids, and trace amounts of pesticides and herbicides. Average phosphorus content at discharge structures in the 1980s and 1990s was 0.1 to 0.25 milligrams/liter (mg/L), representing a ten-fold increase from historic levels (SFWMD 1992, 2000). This phosphorus enrichment modifies the structure and function of the Everglades ecosystem (Noe et al. 2001); even small changes in available phosphorus can alter the composition of plant and animal communities within a few years (Gaiser et al. 2005). Mercury contamination has been a concern in the Everglades since the 1980s. Sources include waste incineration and coal-burning power plants as well as indigenous sulfate-reducing bacteria in wetland soils that convert mercury deposited in wetlands, lakes, and streams into a toxic form called methyl mercury (FDEP 2003, 2010). The park, in association with the state of Florida and others, has been involved in a comprehensive mercury monitoring and effects research program since 1993 (FDEP 2003).

Freshwater Resources

Ridges and Sloughs. Most water in the Everglades flows along the ridge-and-slough systems of south Florida. Small differences in elevation associated with the ridge (high) and slough (low) topography create a varied environment with different water depths, hydroperiods, and flow environments. The average water depth of sloughs approaches 1 foot, but they can be as deep as 3 feet during the rainy season. They support a variety of marsh communities, including their hallmark tree islands. Sloughs are underlain by peat and support a wealth of microbes and fauna (Gunderson and Loftus 1993). Sloughs are the arteries that carry the lifeblood of the Everglades system—freshwater from the north—to the brackish and marine environments to the west and south.

Shark River Slough, the largest slough in the Everglades, supplies fresh water to the southern portion of the greater Everglades system. Shark River Slough is actually a ridge-slough system that flows in a southwesterly direction toward Whitewater Bay and the Gulf Coast (Livingston 1990). The slough width varies from 9 to 17 miles, with a flow gradient of only 2 to 3 inches per mile (Olmsted and Armentano 1997). Shark River Slough includes marshes, tree islands, and ponds; it supports important populations of freshwater fishes, reptiles, and birds. As the slough reaches the southwestern portions of the park, it gradually disperses into a complex web of small streams that form the coastal mangrove estuaries (Olmsted and Armentano 1997).

Shark River Slough was originally formed by sheet flow originating from Lake Okeechobee and traveling south. Now flows in the slough are fully supplied by diked impoundments north of the park, with the quantity and timing of flows dramatically altered from historic norms. In general, peak wet season flows are substantially reduced compared to natural conditions. However, in some areas of the park, such as the western marl prairies, peak wet season flows are greater due to the S-12 canal structures (see below). In northeast

Shark River Slough peak wet season flows are much lower than natural flows (Olmsted and Armentano 1997).

Taylor Slough provides the main flows in the eastern portions of Everglades National Park. Its headwaters include the park's northeastern boundary and the area known as Frog Pond (Livingston 1990). Although Taylor Slough is smaller than Shark River Slough, Taylor Slough flows are a critical component of park hydrology. This drainage is the primary source of freshwater flows into the northeastern portions of Florida Bay. Taylor Slough's current flows have been reduced from historic conditions, but it continues to provide important habitat for Everglades plant and animal communities.

Canals. Modern drainage and flood control measures have significantly altered the Everglades system. Despite early attempts at complete drainage, the vastness of the wetlands prevented their total loss (Ewel 1990; Kushlan 1990). Today a series of canals, levees, pump stations, and gates are used to manage water in the region. The South Florida Water Management District and the U.S. Army Corps of Engineers coordinate efforts to manage these structures to provide flood control and freshwater flows for human and natural systems. The following water management structures are near the park and affect flows:

- C111 (canal)
- S12 A, B, C, and D (all gates)
- S-332B, C, and D (all pump stations)
- L-67, L-31N, and L-31W (all canals)
- S-18C, S-197, and S-33 (all gates)

The most significant of these is the C-111, a large canal that controls freshwater in the southeastern reaches of the park. Historically, flow through Taylor Slough would eventually discharge to central Florida Bay. Now, however, the C-111 canal drains much of this water from Taylor Slough and diverts it into northeast Florida Bay (or into Barnes Sound

during heavy rains). This canal drainage affects hydropatterns in Taylor Slough by reducing peak water levels and alters the timing and spatial distribution of discharge to Florida Bay. The C-111 Spreader Canal project, a CERP project begun in 2010, is intended to mitigate these negative impacts on park water resources by capturing the seepage from Taylor Slough and pumping it back toward the park boundary.

Canal waters are generally clear and free flowing, because they are managed to move large volumes of water. They support a fishery of both nonnative and native species and are frequently used for recreational fishing in the eastern portions of the park. In addition, these waterways have aided the spread of nonnative plants throughout south Florida. The park and other land management agencies control hydrilla, water hyacinth, melaleuca, and torpedo grass in the canals and along their adjacent levees.

Brackish and Saltwater Resources

The marine resources of Everglades National Park are shallow marine waters under the influence of freshwater inflows. Habitats include Florida Bay, the coastline of the Ten Thousand Islands region, and brackish Whitewater Bay (Livingston 1990). These areas are critical to the park's diverse and unique wildlife as well as its marine-based recreation.

Florida Bay. Florida Bay extends from the terrestrial portions of the southern Everglades southward to the Florida Keys. It is the portion of the Gulf of Mexico influenced by freshwater flows from the Everglades from both natural and man-made sources, including Taylor Slough, rainfall, groundwater input, and canal flows (Nelson et al. n.d.).

Florida Bay is a unique, subtropical estuary that has resulted from complex interactions of freshwater inflows, circulation patterns, and changing water conditions. Recent research

has shown that fluctuations in salinity and nitrogen loading occur with freshwater inflows, and that the bay generally has little, if any, phosphorus present. The bay serves as a marine lagoon, with salinity varying due to seasonal cycles in precipitation and evaporation and longer-term climate changes (Florida Bay Science Program 2003).

An ecotone of brackish water, mangrove forests, salt marshes, and tidal zones separates the Everglades from the bay (RECOVER 2004). The bay is generally a shallow, soft-bottomed environment that supports meadows of seagrasses. However, there are areas of exposed hard bottom, rocky outcroppings, and an occasional coral head. The bay is home to a variety of invertebrates—from queen conch to shrimp, oysters, and spiny lobsters. An overwhelming number of commercially and recreationally important fishes also spend time in Florida Bay, including snappers, black drum, and the Florida pompano (Livingston 1990).

The bay had long been known for its clear water, lush seagrass beds, and good fishing. During the 1980s and 1990s, the bay water became clouded with algae, seagrasses died off, and the fishery showed signs of decline (Fourqurean and Robblee 1999). With the advent of the *Comprehensive Everglades Restoration Plan*, the complex history of the bay is under investigation, with the goal of determining appropriate restoration efforts (Florida Bay Science Program 2003).

Ten Thousand Islands Estuaries. The Ten Thousand Islands are a broken string of sandy islands divided by interconnected passes and tidal creeks. Covering the western portions of the park, these estuaries are fed by sheet flow from the park's interior and by tributaries that drain the Everglades system. Here, Gulf of Mexico waters mix with fresh inflows and create a salinity gradient. Salinity and water quality vary by season and can be dramatically affected by rains and tropical storms. This region is largely undisturbed by human activity, and it is one of the least polluted

coastal regions of the United States (Livingston 1990).

This coastline is characterized by low energy: there is frequently little or no wave action or wind-mixing of the water column, and the twice-daily tidal range is about 3 feet. Under these conditions, warm air temperatures can rapidly heat the water, depleting oxygen, stressing plants and animals, and reducing system productivity. In addition, complex upstream processes can deliver turbidity and color released from vegetation (Livingston 1990). This results in the changing water conditions seen along the coast, from tan and milky to a relatively clear blue-green.

Whitewater Bay. Whitewater Bay, in the undeveloped southwestern reaches of the park, is an expanse of brackish water encasing a myriad of mangrove islands. Its name serves as a warning to those who venture into this wilderness—storms can generate enough wave action to reconfigure the islands and sloughs of the bay (Jackson 2000). The bay receives fresh water from Shark River Slough. It opens to the northwest and flows into the Gulf of Mexico. Tidal flows maintain the brackish environment, carrying nutrients out to deeper waters and creating a highly productive fishery and abundant wildlife habitat, including for manatees, wood storks, and osprey (Livingston 1990; Jackson 2000).

Wetlands Classification and Protection

Everglades National Park is predominantly a wetland environment. The classification system used by the National Park Service is that created by Cowardin et al. (1979). The most common wetland classifications within the park are the freshwater emergent wetland, freshwater-forested and shrub wetland, estuarine and marine wetland, and estuarine and marine deep waters (USFWS 2004a). The location and extent of these wetland types is determined by the period and depth of flooding, whether the water is fresh or saline, the degree to which soils have developed

specific hydrologic characteristics, and the vegetation community present. For a detailed description of park plant communities, see the “Vegetation” section later in this chapter.

Wetlands are afforded special protection under U.S. law in Executive Order 11990: “Protection of Wetlands” and by NPS management in Director’s Order 77-1: “Wetland Protection.” The National Park Service must avoid direct or indirect adverse impacts on wetlands or, where impacts cannot be avoided, minimize loss or degradation by every practicable effort. Any actions that may reduce or degrade wetlands are governed by the Clean Water Act and Rivers and Harbors Act, and wetlands are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency.

Ongoing and Planned Hydrologic Restoration Programs

In response to public concern about water management and continued ecosystem degradation, all levels of government have organized efforts to work toward a balanced and sustainable south Florida ecosystem. Several environmental and growth management laws have been passed in an attempt to address the needs of Everglades ecosystem restoration. Restoring and maintaining, at least in part, the natural hydrologic regimen of the area is the most vital component of all restoration efforts. These plans will ultimately affect the environment of the park, and the National Park Service will work in concert with these programs to protect vital resources of Everglades National Park. These plans and projects are summarized in chapter 1, and their impacts on park hydrologic resources are discussed in the cumulative analyses in chapter 5.

Climate Change

Climate change is expected to increase the extent and frequency of coastal flooding

(Loehman and Anderson 2009) from storm surges and sea level rise. Potential effects on water resources due to climate change include increases in flooding, saltwater intrusion, and loss of protective berms, leading to conversion of freshwater wetlands to brackish or saltwater habitats. Changes in precipitation and in air and water temperatures in Florida will likely alter the nutrient cycling in the Everglades because temperature has a marked effect on biotic and abiotic processes, and can impact these processes in short time frames with even slight changes in temperature. Floods may alter the natural floodplain timing and distribution in Everglades National Park, leading to changes in vegetation, wildlife habitat, and fire regimes (Pearlstone et al. 2008). Additionally, shifts in water temperature may have dramatic impacts on dissolved oxygen, pH, and acidity of marine waters, causing a cascade of effects in oxygen content, nutrient cycling, and associated vegetation and wildlife. Wetlands, estuaries, and areas like Florida Bay are especially vulnerable because water temperature alters biochemical components in the ecosystems (Pearlstone et al. 2008). Declines in coastal water quality, habitat quality, and biodiversity are the most likely effects of these changes. Salt marshes may have better resilience to sea level rise, especially if new sedimentation rates are roughly equal to the rate of sea level rise. However, localized impacts on salt marshes could occur, depending on the rate and type of changes.

LANDSCAPE AND SOILS

Most of the physical structure of the Florida peninsula was in place about two million years ago. Since then, several periods of glaciation caused the sea level to rise and fall, alternately inundating and then retreating from the land. During inundation, layers of limestone (CaCO₃), sand, and seashells were deposited to form the near-surface bedrock under modern-day Florida. Although minor compared to underlying layers, these most-recent sediments “are critically important to

modern vegetation and wildlife and to human uses of South Florida” (Lodge 2005).

Of the seven major soil types in Florida, three occur in Everglades National Park—spodosols, histosols, and entisols (Brown et al. 1990).

- **Spodosols** are sandy and characterized by a subsurface layer of accumulated organic matter in combination with aluminum and iron. These soils are nearly level, usually poorly drained, and common in flatwoods and wet to dry prairies.
- **Histosols** such as peat, are soils of organic origin from sawgrass (*Cladium jamaicense*) in some areas and white water lily (*Nymphaea odorata*) in others (Olmsted and Armentano 1997). Histosols are very poorly drained and underlain by marl or limestone. Marls are a mixture of clay and calcium derived from underlying limestone. Marls are formed by precipitation of calcite during photosynthesis by large mats of “periphyton,” which are complex collections of cyanobacteria (blue-green algae), eubacteria, diatoms, and eukaryotic algae common in sparsely vegetated, open freshwater marshes and swamps in the Everglades (Browder et al. 1994; Scinto and Reddy 2003).
- **Entisols** are poorly drained, marly, and thin sandy soils underlain by limestone. They are common in south Florida rockland communities.

Soils on the park’s Gulf Coast are combinations of entisols and histosols. They may be sloping sandy beaches or dunes, or poorly drained soils with a variable content of mineral and organic materials that are subject to frequent tidal inundation. Common communities include dunes, maritime forests, salt marshes, and mangroves (Brown et al. 1990).

Human activity has had widespread impacts on the soils of the Everglades. Because of their usefulness for agricultural purposes, spodosols and histosols have been most impacted in south Florida. Because of the importance of inundation in many soil processes in south Florida, chief among impacts on soils are changes in the timing, distribution, and amount of flooding. For instance, the natural rate of peat accumulation in Florida is estimated to be about 3 inches per 100 years. However, when drained, peat is subject to subsidence or thinning at about 1 inch per year. Causes include mechanical compaction (settling), burning, shrinkage due to dehydration, and most importantly oxidation of organic matter (Brown et al. 1990; Ingebritsen et al. 2005).

According to Ingebritsen et al. (2005), in the Everglades Agricultural Area, the initial peat thickness tapered southward from approximately 12 feet near Lake Okeechobee to about 5 feet near the southern boundary. However, subsidence from 3 to as much as 9 feet has occurred in cultivated areas, and uncultivated areas of similar size have subsided as much as 3 feet. The authors note that “such elevation changes are tremendously significant to a near-sea level wetlands system in which flow is driven by less than 20 feet of total relief.”

Other impacts on soils include atmospheric deposition of metals, eutrophication of marshes and estuaries by sewage effluent, and agricultural runoff. Natural changes arise from hurricanes, drought, and fire (Brown et al. 1990).

Climate Change

Climate change may impact the landscape and soils in the Everglades as a result of increased storm intensity and duration. Soils subsidence and accretion could be affected by increased storm intensity (NPS 2008). Additionally, intrusion of saltwater inland could contribute to coastal erosion, inundation, and changes in wetlands and vegetation across vast areas of

south Florida (NWF 2006). The rate at which sea level rises in the future would be an important factor, and is unknown to some degree. If sea level were to rise slowly, mangroves and shallow mud banks might be able to keep pace with the change. If sea levels were to rise rapidly, mangrove areas and coastal wetlands may not be able to adapt and could be submerged. To date, the impact of coastal erosion has been localized and has not threatened the Everglades ecosystem. But this could change if the rate of sea level rise increases substantially.

VEGETATION

[Note: Appendix E is a listing of common and scientific names for various species discussed in this document.]

Everglades National Park contains a wide diversity of plants and plant communities that are distinctive in the continental United States and on a global scale. Several environmental factors combine to produce this assemblage of plant communities (SFWMD 1999; NPS 2001).

- The park occupies the transition zone between tropical and temperate climates.
- The park includes large expanses where fresh and saltwater mix.
- Water in the park is naturally low in nutrients.
- Nearly flat terrain creates a complex mosaic of habitats and plant communities dependent on subtle changes in elevation.
- Distinct wet and dry seasons create natural cycles of fire, drought, and tropical storms.

Major community types in the Everglades include marine and estuarine communities, mangrove forests, cypress swamps, coastal salt marshes, coastal prairies, freshwater sloughs, marl prairies, pine rocklands, and hardwood

hammocks. The distinguishing characteristics and ecological importance of each habitat are discussed below. This section also reviews the status and impact of invasive nonnative plant species in the park.

Vegetation Communities

[Note: See the “Ecosystem” map on the following page to understand where these habitat types are in the park.]

Marine and Estuarine Communities. Florida Bay and the offshore portions of Ten Thousand Islands are the primary marine estuary environments of the park. These areas include a combination of habitats with complex physical, chemical, and biological interactions. Varying salinity and nutrient levels, shallow depths, and energy input from adjacent open seas provide a range of conditions that nevertheless retain universal characteristics. This marine system has high productivity of plankton and submerged aquatic vegetation, but is dominated by relatively few plant species such as seagrasses. These habitats have relatively low diversity compared to nearby coral reef environments (Livingston 1990).

According to Dawes et al. (2004), “nearly all of the commercially and recreationally valuable estuarine and marine animals depend on seagrass beds as refuge or habitat for parts or all of their life cycles.” Seagrasses are the only flowering plants that live entirely in seawater, thriving in depths between 3 and 15 feet. Six species occur in Florida, three of which are dominant: turtle grass, manatee grass, and shoal grass (Jaap and Hallock 1990; Florida Bay Science Program 2003). Turtle grass is the best known seagrass, having thin blades reaching as long as 1 foot in length. Florida Bay supports about 1,900 square miles of turtle grass meadows, but there is little similar development in Ten Thousand Islands (Livingston 1990; Jaap and Hallock 1990). Manatee grass is found mixed with other species but can occur in small, monotypic patches. Manatee grass leaves are string-like:

round, about 1 millimeter in diameter, and as long as 18 inches in length. This species has shallow roots and is easily uprooted if sediments are disturbed. Shoal grass is a thin, ribbon-like seagrass that grows as long as 8 inches in length. Shoal grass is an early colonizer and can be found in areas where the sediment has been disturbed (Jaap and Hallock 1990).

Seagrass is the most productive and important habitat of the park's nearshore environment.

Seagrass communities historically covered about 90% of Florida Bay; by contrast, mangrove forests occupied only 7%. The seagrass usually occur as monocultures or as a mixture of the species, appearing as vast meadows on the shallow bottom. They greatly affect the chemical, physical, and biological processes of the bay and play a vital role as habitat (FBSP 2003). Local variations in salinity, water quality, and sediment properties can produce changes in seagrass populations. Environmental changes can reduce stem density, provide respite from diseases, or allow development of robust communities (FBSP 2003). In 1987, seagrass die-offs were reported by backcountry fishing guides; more than 9,884 acres (4,000 hectares) of seagrasses had died off (Robblee et al. 1991). After the initial signs of the die-off, seagrass communities in the bay rebounded and showed increases in abundance and productivity of shoal grass and turtle grass (Zieman et al. 1989), although they are now increasingly threatened by propeller scarring.

Florida Bay seagrass beds provide important habitat for many species of fish and other marine animals. Florida Bay is also heavily used by recreational boaters for, among other things, access to productive fishing areas. The bay is a complex system of mud banks, flats, and shallow basins, so boaters can easily damage the bay's sensitive bottom resources. Boat propellers can churn up sediment and bury or scar seagrass. Damage to the park's vast seagrass beds from motorboat propellers has been a problem for decades, but the extent and severity of the problem had not been well

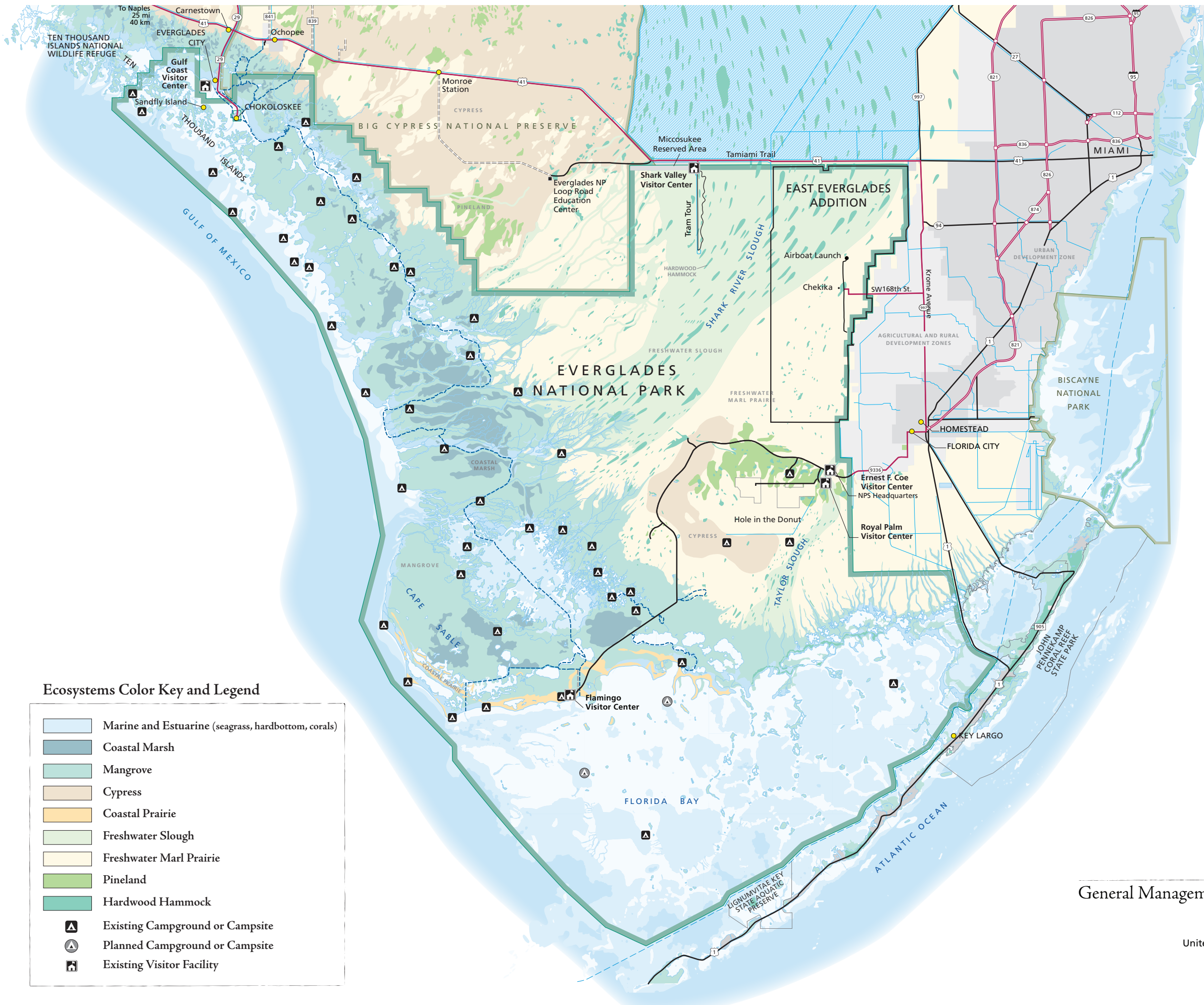
understood or described. During this planning process, the need to better understand seagrass scarring patterns and trends was identified.

To learn more about the problem of seagrass scarring by motorboat propellers and potential ways to address the problem, the park conducted a seagrass scarring mapping project. This study, using 2004 digital imagery that covered all of Florida Bay, found that Florida Bay seagrass scarring is widespread, with dense scarring found in shallow depths, near all navigational channel/access routes, and around areas most heavily used by recreational boats. In addition, scarring occurs when motorboat propellers dredge new channel/access routes or maintain unmarked human-made channel/access routes. Dense scarring is more common near marked and unmarked channel/access routes and shorelines. Substantially more scarring was identified in the study than in a previous statewide study conducted in 1995, and scarring may be increasing at specific Florida Bay sites. In 2006, higher resolution imagery was taken for Snake and Garfield bights. The results of both studies were combined into the complete peer-reviewed study "Patterns of Propeller Scarring of Seagrass in Florida Bay: Associations with Physical and Visitor Use Factors and Implications for Natural Resource Management" (NPS 2008c). If higher resolution imagery had been available for all of Florida Bay, instead of for just Snake and Garfield bights, more scarring probably would have been documented.

In 2011, the park established the 9,400-acre Snake Bight pole and troll zone, the largest of its type in Florida as a noncombustion engine zone in northern Florida Bay to protect this important, heavily used shallow-water area. In advance of zone establishment, the park committed to a monitoring program to determine the effectiveness of the zone in protecting and recovering seagrass resources. The objective of the Snake Bight pole and troll zone monitoring project is to quantify the amount and severity of propeller scarring within the Snake Bight pole and troll zone and

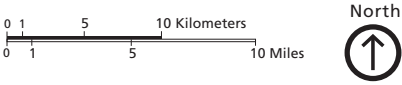
to compare it to other areas in the bay that do not have restrictions to combustion engine use. High-resolution aerial photography was used for the initial propeller-scarring assessment and in-water verification was conducted (10% of total scars) to confirm the presence and severity. A total of 6,040 potential prop scars were identified and mapped in all three project areas during the 2011 aerial image analysis. Scars ranged from ~2 meters to ~4 km in length, and the mean length was ~103 meters. Nearly 66% of the scars had a high severity (extensive substrate exposure) classification. Results of these analyses indicated high prop scar densities and hot spots along and between marked and

unmarked channel/access routes at the boundaries between seagrass banks and slightly deeper water and around areas most heavily used by boats (such as Porpoise Point and near Jimmy's Lake). The 2011 data will be compared to future monitoring events (funding is approved for a 2015 monitoring assessment) to determine the effectiveness of pole/troll zones as a management strategy and maximize their value for enhanced resource protection in the park. The baseline study "Snake Bight Pole and Troll Zone Everglades National Park: Year 1 Monitoring Report" NPS 2011 is available on the park website and future monitoring reports will be made available once completed.



Ecosystems Color Key and Legend

- Marine and Estuarine (seagrass, hardbottom, corals)
- Coastal Marsh
- Mangrove
- Cypress
- Coastal Prairie
- Freshwater Slough
- Freshwater Marl Prairie
- Pineland
- Hardwood Hammock
- Existing Campground or Campsite
- Planned Campground or Campsite
- Existing Visitor Facility



The following “Propeller Scarring” map shows propeller scarring in Florida Bay obtained from the available data sources (2004 digital imagery for all of Florida Bay, combined with the higher resolution 2006 imagery for Snake and Garfield bights only).

The 2008 seagrass study detected some 12,000 seagrass scars ranging from 6 feet to almost a mile in length. The total length of scars was estimated at 325 miles, but additional imagery analysis suggested total scarring may be underestimated by a factor of 10, i.e., there may be as many as 3,250 miles of scars in Florida Bay. Scars are present throughout the shallow areas of Florida Bay, but most are at depths of 3.5 feet or less (NPS 2008c).

According to the NPS study (2008c), seagrass recovery from propeller scarring varies depending on the species and the severity of the scarring. Estimates range from as little as 0.9 year to 7.6 years. Experiments conducted in Florida Bay indicate that shoal grass and manatee grass recover five to seven times faster than turtle grass. However, other studies estimate that scar recovery in some areas in the Florida Keys may require from 10 to 60 years (USFWS 1999h; NPS 2008c). Differences in impacts on and recovery rates between species may alter the community composition and abundance of different seagrass species. Recovery rates are much slower when scarring is deep because substrate into which plants root themselves is removed and deep scars are more susceptible to secondary, continued erosion and expansion of scars from currents, winds, waves, and storms. A negative cycle may begin when increased turbidity reduces available light; lower light levels limit seagrass survival and growth, and the subsequent loss of seagrass reduces sediment stabilization, which increases turbidity (USFWS 1999h). The NPS study (2008c) also noted that “heavily used areas that are continually scarred will probably never recover under current boating pressure. Active restoration of damaged seagrass communities is technically possible but expensive and time consuming.”

Because the seagrass scarring problem is not improving and may be worsening over time, the 2008 study suggested that new management strategies are needed to protect seagrass beds as part of an overall ecosystem management approach in Florida Bay. Potential management strategies to minimize damage caused by propeller scarring could include a mandatory education program, improved navigation aids, pole/troll zones, idle and speed zones, limits on motorized access by watercraft characteristics, and area-specific seasonal access limits or closures in highly impacted locations.

Like terrestrial grasslands, these marine meadows support a diverse community of other organisms. Macroalgae are primary producers of organic matter, and their calcium skeletons are incorporated into the sediment when they die. Moving up the food web, grazers such as shrimp and crabs forage in the grass, and predators then harvest these species (Jaap and Hallock 1990).

The seagrass root system anchors nearshore marine soils, while the leaves improve water quality by removing suspended sediments from the water column by slowing the velocity of water as it passes through the leaves, thereby allowing the suspended sediments to settle to the bottom. The leaves also provide important vertical structure and shelter, as well as important attachment surfaces for various algae and other tiny plants. These algae and plants provide the food base for a diverse assortment of invertebrates (e.g., echinoderms, mollusks, and crustaceans) that are, in turn, prey for other species. Species such as sea urchins, crabs, green sea turtles, and manatees feed directly on seagrass (Jaap and Hallock 1990; USFWS 1999h; Dawes et al. 2004). The nutrient removal function performed by seagrass beds may also play a role in protecting coral reefs (Dawes et al. 2004).

Mangrove Forests. Mangrove forests develop in coastal areas and are subject to regular or sometimes only occasional tidal flushing, which produces elevated soil salinity. Each

mangrove species has a different level of salt tolerance, which in part determines its location within the tidal zone. Mangroves grow best where wave energy is low and freshwater runoff contributes nutrients and helps maintain optimum salinity levels. As a transition zone from land to sea, mangroves serve important ecosystem functions in shore stabilization and nutrient cycling. Mangrove forests also provide foraging and nesting sites for wading birds and nursery habitat for pink shrimp and numerous other fish (Odum and McIvor 1990).

Mangrove forests in south Florida are composed of three mangrove species and one associated tree species, the buttonwood. Black mangroves are generally found rooted firmly on sandy shores and are most easily recognized by the short, aerial root projections (pneumatophores) that reach from 1 to 8 inches above the soil. Black mangroves can reach a height of 60 feet, but are seldom seen that size in the park. Red mangroves are often seen with their telltale “prop root” system extending through the seawater and into the soil beneath. They are generally shorter than black mangroves, and they flower throughout the spring and summer. White mangroves are trees or shrubs that have flat broad leaves as long as 3 inches long. The buttonwood is also a shrub or tree that grows with coastal mangroves. It resembles the white mangrove, with oval leaves as long as 4 inches long and a long-lasting woody fruit (Odum and McIvor 1990).

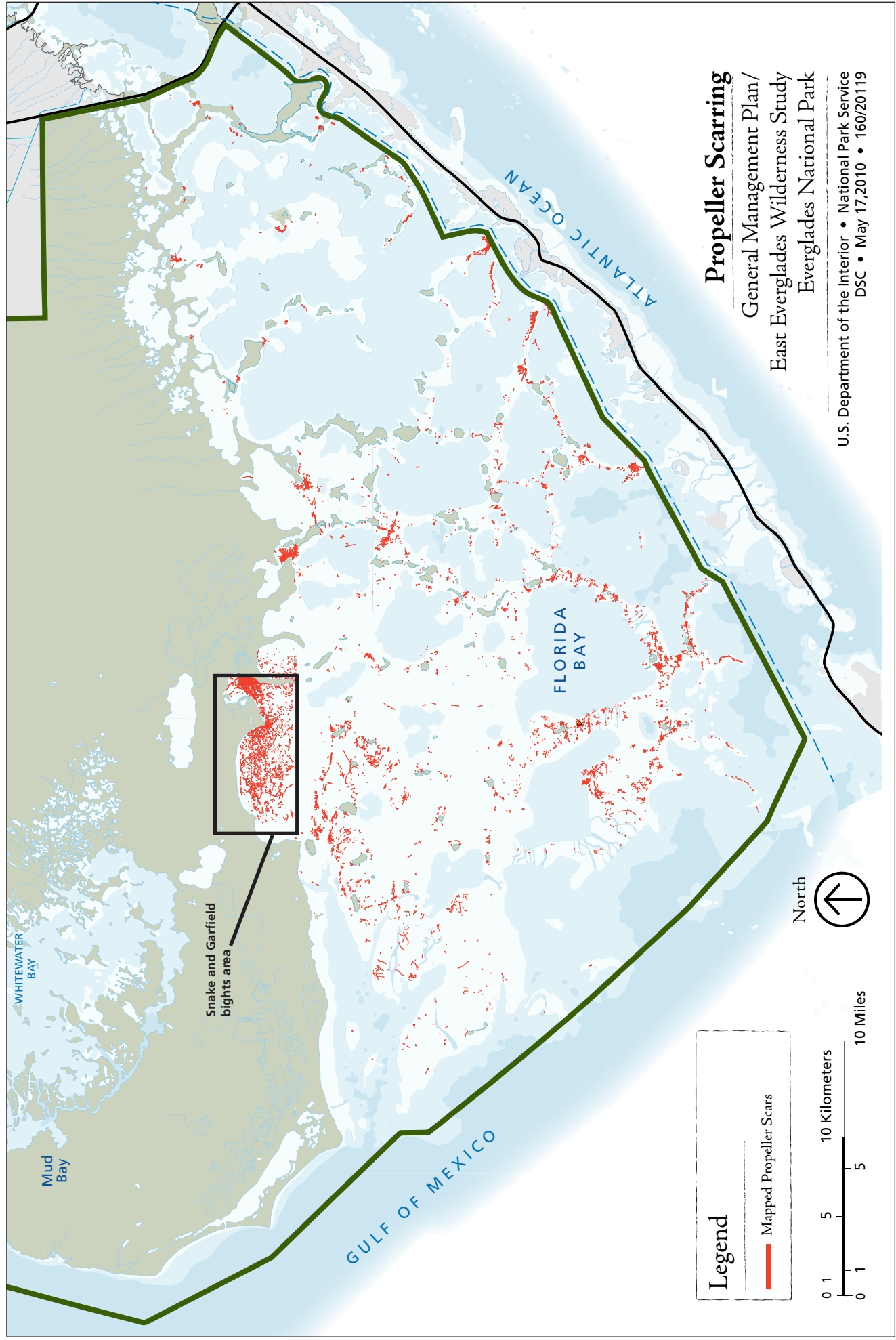
In Everglades National Park, mangrove forests extend from the shores of Florida Bay, westward along the coastline, to the northwestern region of the park in Ten Thousand Islands. Along the Everglades coastline, the most productive mangrove forest is found at the mouth of Shark River Slough, where it enters Florida Bay (FBSP 2003). Salinity, fluctuating water levels, and waterlogged anaerobic soils combine in the mangrove system to exclude many other

vascular plants, including invasive nonnatives (Odum and McIvor 1990). However, where the forest canopy has been opened, a mosaic of other plant communities may appear. Patches of salt marsh, salt-tolerant prairie, hardwood hammock, and submerged aquatic vegetation can be found dispersed throughout the forests (USFWS 1999h).

In addition to the coastal forests, a rare community of dwarf mangroves grows in the shallow, upper inland reaches of Florida Bay, near the Flamingo area. The stunted height and wide-spaced open canopy of this forest reflects low productivity, in which reduced freshwater inflows, attenuated tidal movement inland, and low phosphorus content combine to limit tree height and density (RECOVER 2003). This is a visually striking landscape visited by many migratory and wading birds that forage in the shallows.

Cypress. “Cypress swamps” are the most common and widespread of the stillwater swamps. In south Florida, cypress occupies wet depressions in the soil underlain by peat and limestone bedrock. Water levels in the cypress community generally vary dramatically once or twice each year, with peat exposed for months at a time. When water is present, flow is seldom observed, and dissolved oxygen levels are low, reducing productivity beneath the cypress overstory (Ewel 1990).

Cypress forests composed of small diameter trees, widely spaced with a grassy understory, are similar to the communities that occur in Big Cypress National Preserve north of the park (Gunderson and Loftus 1993; Lodge 2005). Cypress are spindly, semi-deciduous trees, with leathery leaves and low transpiration rates. They can shed their leaves over the winter or during periods of drought stress. This leaf morphology and drought response helps them reduce their water



Propeller Scarring

General Management Plan/
East Everglades Wilderness Study
Everglades National Park

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requirements and survive during dry periods (Ewel 1990). Litter and fallen leaves that can accumulate beneath the canopy often release acids that tint any standing water a reddish brown (Ewel 1990).

Dome-like stands and river-like strands of cypress forest are common in the northern areas of the park. Here, cypress stands are interspersed with pinelands and sawgrass. Cypress trees often ring shallow ponds with fluctuating water levels, with a gradient to mixed hardwoods on the landward side. Further south, only stands of pond cypress occur (Ewel 1990).

Natural fires are typical in cypress communities, and in south Florida cypress may burn several times each decade. However, severe fire may cause stand replacement, with willows and hardwoods replacing cypress. Unfortunately, cypress is susceptible to melaleuca invasion if drained or burned (Ewel 1990).

Coastal Salt Marshes. Florida's coastal salt marshes develop where land meets sea, in intertidal zones that are at least occasionally inundated with seawater. Because mangrove forests dominate the coastal zones of the park, salt marshes are generally confined to seaward and landward fringes of the mangroves. They occur in areas of low wave energy where the mangroves are not dense enough to create heavy shade. There is also generally a watershed network of freshwater drainage immediately upstream of the marsh (Montague and Wiegert 1990).

There are from 825 to 1,175 square miles of nonmangrove "emergent tidal marshes" along Florida's Gulf Coast, most of which are in the park (Montague and Wiegert 1990).

Coastal salt marshes have both terrestrial and marine characteristics. These communities have been described as periodically flooded grassland. The vegetation consists of nonwoody, salt-tolerant plants that can adapt to the harsh conditions of high tidal exchange and freshwater inflows. Vegetation is often a

combination of glasswort, saltwort, salt grass, sea purslane, and sea lavender. Narrow strips of smooth cordgrass occur seaward of some red mangroves, with strips of black needlerush on the landward side.

Despite the appearance of terrestrial plant species, the soils beneath these communities are generally anaerobic, a condition associated with mangrove forests and marine environments. These benthic soils support marine microalgae and phytoplankton, simple plants that provide the basis for a food web that sustains a myriad of crabs and snails. Coastal salt marshes are important for both resident and transient wildlife, including many commercially important wildlife species, and for cover, nurseries, and feeding. Predators move in and out of these marshes, using them to forage and for cover (Montague and Wiegert 1990; USFWS 1999h).

Coastal Prairies. Coastal prairies are the scattered sand beaches within the mangrove zone inland of Florida Bay and the Gulf of Mexico. The vegetation of this habitat is characterized by salt-tolerant herbaceous vegetation and shrubs that can withstand saltwater inundation from tropical storms and saltwater intrusion during droughts. Dominant plants are grasses, succulents, and other relatively low-growing plants that can withstand these harsh conditions (RECOVER 2004).

Common nonwoody species of the coastal prairie include West Indian bluestem, saltwort, glasswort, and sea oats. Shrubs of the system are sea grape, Jamaica dogwood, and lantana. This system is considered relatively low in productivity and does not promote formation of peat soils as do the nearby mangrove forests (Johnson and Barbour 1990; RECOVER 2004).

Coastal prairie communities are a long-term landscape that establishes after tropical storms have inundated coastal forests, depositing sediment and killing the mangroves and buttonwood species. Once halophytic (salt-tolerant or salt-loving) grasses and shrubs

have established, they seem to have the ability to repress recruitment of tree species, creating a stable prairie within the mangrove forest. These prairie communities became notably more common in the park following the great hurricane of 1935 and after hurricane Donna in 1960 (RECOVER 2004).

Freshwater Sloughs. Freshwater sloughs (channels), found throughout the park, are inundated year-round and contain a variety of wetland habitats. The gradual changes in elevation and hydrology within the slough determine the community type, and the landscape varies as these conditions change. Slough channels are dominated by vast stretches of sawgrass, a rhizomatous, perennial sedge, with some 14 other species found in this association. The sawgrass marsh transitions to spikerush and maidencane marshes, as subtle changes in substrate, hydrology, and elevation dictate. Elevated sites within the sloughs support a variety of tree islands, with willowheads occurring in ponded depressions (Olmsted and Armentano 1997). Willowheads are common tree islands that are generally monotypic stands of willow. Sawgrass stands in the Everglades comprise 65% to 70% of the total freshwater slough vegetation cover (SFWMD 1999).

Sawgrass communities range from a sparse 15% ground cover to dense tall sawgrass stands that provide more than 90% ground cover. Sparse sawgrass stands are the most extensive in the slough environment, and these stands have relatively low species diversity, including common spikerush and various periphyton and macrophyte species. Dense stands of tall sawgrass form distinctive strands of notable height and density. Secondary species in these stands include spikerush and blue water hyssop (Olmsted and Armentano 1997).

With subtle changes in hydrology, elevation, and substrate, sawgrass marshes transition to wet prairies with a greater variety of grass-like plants. Wet prairies over peat include beaksedge, blue maidencane, and spikerush. Wet prairies over marl (a mixture of clay and

calcium derived from the underlying limestone) occur in the southern Everglades on the east and west margins of Shark River Slough and Taylor Slough where bedrock elevations are slightly higher and hydroperiods are shorter (Olmsted and Armentano 1997; SFWMD 1999).

Elevated sites within the sloughs support a variety of tree islands or hammocks (Olmsted and Armentano 1997). Tree islands develop on slightly elevated limestone outcrops within the sloughs and marshes. There are four different tree communities on the islands: hardwood hammocks, willowhead, bayhead, and swamp forest.

The major species of slough hardwood hammocks are gumbo limbo, hackberry, white stopper, and cabbage palm. Bayheads, which occur in the midsections of tree islands, are closed-canopy forests consisting of seven tropical species. These trees are red bay, sweet bay, dahoon holly, willow, wax myrtle, cocoplum, and pondapple. The swamp forest species composition is very similar to that of the bayheads, but this community generally occurs at the downstream end of tree islands, with hardwood hammocks occupying the upstream end. The swamp forest has an open canopy with an understory of sawgrass or cattails (Olmsted and Armentano 1997). Sawgrass is a common associate on higher sites, and aquatic plants such as mermaid weed occur on wetter sites. Because willow is an early colonizer, willowheads are usually found in disturbed areas such as alligator holes (Gunderson and Loftus 1993).

Marl Prairies. Marl prairies are marshy freshwater grasslands that occur on higher, drier sites that are flooded about 50 to 150 days each year to a maximum water depth of about 4 inches. These prairies, also known as “wet prairies,” have the most diverse plant life in the Everglades, with more than 100 species recorded. Periphyton shares dominance of the prairies with many species of grasses and sedges that may reach 3 feet in height. Species composition varies greatly, depending on hydroperiod, local soil condition, and

disturbance history (Gunderson and Loftus 1993; Kushlan 1990). The park's marl prairies generally extend out laterally from the main drainages. These relatively large expanses contain interspersed deep-water marshes and upland rises that are seldom flooded (Kushlan 1990). According to Davis et al. (2005), there are approximately 735 square miles of marl prairie on either side of Shark River Slough.

Marl prairie plants are quite tolerant of both flooding and drying. Dominant vegetation common to these wet prairies include maidencane, beak rushes, black sedge, white top sedge, and grasses such as muhly grass and bluejoint panicgrass (Gunderson and Loftus 1993; Kushlan 1990). Sawgrass can be present in these prairies, but stands are sparse and stunted compared to their marsh-living relatives. Some shallow-rooted species that also occur in pineland understories, such as St. John's wort, also grow in marl prairies but are easily killed by drying, which triggers seed dispersal. Wet prairies in the highest elevations can also be invaded by saw palmetto (Kushlan 1990).

Marl prairies provide habitat for one of the park's endangered birds, the Cape Sable seaside sparrow; thus these areas are being protected from further development and degradation (Lodge 2005). Alligator holes, solution holes, and adjacent sloughs provide important refuge habitat for aquatic species during dry periods (Davis et al. 2005).

Periphyton. Where plant densities permit enough sunlight to penetrate to the substrate in slough and wet prairie habitat, periphyton develops. Periphyton is a complex collection of cyanobacteria (blue-green algae), eubacteria, diatoms, and eukaryotic algae common in sparsely vegetated, open freshwater marshes and swamps (Scinto and Reddy 2003). Periphyton grows on the substrate, attaches to rooted vegetation, or forms mats on the water surface, sometimes in association with floating vegetation such as bladderwort. Periphyton accounts for a significant portion of the total vegetation and

productivity in sloughs and wet prairies, and it provides habitat for invertebrate populations.

Along with decaying plant material, periphyton forms the base of the Everglades food web. Periphyton accounts for much of the phosphorus storage in open-water habitats, and it plays a critical role in maintaining low phosphorus concentrations (Browder et al. 1994; Rader 1994; SFWMD 1999). Periphyton productivity and nutrient cycling influence many biological and chemical processes (Scinto and Reddy 2003). Biomass and productivity peak toward the end of the wet season (August through October) and reach a minimum during the colder months of the dry season (January through March) (SFWMD 1999).

Pinelands. Pinelands in south Florida are variously known as pine woodlands, pine flatwoods, pine barrens, and rockland pines (USFWS 1999h). Rockland pine forests in south Florida occur on elevated sites with thin soils, atop limestone bedrock ridges and outcroppings. These elevation peaks vary from feet to inches higher than the surrounding lowlands, resulting in varying inundation periods (Snyder et al. 1990). Within the pinelands are a series of transverse glades, marl prairies lower in elevation than the pinelands, which sometimes hold water in the wet season. In the past, some of these "finger glades" held enough water to act as channels for transverse flow across the pinelands southward into marshes. However, because of the general lowering of the water table and the crossing of roads and canals, this flow is essentially nonexistent today (Snyder et al. 1990; Armentano 2002).

These islands of pine forest are dominated by a lone canopy species—the south Florida variety of slash pine. These pines are tall and slender, reaching as much as 60 feet in height. Trees may reach a diameter of about 12 inches, but most individuals are much smaller. The pines are widely spaced, leaving an open understory with room for hardy plants that can withstand the shallow soils and periodic drought conditions. Subcanopy species are

rare because of the relatively frequent natural fire regimen, but can include wild tamarind and live oak (Snyder et al. 1990).

The shrubs of the community include cabbage palm, saw palmetto, wax myrtle, strangler fig, and willow bastic. If the shrubs leave room for sunlight to reach the soil, a herbaceous layer will occupy the open spaces. Representatives include angadenia, pineland clustervine, firegrass, and coontie. At least one member of the ancient cycad plant family is also found in the pineland community.

Pinelands provide nesting and roosting sites as well as higher ground during flooding. Species of concern that depend on these habitats include Kirtland's warbler, Key deer, eastern indigo snake, and Florida panther (Lodge 2005; USFWS 1999h). The various pineland habitat types also provide habitat to a wide variety of endemic plants and plant species of concern (USFWS 1999h).

Pinelands were once common along the Miami Ridge, at the eastern edge of the park, but are now the rarest of all south Florida communities and are considered a globally imperiled habitat type. They were the first areas in south Florida to be settled and developed, and they were intensively logged before the 1960s. Because of this extensive disturbance, invasive nonnative plants have invaded the region, which now supports thickets of Brazilian pepper and lather leaf.

Hardwood Hammocks. The upland hardwood forests of Everglades National Park cover the smallest area of any habitat type and are locally called "hardwood hammocks" or "tree islands." They occur on the highest elevation sites in the park and on bedrock outcroppings with limited soil development, and they are rarely inundated. Hammocks are relatively small patches of broad-leafed forest surrounded by other vegetation habitats (Gunderson and Loftus 1993; Olmsted and Armentano 1997; Snyder et al. 1990). They are commonly found in association with pinelands or cypress, and they can be

surrounded by natural limestone moats (Snyder et al. 1990).

These tiny forest communities are dominated by hardwoods from both temperate and tropical origins and by native palm trees (Gunderson and Loftus 1993; Olmsted and Armentano 1997). The overstory species within the Everglades hardwood hammock include gumbo limbo, mastic, live oak, and willow bastic. Cabbage palms are frequently found in the hammocks, acting as hosts for strangler figs (Snyder et al. 1990). The tallest trees in the hammock reach 30 to 45 feet. Beneath this canopy is an environment of low light and moderated humidity and temperature. Thus, the interior of an undisturbed hammock supports few shrubs and is notably deficient in herbaceous ground cover (Gunderson and Loftus 1993; Olmsted and Armentano 1997; Snyder et al. 1990). However, two grasses, panic grass and shortleaf basketgrass, are commonly found near the margins or growing beneath canopy gaps (Snyder et al. 1990).

The ecotonal margins of hammocks are densely vegetated and can be nearly impenetrable. These thickets contain lancewood, wild coffee, devil's claw, and Virginia creeper, along with many others (Snyder et al. 1990).

Tree islands are important sites of high plant diversity and habitat for species such as birds, raptors, alligators, turtles, and mammals (USFWS 1999h; Brandt et al. 2000). Tree islands support more species of birds than any other habitat in the central Everglades (SFWMD 1999). Fire is less frequent in hardwood hammocks than other Everglades communities because soils and litter are moister, interior humidity is higher, and understory growth is limited. Unlike pine-lands, hardwood hammock communities do not respond well to fire (Snyder et al. 1990; Lodge 2005).

Royal Palm Hammock (formerly known as Paradise Key) is probably the most famous hammock in south Florida. The designation of

this site as a state park was part of the original effort to protect the lands that have now become Everglades National Park. Although Royal Palm does not represent all hammocks, it is a good example of a mature tropical Florida forest. Visitors to this site can see the royal palm, which is native to the extreme southern mainland, and other species such as live oak, poisonwood, and strangler fig commonly found in the park's hardwood hammocks.

Nonnative and Invasive Plant Species. The most serious land-based threat to Everglades habitats is nonnative plant invasion. On the basis of recent aerial surveys, the park has an estimated 250,000 acres of canopy cover in nonnative plant species. The primary nonnative plant species of concern in the park are Brazilian pepper, melaleuca, lygodium, and Australian pine. According to the U.S. Fish and Wildlife Service, "Florida has been the epicenter for more nonnative species than almost any other region in the country," with the most severe threat coming from plants (1999h). With more than 1,000 plants reported within Everglades National Park, approximately 220 are invasive nonnatives (Everglades Cooperative Invasive Species Management Area 2009). Invasive nonnative plants were first introduced into the Everglades, both accidentally and intentionally, beginning in the mid-1880s (SFWMD 2000b). Thus, invasive nonnatives may represent one of the most serious long-term threats to the park (South Florida Ecosystem Restoration Task Force 2008).

Invasive nonnative plants have been introduced into south Florida to serve as agents of environmental change, as landscape ornamentals, or through natural pathways. They possess high reproductive rates, lack predators, and outcompete native species for resources such as water and sunlight. The four species mentioned above can dramatically modify habitats and bring about fundamental ecosystem changes (National Invasive Species Council 2001).

To combat this invasion, the National Park Service initiated parkwide invasive nonnative plant control in 1996 and began participating on the NPS Exotic Plant Management Team. Using herbicides approved by the U.S. Environmental Protection Agency, biological controls, cutting and chopping, and prescribed fire, the park has successfully treated three of the four aggressive invaders. Much of the melaleuca in the eastern portions of the park has been brought under control, and Australian pines have been virtually eradicated from the park's coastline. Long-term control and management of invasive nonnative plants is addressed by the regional exotic plant management plan (NPS 2010).

Climate Change

The effects of increased temperatures and alterations in precipitation would likely impact vegetation composition in Everglades National Park by reducing the duration of the wet season and increasing the evaporation rates. Increasing sea levels and salinity in the mangrove and salt marsh areas, and in other areas where changes in sea level may alter the water table or soil characteristics, may lead to the loss of these communities and transition to other vegetation communities. The altered community composition in the park could occur because vegetation species require water in particular seasons and durations. Components of the unique plant assemblage represent the interface between the subtropical and temperate zone, which may shift according to water conditions and availability, and may be affected even by slight changes in sea level, salinity, or temperature, for example Plant-animal interactions, such as pollination, seed dispersal, and forage availability, may be disrupted. Phenological changes may be noticeable on short time scales, while species composition may shift over longer time frames. Not only are invasive species expected to expand their ranges due to altered precipitation and temperature regimes (Loehman and Anderson 2009), they may also form new communities from

processes of succession once the effects of climate change compromise existing habitat.

WILDLIFE FISHERIES AND FEDERAL SPECIAL STATUS SPECIES

[Note: Appendix E is a listing of common and scientific names for various species discussed in this document.]

Wildlife (terrestrial)

The warm, wet climate and unique habitats in Everglades National Park support more than 40 species of mammals, more than 350 species of birds, 50 species of reptiles (including 27 snakes and 16 turtles), 15 species of amphibians, and a multitude of freshwater and marine aquatic species. The Everglades region forms the southern terminus of many northern species and is the northern limit for common neotropical species. The small and discontinuous nature of the dry upland habitats helps explain the limited range and subspecies development for several mammals, reptiles, and amphibians.

Although the climate is subtropical, many of the park's resident animal species arrived from the coastal plain of the southeastern United States. Because only a few hardy species ventured far enough south to reach south Florida, there is limited species diversity in all vertebrate groups (Snyder et al. 1990). All of the park's freshwater fishes, all mammals (except several bats), and most reptiles and amphibians also occur in northern portions of the park, where habitat conditions are more suitable for these species. Terrestrial invertebrates, land and tree snails, dragonflies, butterflies, and moths colonized the area from the tropics. The wetland and wading birds for which the park is famous are generally widespread in the neotropics and move freely from the West Indies to the Everglades system (Gunderson and Loftus 1993).

The Everglades provide natural and human-made habitats for freshwater and saltwater fisheries. Aquatic species range from the minnow-sized pond fishes of the park's interior to large marine species such as sharks and rays. The complex Everglades hydrology also created environments in which many estuarine species depend on the condition of and flows from the freshwater habitats.

Upland Wildlife. The park's upland habitats range from pine rocklands to hardwood hammocks and coastal prairies. These locations represent the only consistently dry habitats in this marshy system. Most of the truly terrestrial animals in the Everglades, therefore, must use these communities for at least part of the year. Many animals that inhabit the tree islands also use other habitats when water levels are low enough for them to relocate to other areas.

The mammals of the rocklands and hammocks are adaptive creatures, such as raccoon that forage among the trees, and the opossum, fox squirrel, marsh rabbits, white-tailed deer, and several species of rodents. The highly endangered Florida panther also uses the cover of the forests to forage and rest. In the trees, Jamaican fruit bats and mastiff bats can be observed foraging for fruit or insects (Gunderson and Loftus 1993; Snyder et al. 1990).

Pine rocklands and hammocks contain lower densities of birds than the nearby wetland habitats. However, several bird species that inhabit the upland forests also frequent the coastal mangrove habitats (see "Mangrove Wildlife" section below). The birds of the park's forests forage on the fruit, caterpillars, insects, and small amphibians and reptiles that reside here. Tropical West Indian land birds of the forested uplands include the mangrove cuckoo, gray kingbird, smooth-billed ani, Cuban yellow warbler, Antillean nighthawk, the greater Antillean subspecies of the mourning dove, the West Indian cave swallow, and the state listed threatened white-crowned pigeon. North American birds common to the area include the red-

shouldered hawk, blue-gray gnatcatcher, Carolina wren, pine warbler, and northern cardinal (Gunderson and Loftus 1993; Snyder et al. 1990).

Reptiles and amphibians in the upland forests can be found on the ground and in the trees. During daylight hours, small lizard-like anoles and geckos such as the green anole, brown anole, bark anole, and reef gecko scurry about in search of insects. A nighttime hammock chorus is provided by green and Cuban tree frogs, as well as greenhouse frogs and bufo toads. Forest snakes include the Miami black-headed snake, Florida king snake, black racer, rough green snake, and Burmese pythons. Several of these are considered to be nonnative to the area.

Invertebrates in the rockland communities are of both continental and Caribbean origin. For example, most ants are native to the southeastern United States, but nonnative ant species that are common in the Miami area, such as fire ants, have recently been introduced into Everglades National Park. Sixty species of land snails exist in the rockland habitat, including the Florida tree snail. This species displays a wide variety of color and shell patterning (Gunderson and Loftus 1993).

Butterflies include species of West Indian origin that can be seen only in subtropical areas of the United States. Some butterfly species are endemic to south Florida. Many species that were listed by Lenczewski (1980) as being recorded in the park have not been seen in recent years. Lenczewski's records include 99 species, of which 63 were present in a survey conducted by Dr. David Smith (1994). Park staff members are reintroducing butterfly species that have been extirpated from the park, including the state-listed endangered Miami blue butterfly and the atala. About a dozen extirpated species are candidates for reintroduction, including the federally listed endangered Schaus swallowtail. Some butterfly species are winter migrants that fly great distances to arrive at the tip of the Florida peninsula.

Slough and Wetland Wildlife. The wetland habitats of the park vary from cypress domes and strands to sawgrass marsh and wet marl prairie. These environments make up most of Everglades National Park. The park's flat topography and high water tables allow water and nutrients to mix between adjacent ecosystems—and animals to use more than one habitat to forage and reproduce. It is common for a species to inhabit both terrestrial and wetland or aquatic and wetland ecosystems (Ewel 1990).

Many mammals range between the various wetland habitats and use the resources available in each. The vegetation, tree trunks, canopy, and water provide important cover, food sources, and hydration. The edges of floodplain forests, which provide cover and access to other species in adjacent forest stands, are used by adaptable wildlife such as opossum and white-tailed deer (Ewel 1990). Common terrestrial mammals of river swamps include the southeastern shrew, cotton mouse, and golden mouse. Some mammals commonly observed in sloughs extend their range far beyond the slough edge; the raccoon and Florida panther are known to range throughout most of the park's habitats.

The park wetlands provide important habitat for predatory water birds and raptors. Many of these species prefer cypress savannahs and open marshes for the sparse cover and availability of small fish, amphibians, and reptiles on which they prey. Majestic wood storks and seven heron species, including the great blue heron are often observed wading through the marsh grasses as they forage. Marshland environments are commonly inhabited by limpkins, white ibis, glossy ibis, and a variety of egrets. Belted kingfishers, anhinga, and double-crested cormorants perch in the trees above sloughs and ponds, searching the water for their meals.

Many birds also congregate in the Everglades for the greater availability of insects and the number of plants bearing fruit and seeds. As a result, the wetlands of the park are also home to at least 14 species of songbirds that breed

elsewhere, including the Swainson's warblers and the common yellowthroat. Slough and marsh habitats are also important foraging and breeding habitats for the swallow-tailed kite and the federally listed endangered Everglade snail kite, discussed further in the "Federal Special Status Species" section (Ewel 1990).

Amphibians and reptiles inhabit marsh habitat year-round. Rivers are less-preferred habitat among amphibians and reptiles because of their short floods and occasionally strong flow rates. However, American alligators, aquatic salamanders called "sirens," striped crayfish snakes, and glossy crayfish snakes can still be found in swamps and marshes (Ewel 1990). Cypress swamps lack understory and are not often used by amphibians and reptiles (except alligators), although still-water swamps are the ideal habitat for all amphibians and frogs because of the wet-dry cycles. Amphibians that occur in the marsh and slough wetlands in the Everglades include the greater siren, Everglades dwarf siren, and several frog species (Lodge 2005).

Invertebrates are important in marsh food webs. Hydrologic and chemical differences in the marl prairies and sloughs lead to a high diversity of worms, mollusks, aquatic insects (especially dragonflies, flies, and beetles), spiders, and crustaceans. Within the karst topography of the Rocky Glades are subterranean communities of small organisms, such as copepods, that find underground refuges when surface marshes dry up. Some species are important because they are the only food source for other native species; for example, the apple snail is the only food source for the endangered Everglade snail kite. Prawns (freshwater shrimp) are important indicators of adequate water depths in sloughs. Some invertebrate groups, such as midges (the aquatic insects Chironomidae and Ceratopogonidae), are excellent indicators of hydrologic conditions and unnatural nutrient enrichment, and they can be used to monitor the success of hydrologic restoration projects (Jacobsen 2008).

Freshwater Marsh Wildlife. Marshes are wetlands dominated by herbaceous plants rooted in shallow water that usually stand at or above ground level, with less than one-third of the surface area covered by trees and shrubs (Kushlan 1990). Florida contains nine types of marsh, designated by either their physiognomy or dominant plant types.

Mammals are not very abundant in Florida's freshwater marshes, and most of those occurring in the marsh habitat are quite small. The only large mammal species known to consistently use marshes are the Florida panther (as described in the later "Federal Special Status Species" section) and white-tailed deer. White-tailed deer in the Everglades are distinguished from their northern relatives by a smaller stature and adaptation to wetland conditions. The representative small marsh mammal is the Florida water rat, which occupies the same niche here that the larger muskrat fills in many North American marshes (Kushlan 1990).

Various bird species reside in freshwater marshes year-round, and many more winter there. Their number and diversity are limited by seasonal high water (Kushlan 1990). The waterbirds most dependent on freshwater marshes are the least bittern, American bittern, green-backed heron, white ibis, glossy ibis, limpkin, king rail, marsh wren, common yellowthroat, red-winged blackbird, and boat-tailed grackle. Several endangered species use the stable, deeply flooded marshes of the Everglades (Kushlan 1990); see also the later "Federal Special Status Species" section). Wading birds, including wood storks, herons, ibis, and egrets, create mixed-species colonies along the marsh borders as they roost and nest in adjoining forests. Wintering waterfowl, including one species of duck (mottled duck), are uncommon but increasing in the park's marshes. At least eight waterfowl species live in the Everglades year-round, but the diversity and density of species increases, and may even quadruple, in the winter.

Amphibians and reptiles are abundant in the park's marshes. They are both predator and

prey and provide a chorus of song in the quiet of the park's night. The park's most well-known and endemic reptile—the American alligator—is at home in both shallow and deep marshes, creating deep wallows, or alligator holes, in which to hide. Other species common to the marsh include the leopard frog, pig frog, green tree frog, fire-bellied newt, dwarf siren, green water snake, swamp snake, cottonmouth, mud turtle, musk turtle, Florida cooter, and red-bellied turtle (Kushlan 1990).

Macroinvertebrates and insects are essential in the freshwater marsh food web. Prawns, crayfish, snails, amphipods, dragonflies, mayflies, mosquitoes, and gnats are abundant in marshes, especially in the shelter of vegetation where they can safely hide from predators. These populations increase following the onset of the wet-season rains that signal the end of the dry season (Kushlan 1990).

Salt Marsh Wildlife. Salt marshes at the unshaded interface of land and sea support salt-tolerant plants that are occasionally inundated. This environment is dynamic and challenging for animals because of the dramatic, irregular fluctuations in salinity and water level. It is difficult for most species to adapt to these extremes, but hardy terrestrial mammals and other vertebrates use the salt marshes for some daily activities. These few species that can adapt are often abundant; thus, production is high and diversity is low (Montague and Weigert 1990). Only five or six fish, reptile, bird, or mammal species are considered residents of salt marshes. The few successful salt marsh species are widely distributed throughout Florida and the southeastern United States. The distribution and diversity of species are remarkably similar from marsh to marsh.

The most common terrestrial mammal to use the salt marsh consistently for both feeding and nesting is the rice rat. Along with raccoons, they are effective egg predators and feed on a variety of bird and reptile eggs in

and around the salt marshes. The round-tailed muskrat is also a frequent visitor to the marsh.

Three species of birds are exclusive to salt marshes: clapper rails, long-billed marsh wrens, and seaside sparrows (FWC 2003). These birds use the stems and leaves of salt marsh plants to construct raised nests to avoid all but the highest tides. Other birds that use the marsh for foraging or nesting include the willet, tricolored heron, white ibis, roseate tern, and several species of swallows and wrens (Montague and Wiegert 1990; Lodge 2005).

Salt-tolerant amphibians and reptiles, such as the southern leopard frog and to a lesser extent the American alligator, use the salt marshes, as do the diamondback terrapin and salt marsh snake. These species cannot tolerate full-strength seawater and prefer these marshes to the nearby lagoons (Montague and Wiegert 1990).

The stems and leaves of salt marsh plants provide the basis for a grazing food web. The invertebrates that graze here include abundant herbivorous insects such as planthoppers, snails, and marsh crabs. These species, in turn, are preyed upon by carnivores varying from tissue-eating grasshoppers to cattle egrets. Several ant species, wolf and other spiders, wasps, and fiddler crabs also find the salt marshes useful as a residence or for transient use (Montague and Wiegert 1990).

Mangrove Wildlife. Mangrove forests grow along the coast and are subject to tidal flushing, which produces elevated soil salinity. Mangroves grow best where freshwater runoff adds nutrients and maintains optimum salinity levels. These dense, unbroken stands of shrubby trees provide protective nurseries and food for crustaceans, fish, and shellfish, and shelter for birds and other animals. Mangrove ecosystems provide valuable habitat for seven species listed as threatened or endangered by the U.S. Fish and Wildlife Service. In addition, the commercial and recreational fishing industries in Florida

depend on the services provided by the mangrove forests.

Eighteen species of terrestrial mammals depend on the Florida mangrove system for food and shelter, including the raccoon, opossum, river otter, black bear, and striped skunk. The federally listed endangered manatee is commonly sighted in the rivers, canals, and nearshore waters of the mangrove environment (Odum and McIvor 1990; RECOVER 2004).

About 180 bird species use mangroves to forage, roost, and nest. These include 18 wading birds, 25 shore birds, 29 floating and diving birds, 34 aerial searchers and raptors, and 70 songbirds from northern habitats (Odum and McIvor 1990). Some of these species are also present in the park's hardwood hammocks (see "Upland Wildlife"). The mangrove canopy has traditionally supported large nesting colonies of wading storks, great egrets, colorful roseate spoonbills, and the popular brown pelican. Wading bird populations have increased by about 400% since the 1980s (Lodge 2005).

The reptiles and amphibians of mangrove forests include species found in the park's interior such as the American alligator and several species of snakes, anoles, and geckos. Alligators are sensitive to saltwater and venture into marine environments only to feed, keeping a freshwater source nearby. The American crocodile is a permanent resident of the ponds and creeks of mangrove estuaries. Crocodiles tolerate a wide variety of salinity because they can control their own internal salinity levels (called osmo-regulation). However, juveniles lack this ability and, when the choice is available, will seek freshwater areas such as black mangrove stands (RECOVER 2004).

Because the American crocodiles were hunted and extirpated from their natural habitats in Florida, they were declared endangered in 1975, and with only a portion of their remaining habitat in Florida Bay, the National Park Service protected the remaining area and

designated it as Crocodile Sanctuary, which is in two prominent bays in northeastern Florida Bay and southeast of Taylor Slough—Little Madeira Bay and Joe Bay. The sanctuary provides nesting and nursery habitat for the crocodiles, and there has been no public access to this area for more than 20 years.

Invertebrates in mangrove systems include terrestrial and marine species. Tree snails, dragonflies, fiddler crabs, and many insects found in other park habitats also use coastal mangroves for all or part of their lives. Mangrove estuaries are nursery grounds for pink shrimp and spiny lobsters, economically important species in south Florida. This pink shrimp fishery is one of the most valuable fisheries in the state (RESTORE 2004).

Florida Bay Wildlife. The area between the Florida Keys and the southern tip of the Everglades includes many dynamic and unique attributes that form Florida Bay. Florida Bay is a shallow, brackish estuary that contains numerous small islands (keys), seagrass flats, and sandbars. More than 700 square miles of this bay are within the boundary of Everglades National Park. Invertebrates and fishes have historically been abundant in its waters, and the bay also provides excellent habitat for birds, manatees, and crocodiles (SFWMD 2000a). The ecosystem's mangroves, seagrass habitats, and mud banks create a network of basins (Holmquist et al. 1989) and divide the bay into distinct subenvironments for fishes and invertebrate fauna. The sea trout is a key indicator species for the effects of these environmental changes because it spends its entire life in the bay.

Manatees forage in the seagrass meadows (Van Meter 1989), and bottlenose dolphin can find a lobster or crab meal on the sandy bottom. A variety of diving birds find fish in the waters, including brown pelicans, magnificent frigate birds, raucous laughing gulls, and elegant Royal terns with their bright orange-red beaks.

The islands in Florida Bay are important to nesting and roosting bird populations in Florida. Many islands provide roosting and nesting habitat to many birds, including great white herons, great and snowy egrets, white ibises, and roseate spoonbills. Many of the islands are covered with mangrove trees and hardwoods on the island interior and have little to no human activity, which creates ideal breeding sites for several bird species.

Several sea turtle species occasionally venture into the mangrove estuaries as they forage. The Kemp's Ridley, leatherback, green, and hawksbill turtles are federally listed endangered species, while the loggerhead turtle is classified as a threatened species; all are known to occur in Florida Bay estuaries.

Nestled between the Florida Keys and Florida's mainland, Florida Bay has many interconnected basins that average about 3 feet in depth. At its greatest depth, Florida Bay is 9 feet deep. The waters of Florida Bay support a variety of wildlife in addition to an important fishery. The combination of waters—saltwater from the Gulf of Mexico and fresh water from the Everglades—creates an estuary that flows between and around several hundred mangrove-islands. The basins, seagrass mats, mudflats, grass-lined mud banks, mangroves, and mangrove islands support habitat diversity for fish in Florida Bay. Fish larvae are transported into Florida Bay from neighboring keys by coastal eddies, Loop and Florida Current flow, Dry Tortugas Gyre, and local winds (Hunt and Nuttle 2007). Once larvae enter the bay, environmental conditions (salinity, temperature, and benthic conditions) dictate conditions for nursery habitat for larvae. Habitat diversity provides a variety of conditions for yearling fish (Mumby 2006). As fish grow and feed on the invertebrate resources in the bay, they travel to the many neighboring areas of the park such as the Florida Keys, Gulf Coast, and Atlantic Coast. Because the fish travel to these areas, they contribute to the community trophic structure as predator and prey. Without the mangroves along Florida Bay, the

important recreational and fisheries would decline and collapse (Thayer et al 1987).

Estuaries, lagoons, and bays are extremely important habitats for the productivity of fisheries and wildlife in Florida Bay (Zieman et al. 1989). The network of seagrass meadows and mud banks in Florida Bay bridges the distance between coral reefs and mangrove habitats, which have widely different physical requirements (Zieman 1982). Seagrass meadows in the bay are important to many fisheries in the bay because they provide habitat for invertebrates and fish of all life stages. The dominant seagrasses in Florida Bay include turtle grass, shoal grass, and manatee grass (Zieman and Zieman 1989). Seagrasses historically covered an estimated 90% of the about 444,800 acres (180,000 hectares) of subtidal mud banks and basins within Florida Bay (Zieman et al. 1989). In 1987, seagrass die-offs were first reported by backcountry fishing guides, and it was soon discovered that more than 9,884 acres (4,000 hectares) of seagrasses had died off (Robblee et al. 1991). Since the initial signs of the die-off, seagrass communities in the bay have shown increases in abundance and productivity of shoal grass and turtle grass (Zieman et al. 1989). Researchers suggest that the die-off of seagrasses affected fisheries in the bay (Robblee et al. 1991). For additional information on the seagrasses in Florida Bay, please see the "Vegetation" section.

Invertebrates are important components of the Florida Bay system, and they vary from macroscopic phytoplankton to large mollusks such as queen conch. A variety of shrimp, blue crab, and stone crab (a local delicacy) use the soft substrates and seagrasses as juveniles before moving to deeper waters. Oyster bars, primarily composed of eastern oysters, can be observed near the mouths of rivers, where they filter-feed on algae and plankton larvae. Juveniles and larvae of spiny lobster also use the bay and inshore waters as nurseries before heading to the reef line and waters as deep as 240 feet (Livingston 1990).

Sponges are also an important component of the bay community. They are efficient filter feeders of small phytoplankton, and they can improve water quality and clarity. Prior to degradation of the bay noted in the 1980s and 1990s, it is estimated that the population of sponges was capable of filtering the entire water column in a single day. At present densities, it takes an estimated four days for the sponge population to accomplish the same feat (Florida Bay Science Program 2003).

Climate Change. Climate change is expected to have profound effects on wildlife because many of their biological cycles are so closely tied to temperature and their habitat. Birds, mammals, amphibians, and marine species are most likely to be affected. Bird migration patterns are already changing, with birds wintering in the southeast United States arriving on average 13 days earlier (Cotton 2003). Earlier breeding and egg-laying dates and range expansion are already being seen in a variety of bird species. Because Everglades National Park is home to both migratory and resident bird species, these effects are likely to be noticeable in the near future, as well as beyond the life of this plan. Fish and other marine species are especially sensitive to changes in water depth, temperature, and chemistry. The alteration of environmental conditions important to the life cycles of these species, especially breeding and egg laying, are occurring. Disease outbreaks in ocean species, due in part to range expansion of marine parasites, are also occurring and are expected to increase as water temperatures rise. Other documented impacts on predator-prey relationships and wildlife habitat in marine and terrestrial environments are already occurring such as changes in the male/female ratio of sea turtles and amphibians. Sensitive species such as the manatee, which already has a reduced habitat range, are especially vulnerable to the impacts of climate change because of habitat alteration and changes in forage availability (Loehman and Anderson 2009; Pearlstine et al. 2008).

Fisheries

About 300 fish species inhabit Everglades National Park. They occur in nearly all aquatic park habitats, from open flowing waters to areas that are seasonally flooded such as marl prairies. During inundation periods, small fishes move from deeper sloughs and dry season refuges (e.g., alligator holes) to repopulate the higher elevation marshes. The park's fishes occupy all trophic groups; they are both predator and prey. Many species serve as food sources for wading birds, raptors, and alligators. There is some fishing in freshwater ponds, but many of the freshwater sport fish species are suspected of being contaminated with mercury.

Changes in fish populations can affect the food web. Thus, changes are considered to be relatively good indicators of how fishing, water management, and resource protection measures will travel through the estuaries of the park (Florida Bay Science Program 2003). Fish composition and density are used to evaluate the success of hydrologic restoration and other efforts to enhance natural system functions in the park (Loftus and Eklund 1994).

Freshwater Fishery. Although abundant, native freshwater species in the Everglades are not highly diverse. The fishes of the Everglades are the most studied in Florida, and many of the marsh, pond, and slough populations are derived from northern temperate species, with the exception of a few species from the West Indies (Kushlan 1990).

The fish community is dominated by minnow-sized species such as the mosquito fish, which can make up 60% of a local population; least killifish; and several small, soft-finned species, including flagfish and golden topminnow. The dominance of small fishes arises from the mortality of large species during dry spells. Thus, the distribution and abundance of species can change seasonally or with climate variation (Kushlan 1990).

Deeper pools, ponds, and canals support populations of small sunfishes such as pygmy sunfish and bluespotted sunfish. These fishes are commonly preyed upon by anhinga, cormorants, and other diving birds. These perennial water bodies also support the largest fishes in the park—largemouth bass, the prehistoric-looking Florida gar, yellow bullhead, and pirate perch. Fluctuating marshes provide habitat for small individuals of larger species such as warmouth and redear sunfish (Gunderson and Loftus 1993; Kushlan 1990).

In the southern reaches of the park, freshwater diversity decreases, and estuarine and marine species augment the fish populations (Gunderson and Loftus 1993; Kushlan 1990). This ecotone of brackish water supports killfishes, livebearers, and several marine species. Spot, mullet, and pinfish, in various life stages, are often abundant. In turn, predators that feed on these species can also be observed in these inland waters. Tarpon, snook, and even sharks have been sighted foraging in salt marsh tidal creeks (Kushlan 1990).

The canals and water retention ponds on the periphery of Everglades National Park have facilitated the spread of invasive nonnative fishes into the park. Several catfish species, including the walking catfish and oscars, are common in these human-made waterways. These species and other nonnatives such as the blue tilapia now live in the park, especially in the unnatural borrow pits such as Anhinga Pond. Some invasive nonnative species, such as the Mayan cyclid, pike killifish, and black acara, have become well established in marshes. Changes in water delivery and overflowing of canals that border the park have recently introduced new nonnative species, including the jaguar guapote, brown hoplosternum, and jewel cichlid, which is now reproducing and spreading westward in the marshes. Nonnative species are still dominant in the western, less-disturbed areas of the park (Kushlan 1990).

Marine Fishery. Florida's inshore marine habitats include Florida Bay, Ten Thousand Islands, and Whitewater Bay. These estuary-like habitats are generally high in biological productivity and low in species diversity, and they are crucial habitat for fish and invertebrate populations. Some species use these inshore marine habitats during only part of their lives, such as in juvenile stages and early development, while others live in the shallow waters of the park.

The occurrence and density of fish species in these nearshore environments correlate with salinity, water temperature, water quality, and benthic habitat (especially seagrass type and density). Changes in populations and distribution depend on watershed processes acting on the system as a whole. At the species level, factors that influence populations include dietary needs, food-web relationships, spawning and migration requirements, and fishing pressure. Each species has a different set of needs, and presence and abundance will vary based on local conditions (Florida Bay Science Program 2003).

Bay anchovy and Spanish sardines are major food sources for almost all predatory fish, making them key species in the estuary food web. The spotted seatrout, snook, and tarpon are commercially important to both coasts; they inhabit shallow coastal areas such as salt marshes, sand flats, and seagrass beds. Sport fisheries on both coasts depend on the bonefish, tarpon, snook, Florida pompano, mutton snapper, gray snapper, lane snapper, and yellowtail snapper, all of which spend part of their time in inshore marine areas (Livingston 1990). Recreational fishing in Everglades National Park affects the size and structure of the gray snapper community, and evidence of overfishing is seen in this and other species that migrate outside the park (Florida Bay Science Program 2003).

Members of the shark family, including lemon sharks, nurse sharks, and bonnetheads, along with bottlenose dolphin, forage for fish, mollusks, and shellfish in park waters.

Climate Change. The quality of freshwater and marine fish habitat may be affected by climate change in south Florida. The altered hydrologic regime and increased surface water temperatures could result in decreased dissolved oxygen concentrations and increased toxicity from pollutants (Ficke et al. 2007). In marine and estuarine ecosystems, acidification and changes in salinity patterns associated with changing rainfall and increasing evaporation rates could also result in changes in the fish community and abundance. In response, species range and spawning and nursery habitat could likely shift to other habitats, which may lead to additional community-wide impacts resulting in reduced or adversely impacted fish species throughout the park (Pearlstine et al. 2008). These changes could be evident during the life of this plan, and also for years to come beyond the life span of this plan.

Essential Fish Habitat

The Council on Environmental Quality guidelines for implementing the National Environmental Policy Act requires an analysis of resources that would be considered ecologically critical areas. Within Everglades National Park, ecologically critical areas include essential fish habitat, as identified by the Gulf of Mexico Fisheries Management Council (GMFMC 2005), and habitat areas of particular concern, as defined by the National Oceanic and Atmospheric Administration and mapped by the council.

In 1996 Congress made substantial revisions to the Magnuson-Stevens Fishery Conservation and Management Act and refined the focus of fisheries management by emphasizing the need to protect fish habitat. Specifically, the act required that fishery management plans identify as essential fish habitat those areas that are necessary to fish for their basic life functions. Essential fish habitat is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” “Waters” include aquatic areas and their

associated physical, chemical, and biological properties that are used by fish. “Substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities. “Necessary” means the habitat required to support a sustainable fishery and the managed species’ contributions to a healthy ecosystem. “Spawning, breeding, feeding, or growth to maturity” covers a species’ full life cycle (NOAA 2009b).

The intent of the 1996 Magnuson-Stevens Fishery Conservation and Management Act is to conserve and enhance essential fish habitat and focus conservation efforts on areas that are important to the life cycles of federally managed fish and shellfish. For this document, these areas include areas that provide refuge, foraging, and breeding areas for fish and invertebrates. For a detailed analysis of effects on mangroves, salt marshes, and seagrasses, please refer to the “Vegetation and Wetlands” section of this document.

The Magnuson-Stevens Fishery Conservation and Management Act requires the NOAA-Fisheries and regional fishery management council to minimize, to the extent practicable, adverse effects on essential fish habitat caused by fishing activities. The act also requires federal agencies to consult with NOAA-Fisheries about actions that would damage essential fish habitat.

Essential fish habitats in the park, as defined by the fishery management councils, include the following:

- submerged aquatic vegetation (seagrasses)
- intertidal vegetation (marshes and mangrove)
- benthic algae
- coral reefs
- sand/shell bottoms
- soft bottoms
- pelagic communities, oyster reefs, and shell banks

- hard bottoms

A description of mangroves has been provided previously in the discussion on vegetation. The following description and discussions of importance of these essential fish habitats have been taken from the Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plan of the Gulf of Mexico Fisheries Management Council (GMFMC 2004).

Seagrass meadows provide substrates and environmental conditions that are essential to the feeding, spawning, and growth of several managed species. Juvenile and adult invertebrates and fishes, as well as their food sources, use seagrass beds extensively (GMFMC 2004).

Mangroves and marshes provide essential habitat for many managed species, serving as nursery grounds for larvae, juveniles, and adults. Mangrove habitats (particularly riverine, overwash, and fringe forests) provide shelter for larvae, juvenile, and adult fish and invertebrates. In addition, mangroves and marshes provide dissolved and particulate organic detritus to estuarine food webs. Because of this dual role as habitat and as food resource, mangroves are important exporters of material to coastal systems. Mangroves also export materials to terrestrial systems by providing shelter, foraging grounds, and nursery/rookery areas for terrestrial organisms. The root system binds sediments, thereby contributing to sedimentation and sediment stabilization (GMFMC 2004).

Corals and coral reefs support a wide array of corals, finfish, invertebrates, plants, and microorganisms.

Hard bottoms and hard banks often have high species diversity but may lack reef-building (hermatypic) corals, the supporting coralline structure, or some of the associated biota. Hard bottoms are usually of low relief and on the continental shelf; many are associated with relic reefs, where the coral veneer is supported by dead corals. In deeper waters,

large, elongated mounds (called deepwater banks) that are hundreds of yards in length often support a rich fauna compared with adjacent areas.

Benthic algae occur in both estuarine and marine environments and are used as habitat by managed species such as the queen conch and early stages of the spiny lobster. Threatened sea turtles use some benthic algae species as food. Invertebrate species, including mollusks and crustaceans, inhabit this area and are eaten by various fishes.

Sandshell and soft bottom habitats are common throughout Florida and the Caribbean. These habitats are characterized as being extremely dynamic. However, buffering by reefs and seagrasses allows some salt-tolerant plants to colonize the beach periphery. Birds, sea turtles, crabs, clams, worms, and urchins use the intertidal areas. The sand/mud subsystem includes all non-living bottom habitats or those with a low percent of cover (less than 10%). Sandy and mud bottom habitats are widely distributed and are found in coastal and shelf areas. These areas include inshore, sandy areas separating living reefs from turtle grass beds and shorelines, rocky bottoms near rocky shorelines, and mud substrates along mangrove shorelines. Sand/shell habitat is used for foraging by many fishes such as mojarras, and as substrate for solitary corals.

The pelagic subsystem includes the habitat of pelagic fishes. Pelagic habitat is associated with open waters beyond the direct influence of coastal systems. In general, primary productivity in this zone is low and patchily distributed, being higher in nearshore areas as opposed to offshore areas. The pelagic system is inhabited by the eggs and larval stages of many reef fishes, highly migratory fishes, and invertebrates.

Oyster and shell essential fish habitat is defined as the natural structures found between (intertidal) and beneath (subtidal) tide lines. These structures are composed of oyster shell, live oysters, and other organisms

that are discrete. Oysters have often been described as the “keystone” species in an estuary, and they provide substantial surface area as habitat. Oyster communities are critical to a healthy ecosystem, because oyster reefs remove, via filter feeding, large amounts of particulate material from the water column and release large quantities of inorganic and organic nutrients. The oyster reef as a structure provides food and protection and contributes to critical fisheries habitat.

Whereas essential fish habitat must be described and identified for each species and life, habitat areas of particular concern are identified on the basis of the condition of the habitat. The final rule to implement the essential fish habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act lists the following considerations in the designation of habitat areas of particular concern (50 CFR 600.815[a][8]):

- the importance of the ecological function provided by the habitat
- the extent to which the habitat is sensitive to human-induced environmental degradation
- whether, and to what extent, development activities are, or would be, stressing the habitat
- the rarity of the habitat type

The designation of habitat areas of particular concern is intended to identify those areas of essential fish habitat considered to be of the highest importance in the life cycles of managed species and most in need of protection. A habitat area of particular concern is expected to be a localized area of an essential fish habitat that is especially ecologically important, sensitive, stressed, or rare when compared to the rest of the essential fish habitat.

Florida Bay in Everglades National Park has been identified as a habitat area of particular concern. Mangrove-covered islands and submerged aquatic vegetation in the bay

provide important habitat for many of the fisheries such as pink shrimp, red drum, and spiny lobster. Categories of essential fish habitat that would be affected by the proposed alternatives include the estuarine/marine water column and nonvegetated bottom (with mud, sand, and rock substrates). Essential fish habitat for the highly migratory pelagic species would be restricted to the estuarine/marine water column; essential fish habitat for the remaining species also includes the nonvegetated bottom.

Essential fish habitat in Everglades National Park is composed of estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities) and includes submerged vegetation (seagrasses and algae), marshes and mangroves, and oyster shell reefs or banks (GMFMC 2004).

The Gulf of Mexico Fisheries Management Council identified six areas in Everglades National Park—Florida Bay; Lake Ingraham; Whitewater Bay; Cape Sable to Lostman’s River; Lostman’s River to Mormon Key; and Mormon Key, up to and beyond the park boundary, to Caxambas Pass—that contain essential fish habitat dominated by mangrove islands and mangrove forests that include marsh areas and areas of submerged aquatic vegetation (seagrass). The complex of six areas is referred to as the Florida Bay and Ten Thousand Islands area. Mangroves in these areas cover approximately 456 square miles, and marsh areas cover about 415 square miles. Cape Sable contains about 66% of the tidal marsh and greater than 60% of the mangroves in these areas. Submerged vegetation in the area totals nearly 413 square miles, mostly within Florida Bay.

These habitats provide forage, nursing, and spawning areas for species such as shrimp, red drum, spiny lobster, reef fish, and mackerels. The table below lists species that have been observed or recorded in the park or species that have prey that are found in the park (GMFMC 2004). The table indicates the essential fish habitat identified for federally managed species that inhabit in the park.

TABLE 9. FEDERALLY MANAGED FISH SPECIES USING ESSENTIAL FISH HABITATS IN EVERGLADES NATIONAL PARK

Common Name	Scientific Name	Habitat
Fin Fish		
Red drum	<i>Sciaenops ocellatus</i>	Marine plankton, submerged aquatic vegetation, mud bottom, marsh
Gray triggerfish	<i>Balistes capniscus</i>	Marine sand, floating plants, mangroves
Greater amberjack	<i>Seriola dumerili</i>	Floating plants, pelagic
Lesser amberjack	<i>Seriola fasciata</i>	Floating plants, pelagic
Red snapper	<i>Lutjanus campechanus</i>	Sand, mud, rock outcrops, gravel
Gray (mangrove) snapper	<i>Lutjanus griseus</i>	Marine plankton, submerged aquatic vegetation, mangrove, mud
Lane snapper	<i>Lutjanus synagris</i>	Submerged aquatic vegetation, mangrove, mud, sand, reefs
Yellowtail snapper	<i>Ocyurus chrysurus</i>	Submerged aquatic vegetation, mangrove, mud, sand, reefs
Vermilion snapper	<i>Rhomboplites aurorubens</i>	Submerged aquatic vegetation, mangrove, mud, sand, reefs
Golden tilefish	<i>Lopholatilus chamaeleonticeps</i>	Burrows, rough bottom
Red grouper	<i>Epinephelus mono</i>	Marine plankton, submerged aquatic vegetation, hard bottoms
Black grouper	<i>Mycteroperca bonaci</i>	Marine plankton, submerged aquatic vegetation, hard bottoms
Gag grouper	<i>Mycteroperca microlepis</i>	Marine plankton, submerged aquatic vegetation, hard bottoms
Scamp	<i>Mycteroperca phenax</i>	Hard bottoms, reefs
King mackerel	<i>Scomberomorus cavalla</i>	Pelagic
Spanish mackerel	<i>Scomberomorus maculatus</i>	Pelagic
Cobia	<i>Rachycentron canadum</i>	Coastal
Cero	<i>Scomberomorus regalis</i>	Pelagic
Little tunny	<i>Euthynnus alletteratus</i>	Estuaries, pelagic
Dolphin fish	<i>Coryphaena hippurus</i>	Epipelagic
Bluefish	<i>Pomatomus saltatrix</i>	Estuaries, pelagic
Shrimp		
Brown shrimp	<i>Penaeus aztecus</i>	Marsh, mud
White shrimp	<i>Penaeus setiferus</i>	Marsh, mud
Pink shrimp	<i>Penaeus duorarum</i>	Sand
Royal red shrimp	<i>Pleoticus robustus</i>	Submerged aquatic vegetation
Lobsters		
Spiny lobster	<i>Panulirus argus</i>	Hard bottoms
Spotted spiny lobster	<i>Panulirus guttatus</i>	Hard bottoms
Smooth tail lobster	<i>Panulirus laevis</i>	Hard bottoms
Spanish slipper lobster	<i>Scyllarides aequinoctialis</i>	Hard bottoms

Source: Gulf of Mexico Fishery Management Council 2009

Federal Special Status Species

Table 10 summarizes information about the federally listed species found in Everglades National Park and indicates whether each species was retained for detailed analysis in this document, or whether it was dismissed from detailed analysis and why. The two categories are combined into this one table for ease of review by consulting agencies such as the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

It should be noted that NPS management actions are carried out or planned in Everglades National Park that are not described in detail in this document. In some cases, those actions may have the potential to affect Federal Special Status Species. Everglades National Park will request separate consultation for those projects and plans. Consultation will either be requested on a project by project basis (e.g., limited scientific research proposed by an outside entity) or on a programmatic basis (e.g., a parkwide fire management plan.) Other projects, such as the restoration projects comprising CERP, may have another federal agency as the lead agency. These projects have the potential to affect federal special status species and consultation will be requested by the federal agency leading the project.

Mammals. Everglades National Park provides habitat for a variety of federally listed endangered and threatened species. These species occupy many habitats and vary in size from ounces to 1,000 pounds. Although individuals from these imperiled groups find refuge in the park, their species' status and prognosis for survival may well depend on larger external factors acting outside the park boundaries. The park will endeavor to protect these species and continue to provide habitat for their continued survival. Two especially intriguing federally listed endangered mammals in Everglades National Park are the Florida panther and the manatee.

Birds. Special status birds in the park are threatened or endangered largely because of

habitat loss and altered hydrologic conditions. Species that depend on the wetland environments typical of the Everglades system have lost most of their habitat over the last century. The endangered birds in the park include the highly specialized Everglades snail kite (which feeds almost exclusively on apple snails) and the Cape Sable seaside sparrow. Additionally, the wood stork is classified as threatened.

Reptiles. Threatened and endangered reptiles that live in the park include the eastern indigo snake and five of the world's seven species of sea turtle and two of the world's largest lizards—the American crocodile and the American alligator. Habitat loss and fragmentation due to increases in urbanization and agricultural land uses; natural catastrophes (e.g., hurricanes); changes in the distribution, timing, quantity, and quality of freshwater flows; and hunting affect crocodiles. Crocodilians were hunted to near extinction, but both species found in the park are staging comebacks. The remote and secluded areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) have been instrumental for crocodile recovery in the park.

The populations of sea turtles have been dramatically reduced worldwide by hunting and egg collecting, and they are now further threatened by effects of commercial fishing and shoreline habitat loss (FWC 2010b).

Invertebrates. Since 2011, three butterflies have either been listed or proposed to be listed as endangered within Everglades National Park. Habitat loss and fragmentation, pesticide use, and other factors have resulted in these species' decline. Everglades National Park represents one of the last strongholds for two of these butterflies—the Florida leafwing and the Bartram's hairstreak. The park is currently believed to support the entire remaining population of the Florida leafwing.

Plants. The populations of south Florida's imperiled plants have been reduced by habitat

loss. Changes in natural hydrology, large-scale agriculture, and urban development have eradicated most pineland communities and changed the nature of hardwood hammocks. Remaining populations of Florida prairie clover may be as low as 200 to 300 individuals. Likewise, fewer than 100 individual crenulate lead-plants may now exist in the wild.

Fish. Both freshwater and marine fish populations have declined because of habitat loss and altered hydrologic conditions. The endangered small-toothed sawfish lives in the marine waters of the park. Sawfish are inherently vulnerable to exploitation because of their tendency for entanglement in fishing gear, their restricted habitat, and their low rate of population growth. All of Ten Thousand Islands and Florida Bay waters less than 3 feet (1 meter) in depth are designated as critical habitat for the small-toothed sawfish.

Climate Change. The federal government has listed dozens of plant and animal species in south Florida as threatened or endangered, with many other species included on the state list. Many of the threatened and endangered species occupy specific aquatic or terrestrial habitats in the park. As the effects of climate change increase, the fragility of long-term recovery for threatened and endangered species in south Florida could be amplified. Climate change could increase habitat fragmentation and cause some species to migrate or occupy uncharacteristic habitats (Committee on Independent Scientific Review of Everglades Restoration Progress 2008), further contributing to potential loss of endangered species. Continual spread of invasive nonnative plants and animals could also contribute to the competition for resources among endangered plants and animals and is also likely to cause further endangerment of these species in the Everglades and south Florida (Pearlstine et al. 2008).

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
MAMMALS					
Analyzed	Florida panther	<i>Puma concolor coryi</i>	Endangered	<p>The panther, Florida’s state animal, is one of the most endangered large mammals in the world, largely from loss of habitat. Although it was listed as endangered by the U.S. Fish and Wildlife Service in 1967, there is no designated critical habitat. Population estimates in south Florida range between 100 to 120 total individuals (USFWS 2008c and FFWCC 2010c). Panthers appear to prefer large and remote tracts with adequate prey and cover. The preferred habitats of the Florida panther are pinelands, hardwood and cypress swamps, and hardwood hammocks (Comiskey et al. 2002). Dense saw palmetto is preferred for resting and denning. Panther breeding may occur throughout the year, with a peak during winter and spring. Panthers have a gestation period of around 90 to 95 days, litter sizes of one to four kittens, and a breeding cycle of two years for females successfully raising young to dispersal, which occurs around 18 to 24 months (USFWS 2008c). The panthers’ preferred prey species are the white-tailed deer and feral hogs (USFWS 2006).</p> <p>The Florida panther’s range encompasses nearly all of Everglades National Park (except the mangrove zone), and the park supports a small viable breeding population of Florida panthers, although most of the population occurs in Big Cypress National Park. Figure 4 shows lands considered essential to the long-term viability and persistence of the panther in the wild. Factors affecting the Florida panther include habitat loss and fragmentation, environmental contaminants, disease, genetic erosion, and prey availability; human activities and disturbance also are factors (Dunbar 1994).</p> <p>No critical habitat has been designated for the Florida panther. However, much of Everglades National Park lies within the panther “primary zone” of the panther focus areas identified by the U.S. Fish and Wildlife Service, indicating that these areas are important to the recovery of panthers in south Florida.</p>	
Analyzed	bottlenose dolphin	<i>Tursiops truncatus</i>	Depleted	<p>Bottlenose dolphins are one of the best-known species of marine mammals. They are protected under the Marine Mammal Protection Act of 1972, as amended.</p> <p>Bottlenose dolphins were designated as depleted in 1993 because of a substantial loss of bottlenose dolphins between 1987 and 1988 (Waring et al. 2002). The National Oceanic and Atmospheric Administration Fisheries Service (National Marine Fisheries Service, or NMFS), designated the Atlantic coastal population of bottlenose dolphins as a single migratory stock, designating the stock as “strategic” under the Marine Mammal Protection Act.</p> <p>Bottlenose dolphins have strong, powerful bodies that are blue-gray on top with lighter sides and bellies. They range in size from 6 to as much as 12 feet long and can weigh as much as 1,200 pounds. Bottlenose dolphins are found in groups of 2 to 15 individuals and feed on both fish and invertebrates (NMFS 2010b). These dolphins are found around the world in temperate and tropical waters.</p> <p>Some bottlenose populations migrate into bays, estuaries, and river mouths, while other populations inhabit oceanic waters along the continental shelf.</p> <p>The primary threat to bottlenose dolphins is incidental injury and mortality from fishing gear used in gillnet, seine, trawl, and longline commercial and recreational operations (NMFS 2010b).</p>	
Analyzed	West Indian manatee	<i>Trichechus manatus latirostris</i>	Endangered, Critical Habitat	<p>The Florida manatee is a subspecies of the West Indian manatee (USFWS 2007b). The manatee was first listed as endangered in 1967, and critical habitat (Gulf Coast waters and part of Florida Bay—see figure 5a at the end of this table) was designated in 1976. Past hunting and poaching and the present-day effects of boat impacts and propeller injuries (USFWS 2001) contribute to the manatee’s endangered status. Manatees inhabit Everglades National Park waters in the Ten Thousand Islands area, Whitewater Bay, and some of the larger rivers that flow into the Gulf of Mexico (Park Ecologist Skip Snow, pers. comm., 2008).The Chokoloskee Area of Inadequate Protection for manatees was established by the U.S. Fish and Wildlife Service in 2001. This designation was removed in April 2010 based on implementing the zones depicted in figure 5b, along with signage and law enforcement commitments.</p> <p>The large, aquatic, herbivorous manatee lives in freshwater, brackish, and marine habitats, and eats submerged, emergent, and floating vegetation. Manatees generally seek out warm water refuges in quiet areas in canals, creeks, lagoons, or rivers. Water temperatures colder than 68 degrees Fahrenheit increase manatee susceptibility to cold stress and cold-induced mortality. The primary threats to manatee, aside from low temperatures, are collisions with watercraft, degradation of seagrasses, and entrapment in water-control structures. In the winter, manatees concentrate in southwest peninsular Florida, depending on warm water flows from natural springs and power plant outfalls.</p>	
Analyzed	Key Largo woodrat	<i>Neotoma floridana smalli</i>	Endangered	<p>The Key Largo woodrat is a small, endemic rodent that once ranged throughout Key Largo. Nearly half of the woodrat’s habitat has been lost to development activities in Key Largo (McCleery et al. 2006). In 1986, the Key Largo woodrat was listed as an endangered species because of the drastic decline of known habitat and population size. The current distribution of the woodrat is restricted to the northern third of Key largo. Woodrats once inhabited the upland areas of Key Largo, but now are only found in the tropical hardwood hammocks.</p> <p>The Key Largo woodrat is gray-brown above with cream or white ventral coloration. It is also distinguishable by its large, rounded ears and protuberant eyes. It is critically dependent on native vegetation in Key Largo (USFWS 1999). Stick nests, solution holes, and the root systems of large trees are used by nesting Key Largo woodrats.</p>	

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Analyzed	Key Largo cotton mouse	<i>Peromyscus gossypinus allapaticola</i>	Endangered	<p>The Key Largo cotton mouse was characterized as endangered by the U.S. Fish and Wildlife Service in 1984. The cotton mouse is susceptible to human encroachment and development activities that have impacted its primary habitat. It is now restricted to the northernmost portion of Key Largo. Urbanization of Key Largo has severely reduced the forests of the tropical hardwood hammocks and has reduced the availability of food, shelter, and habitat for the cotton mouse.</p> <p>The Key Largo cotton mouse is more reddish than other subspecies of mainland cotton mice. Habitats include tropical hardwoods and recently burned, early successional, and mature hammock forests. The Key Largo cotton mouse builds leaf-lined nests in logs, tree hollows, and rock crevices (USFWS 1999). Key Largo cotton mice are omnivorous and feed on a wide variety of plant and animal materials. The tropical hardwood hammock trees and shrubs produce fruits and berries that provide important food items for the Key Largo cotton mouse.</p>	
Dismissed	mangrove fox squirrel	<i>Sciurus niger</i>	Candidate	<p>The mangrove fox squirrel is a subspecies of the fox squirrel found only in southwest Florida. Mangrove fox squirrels are 10 to 12 inches in body length, with tails 8 to 10 inches long. Most mangrove fox squirrels in Florida are black with a white nose and tip of the tail. They may weigh as much as 2 pounds. Their preferred habitat is mangrove stands, but they spend a great deal of time on the ground searching for nuts, buds, and seeds (FWC 2000).</p> <p>Few details are known of the habits and specific preferences of this candidate species. Mangrove fox squirrels are most commonly reported from road fatalities. Three incidents of mortality along the road to Flamingo have been documented. Live animals are rarely observed in the park.</p>	The preferred habitat of this species is mangrove stands. It is not anticipated that actions proposed in the alternatives would affect the species or its habitat. This species was not carried through for full analysis.
Dismissed	Florida bonneted bat	<i>Eumops glaucinus floridanus</i>	Endangered	<p>The Florida bonneted bat is the largest bat species in Florida and is a free-tailed bat. It was formerly considered a subspecies known as the Florida mastiff bat, but in 2004 was determined to be a separate species unique to Florida.</p> <p>The Florida bonneted bat was listed as endangered in November 2013 (USFWS 2013a). It occurs only in the southern portion of Florida—excluding the Florida Keys—in urban, suburban, and forested areas. It roosts singly or in groups of up to a few dozen individuals in buildings (e.g., under Spanish roof tiles) or sometimes in tree hollows or in the foliage of palm trees. It has also been found under rocks and in fissures in limestone outcrops. It is nocturnal and feeds on night-flying insects. Critical habitat has not been proposed for the Florida bonneted bat.</p> <p>The Florida bonneted bat is vulnerable to habitat loss (in urban and forested areas), habitat alteration, and pesticide spraying for mosquitoes. The latter may be responsible for the species’ decline in the Miami area because roosting sites are still abundant.</p>	There is limited information about the occurrence of this species in the park. It has been documented through acoustic monitoring in several locations, but no known roosts or breeding sites have been identified. The proposed general management plan alternatives are not expected to affect areas where this species would be likely to roost and there are only minor differences among alternatives with respect to this species. If potential disturbance is identified, surveys would be conducted to determine if this species is present, and appropriate mitigation actions would be taken in consultation with the U.S. Fish and Wildlife Service. Therefore, this species was not carried through for full analysis.
BIRDS					
Analyzed	piping plover	<i>Charadrius melodus</i>	Threatened, Critical Habitat	<p>The piping plover is a small, stocky, sand-colored shorebird with orange-yellow legs, a black band across the forehead between the eyes, and a black ring around its neck. The plover may be found on sandy beaches, mud flats, or algal mats in protected bays of south Florida. It breeds on outer coastal beaches from Newfoundland to North Carolina, beginning in late March or early April. The fledglings hatch about 28 days after incubation commences and are able to fly 28 days later. They winter on the Atlantic Coast as far south as the West Indies, departing in early September. In south Florida, plovers are considered rare and are usually observed during migration and winter months.</p> <p>The current Atlantic coast population of the piping plover is estimated to be about 2,000 pairs. An initial decline in population occurred in the late 19th century because of overhunting, but the species recovered by the 1940s under the protection of the Migratory Bird Treaty Act. A second decline has occurred more recently because of the development of coastal areas and the consequent loss of habitat. The species was federally listed as threatened in 1986. Current threats to the plover’s existence include development, human disturbance (including pets), increased numbers of scavenging predators near concessions, and storm tides (USFWS 2007a).</p> <p>Wintering critical habitat was designated for the piping plover in 2002 and includes a relatively small area of beach on Sandy Key and Carl Ross Key in Florida Bay (USFWS 2002).</p>	
Analyzed	wood stork	<i>Mycteria americana</i>	Threatened	<p>Wood storks were listed as endangered in 1984 because of loss of foraging habitat and colony nesting failures. No critical habitat has been designated for the wood stork. Wood storks are birds of freshwater and brackish wetlands, primarily nesting in cypress or mangrove swamps. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools, primarily on fish as long as 10 inches long (USFWS 1999h). Particularly attractive feeding sites are depressions in marshes or swamps where fish congregate during periods of falling water levels. The U.S. breeding population of the wood stork declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960. Since 1978, fewer than 5,000 pairs have bred each year. The decline is believed to be due primarily to the loss of suitable feeding habitat, especially in south Florida rookeries, where repeated nesting failures have occurred despite protection of the rookeries. Feeding areas in south Florida have decreased by about 35% since 1900 because of human alteration of wetlands. Additionally, human-made levees, canals, and floodgates have greatly changed natural water regimes in south Florida (USFWS 1999h).</p> <p>Wood stork surveys completed in 1999 and 2001 to 2006 documented a population ranging from 5,560 to 11,279 pairs, with the greatest number of pairs occurring in 2006 (USFWS 2007c). The 2009 annual survey counted more than 2,600 wood stork nests among 14 sites in the Everglades (pers. comm. with Mr. O. L. “Sonny” Bass, Everglades National Park supervisory wildlife biologist, and Gabriel Cosyleon, Parsons, regarding the presence of wood stork nests in the park). The substantial increase in nesting pairs may be attributable to a favorable combination of water levels, rainfall timing, and forage availability (Morgan 2009). Currently, two wood stork colonies exist south of Tamiami Trail in the East Everglades Addition. Wood storks are susceptible to human activities, and habitat management guidelines are intended to improve environmental</p>	

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	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
				<p>conditions required for the survival and well-being of the wood stork (USFWS 1990).</p> <p>No critical habitat has been proposed for the wood stork.</p> <p>In December 2012, the U.S. Fish and Wildlife Service published a proposed rule to reclassify the wood stork’s status from endangered to threatened in recognition of population growth and improved nesting since listing, primarily related to the northward expansion of the nesting range within the United States (USFWS 2012a). In June 2014, the U.S. Fish and Wildlife Service published the final rule for the reclassification of the wood stork from endangered to threatened (USFWS 2014a).</p>	
Analyzed	roseate tern	<i>Sterna dougallii dougallii</i>	Threatened	<p>Roseate terns are coastal birds that can range in size from 14 to 17 inches, with a wingspan of 30 inches. Their backs are pearly gray and the underparts are white, but in the summer, the tern has a black bill, cap, and nape. They breed on salt marsh islands and beaches with sparse vegetation from the Gulf of St. Lawrence in Canada, south to Virginia, and in the West Indies. Terns may breed on many substrate types including open sandy beaches isolated from human activity, pea gravel, open sand, and salt marshes. In Florida, a few dozen pairs nest every year among other terns in the Dry Tortugas, and pairs have been known to nest in Key West in recent years. The roseate tern migrates for the winter to the Caribbean and the northeastern coast of South America. In south Florida, roseate terns are considered rare and are usually observed during migration and winter months. The worldwide population was recently estimated to be 3,300 breeding pairs; this is down from the estimated 8,500 pairs 50 years ago (USFWS 1987).</p> <p>Roseate terns were in danger of extirpation between the late 1800s and the 1920s. They have again declined in number because of vegetation changes, competition for breeding areas, and predation (New York State Department of Environmental Conservation 2010). Large gulls prey on the eggs and chicks during the breeding season, and humans prey on the birds in their winter habitat for their plumage.</p> <p>No critical habitat has been designated for the roseate tern.</p>	
Dismissed	Audubon’s crested caracara	<i>Polyborus plancus audubonii</i>	Threatened	<p>The Audubon’s crested caracara is a member of the falcon family and has a length of 21 to 23 inches, with a wingspan of almost 4 feet. It has long, yellow legs and a large blue bill. It spends a great deal of time on the ground hunting or foraging.</p> <p>Populations occur in Florida, Baja California, Arizona, Texas, Cuba, and the Isle of Pines. A subspecies occurs in New Mexico and Louisiana. They maintain large territories with their mates. Unlike other falcon species, they build large nests of vines and sticks. These nests are usually in a cabbage palm or cactus or on the ground and contain two or three eggs. The caracara prefers dry prairies with wet areas, river edges, ranches, and lightly wooded areas with intermittent open grassland (USFWS 1999a). The crested caracara’s center of abundance in Florida is Kissimmee Prairie, north of Lake Okeechobee (USFWS 1989), but it does not occur in Everglades National Park (pers. comm. with Mr. O. L. “Sonny” Bass, Everglades National Park supervisory wildlife biologist, and Gabriel Cosyleon, Parsons, regarding the presence of Audubon’s crested caracara nests in the park). No critical habitat has been designated.</p> <p>This species’ population decline is primarily because of habitat loss from real estate development, citrus groves, tree plantations, and agricultural use. The caracara also fall prey to illegal trapping/killing and collisions with vehicles (USFWS 1989).</p>	<p>The primary habitat for Audubon’s crested caracara is the Kissimmee Lakes region in central Florida. Only occasional sightings of individuals have been reported in western portions of the park and the Florida Keys, most likely due to individual birds wandering beyond their range (FL Natural Areas Inventory 2001). The caracara does not occur in the park, given its preference for prairie or agricultural areas.</p> <p>It is unlikely that activities proposed in this management plan would affect this species. The caracara was not carried forward for analysis.</p>
Dismissed	red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	<p>The red-cockaded woodpecker was federally listed as endangered in 1970. This woodpecker is 7 inches long, with a wingspan of 15 inches. It has black and white horizontal stripes on its back, a black cap and throat, and white underparts. Males have a red spot on each side of the cap, called a cockade. These woodpeckers are nonmigratory and are a cooperative breeding species, meaning that a group of several adult birds share in the tasks of raising the chicks of only one set of parents. This group consists of a breeding pair and as many as seven other birds. They tend to the eggs and keep watch over the fledglings after they are hatched. The territory for a group of this size is about 200 acres, on average. Their primary habitat is a pine forest of 80- to 120-year-old trees. Longleaf pines are preferred, but they will occasionally nest in southern pines. Red-cockaded woodpeckers are the only woodpecker that excavates cavities in living pines. Pines with fungus infections, such as red-heart disease, are preferred for excavating cavities, which takes one to three years.</p> <p>The historical range for populations of this species was from as far west as Texas and Oklahoma, east to Florida, and north to New Jersey, with scattered populations on islands. The current population estimate is 12,500 birds (USFWS 2004b). They have been extirpated in New Jersey, Maryland, Tennessee, and Missouri. The red-cockaded woodpecker is not known to occur in Everglades National Park (pers. comm. with Mr. O. L. “Sonny” Bass, Everglades National Park supervisory wildlife biologist, and Gabriel Cosyleon, Parsons, regarding the presence of red-cockaded woodpecker nests in the park).</p> <p>The number of these woodpeckers has declined primarily because of habitat destruction. Pine trees older than 80 years are at risk of both harvest and the encroachment of mid-story hardwood trees because of fire suppression (USFWS 2004b). Several federal agencies are working with private landowners to implement the recovery plan for the species.</p>	<p>The red-cockaded woodpecker nests and roosts in pine or pine-hardwood stands with a low or sparse understory and ample old-growth pines; primary threats include habitat destruction or degradation by timbering and other land-clearing activities (USFWS 1999h). Suitable habitat for the red-cockaded woodpecker is in Big Cypress National Preserve, approximately 20 miles southeast of Everglades City. This location is well outside areas that would be affected by actions proposed in this general management plan. Therefore, this species was not carried through for full analysis.</p>

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Dismissed	Cape Sable seaside sparrow	<i>Ammodramus maritimus mirabilis</i>	Endangered, Critical Habitat	<p>The Cape Sable seaside sparrow is an ecologically isolated subspecies of the seaside sparrow listed as an endangered species by the U.S. Fish and Wildlife Service in 1967; critical habitat was designated in 1977. Most of the critical habitat for the seaside sparrows occurs in Everglades National Park. Recent surveys estimate the population at approximately 3,000 individuals, mostly east of the Northeast Shark River Slough (USFWS 2013b). The Cape Sable seaside sparrow has a specific habitat preference of dense stands of graminoid species less than 3 feet tall and naturally inundated by freshwater during part of the year. The sparrow has a generalist diet; it commonly feeds on soft-bodied insects, such as grasshoppers, spiders, moths, caterpillars, beetles, dragonflies, wasps, marine worms, shrimp, grass, and sedge seeds, in rough proportion to their availability (USFWS 1999b). The sparrow’s breeding season typically extends about six months. Nesting may begin as early as late February and continue into early August. The amount of summer nesting, which essentially means the number of third broods attempted, may depend on the characteristics of individual rainy seasons. Nesting activity decreases abruptly when water depths in nesting habitat exceed 4 to 8 inches.</p> <p>Critical habitat for the Cape Sable seaside sparrow was designated in 1976 and revised in 2007 (USFWS 2007d). The majority of designated critical habitat for this species lies within the short-hydroperiod marl prairies of Everglades National Park. Important characteristics of critical habitat include calcareous marl soils; open, expansive marl prairie habitat with few trees and shrubs; and diverse herbaceous vegetation composed of native grasses characteristic of short-hydroperiod marl prairies.</p>	Cape Sable seaside sparrows are distributed in two areas of marl prairies east and west of Shark River Slough and flanking Taylor Slough (USFWS 1999b); designated critical habitat is outside the park in Miami-Dade County (72 FR 62735 et seq.). The main threat to this species is habitat change resulting from alteration of the natural distribution, timing, and quantity of water flows in south Florida. Although ongoing projects designed to improve water flow and quality in the park might affect the Cape Sable seaside sparrow and its habitat, these actions are not part of this general management plan. It is not anticipated that actions proposed in the alternatives of this plan would affect this species or its habitat. Therefore, this species was not carried through for full analysis.
Analyzed	Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	Endangered, Critical Habitat	<p>The Everglade snail kite is a wide-ranging raptor listed as endangered by the U.S. Fish and Wildlife Service in 1967; critical habitat was designated in 1977. This endangered raptor inhabits freshwater marshes and marl prairies of the Florida peninsula. The Everglade snail kite feeds almost exclusively on the apple snail, so the continued existence and availability of this snail primarily decides the fate of the snail kite. The apple snail lives in freshwater wetlands with sparsely distributed emergent vegetation consisting predominantly of grass and sedge species. Managing the hydrology of these marshes is important to the survival of the snails. There are snail kite management zones within the northeast side of the East Everglades Addition (USACE and NPS 2008). It is anticipated that, with the proposed hydrologic and other habitat improvements associated with the Everglades restoration projects (including the Modified Water Deliveries project and the <i>Comprehensive Everglades Restoration Plan</i>), the kite could return to its historical habitat (USFWS 1999d) within Everglades National Park.</p> <p>Kites only rarely use the designated critical habitat within Everglades National Park. Important characteristics of critical habitat include availability of native apple snails, native herbaceous wetlands, and availability of nesting substrate such as small trees.</p>	
Analyzed	red knot	<i>Calidris canutus rufa</i>	Proposed threatened	<p>The red knot is a robin-sized, highly migratory shorebird that breeds in the arctic regions of North America and winters in southern South America, but also rarely in the southeastern United States and Central America. It makes one of the longest migrations of any bird species, and consequently, migration stopover sites are an important component of their habitat needs, primarily during spring migration.</p> <p>Red knots forage for mollusks on expansive intertidal areas and often are seen in large flocks of several hundred birds. High quality foraging habitat that is largely free of disturbance is important for red knots. The steepest decline in red knot population occurred since 2000 and is believed to be a result of limited food availability at key stopover sites in Delaware Bay, where a horseshoe crab fishery was reducing availability of prey. Timing of prey availability is also crucial during migration. Within Everglades National Park there are few sites that routinely support red knots during migration. However, red knots occur in Lake Ingraham, on Cape Sable, and in exposed intertidal areas of Florida Bay and mainland beaches during low tide.</p> <p>The red knot (rufa subspecies) was proposed for listing as threatened under the Endangered Species Act in September 2013 due to significant population declines (USFWS 2013c). No critical habitat for the red knot has been proposed.</p>	
REPTILES					
Analyzed	eastern indigo snake	<i>Drymarchon corais couperi</i>	Threatened	<p>The eastern indigo snake was first listed by the U.S. Fish and Wildlife Service as threatened in 1979 and has no designated critical habitat. The indigo snake is the longest of the North American snakes, with a heavy body and shiny blue-black coloring. This docile, nonvenomous snake has declined in numbers over the last 100 years because of habitat loss, pesticide use, and collection for the pet trade. Individuals require large areas with a variety of habitats, and areas of 10,000 acres or more may be essential for population viability. The U.S. Fish and Wildlife Service has categorized the species as declining, with strict enforcement of anti-collection laws needed (NatureServe 2008; USFWS 2008b).</p> <p>In the park, the indigo snake can be observed in wet prairie and hardwood hammock areas. It uses the burrows of other animals for denning or to lay eggs and may inhabit canal banks where there are numerous burrows. The preferred diet of these snakes is frogs, other snakes, toads, salamanders, small mammals, and birds. In summer, the eastern indigo snake ranges widely (over 125 to 250 acres) in search of prey, but in winter it stays close to the den (within 25 acres). A year-long road kill survey along Tamiami Trail found many reptiles and amphibians but documented no eastern indigo snakes (USFWS 2004c).</p> <p>No critical habitat for the eastern indigo snake has been designated.</p>	

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	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Analyzed	American alligator	<i>Alligator mississippiensis</i>	Threatened S/A — (similar in appearance)	<p>Since American alligators were first protected in 1967, before the Endangered Species Act, the species has made a dramatic comeback. In 1987, the U.S. Fish and Wildlife Service pronounced the species “fully recovered.” However, it remains protected as a threatened species because of its similarity in appearance to the threatened American crocodile. The alligator can be distinguished from the American crocodile by its broader snout and dark body color and it is found in freshwater and brackish water habitats.</p> <p>Alligators may live 30 years or more, reach lengths of 10 to 13 feet, and weigh 1,000 pounds at maturity. Alligators prey on fish, turtles, snails, and any animals that come to the water’s edge. They depend on wetland habitats, and in some ways the wetlands of the Everglades depend on them. An alligator uses its mouth and claws to uproot vegetation; then, slashing with its powerful tail, it wallows out a depression. This “alligator hole” is full of water in the wet season and holds water during the dry season. During extended droughts, ‘gator holes provide vital water for fish, insects, crustaceans, snakes, turtles, birds, and other animals in addition to the alligator (USFWS 2008a).</p>	
Analyzed	American crocodile	<i>Crocodylus acutus</i>	Threatened, Critical Habitat	<p>The American crocodile is listed by the U.S. Fish and Wildlife Service as threatened. Critical habitat was designated in 1979. The crocodile population in Florida, although small, appears stable. The American crocodile inhabits coastal habitats of extreme south Florida, including coastal areas of Miami-Dade, Monroe, Collier, and Lee counties. Crocodiles are regularly observed in Florida and Biscayne bays, and they are observed primarily in mangrove swamps, low-energy mangrove-lined bays, creeks, and inland swamps (Kushlan and Mazzotti 1989).</p> <p>The status of the American crocodile population in Florida was upgraded from endangered to threatened in 2007 (USFWS 2007e). It remains listed as endangered outside of Florida.</p> <p>Important characteristics of critical habitat include low salinity waters resulting from freshwater flows to the estuarine zone and sheltered bays and creeks protected from wave action and disturbance.</p>	
Analyzed	green sea turtle	<i>Chelonia mydas</i>	Endangered	<p>In 1978, the breeding populations of green sea turtles off Florida and the Pacific coast of Mexico were listed as endangered, while all other populations were listed as threatened (NMFS 2003a). Adult green sea turtles measure from 35 to 46 inches in straight carapace length and weigh 220 to more than 300 pounds.</p> <p>Green sea turtles range throughout the tropics worldwide. They are the only herbivorous sea turtle (Guseman and Ehrhart 1992). During the day, green sea turtles feed in the seagrass beds that grow in shallow waters. At night, they sleep on the shallow bottom and sometimes out of the water on rocky ledges. Although sea turtles are subject to predation throughout their life cycle, predation is particularly high during the first two years of life. Sharks prey on green sea turtles of all ages (NMFS 2003a). The greatest cause of decline in green sea turtle populations is commercial harvest for eggs, food, skin, and shells for jewelry. Incidental catch and mortality during commercial shrimp trawling adversely affects the species’ recovery (NMFS 2003a).</p> <p>Total population estimates for the green sea turtle are unavailable, and trends are particularly difficult to assess because of wide year-to-year fluctuations in numbers of nesting females, difficulties of conducting research on young turtles and time to reach reproductive maturity. The recovery team for the green sea turtle concluded that the species’ status has not improved appreciably since listing. Present estimates range from 200 to 1,100 females nesting on U.S. beaches (NMFS 2003a), and almost all U.S. nesting occurs on eastern Florida beaches between May and September (Guseman and Ehrhart 1992). The Dry Tortugas support the largest green turtle rookery in Monroe County. Green sea turtles are found in Florida Bay and along the west coast of the park.</p> <p>There is no designated critical habitat for green sea turtles in Florida.</p>	
Analyzed	hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	<p>The hawksbill sea turtle was listed as endangered in 1970, and its status has not changed since. The hawksbill sea turtle is a small to medium-sized sea turtle ranging worldwide throughout the tropics. In the Caribbean, nesting females average about 24 to 37 inches in straight carapace length (Meylan 1999). Weight is typically as much as 176 pounds in the wider Caribbean (NMFS 2003b). The hawksbill is a solitary nester, and thus population trends or estimates are difficult to determine; however, most researchers agree that the nesting population is declining. The major cause for the hawksbill’s continued decline is commercial exploitation for its shell and for other products, including leather, oil, perfume, and cosmetics (NMFS 2003b). Substantial incidental catch and mortality from commercial fishing, petroleum pollution in offshore waters, and entanglement in marine debris, such as monofilament line, have also been documented.</p> <p>In Florida, only a few hawksbill nests are documented each year (Meylan 1992). Hawksbill sea turtles inhabit the waters of the Dry Tortugas, Florida Bay, and along the west coast of the park (Smith 2001).</p> <p>Post-hatchling hawksbills are seagoing, but juveniles through adults use coral reefs as foraging habitat and prey on sponges. Hawksbills are also known to inhabit mangrove-fringed bays and estuaries, particularly along the eastern shore of continents where coral reefs are absent. Both insular and mainland nesting sites are known. Hawksbills will nest on small pocket beaches, and they nest in a variety of soils. Nests are typically placed under vegetation (NMFS 2003b).</p> <p>There is no designated critical habitat for hawksbill sea turtles in Florida.</p>	

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Analyzed	Kemp’s Ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	<p>The Kemp's Ridley sea turtle was federally listed as endangered throughout its range in 1970, and its status has remained unchanged. The Kemp's Ridley population has declined since 1947, when an estimated 42,000 females nested in one day, to a nesting population of approximately 1,000 in the mid-980s. The decline of this species was primarily due to human activities, including collection of eggs, fishing for juveniles and adults, killing adults for meat and other products, and incidental take by shrimp trawlers. Today, under strict protection, the population appears to be in the earliest stages of recovery due to full protection of nesting females and their nests in Mexico, and the requirement to use turtle excluder devices in shrimp trawls both in the United States and Mexico (NMFS 2003c).</p> <p>The Kemp's Ridley is the smallest of all extant sea turtles, with the weight of an adult generally less than 100 pounds and the straight carapace length around 26 inches. Adult Kemp's Ridley shells are almost as wide as long. Hatchling Kemp's Ridley's feed on the available sargassum and associated fauna occurring in the Gulf of Mexico. Juvenile and adult Kemp's Ridleys are largely crab eaters, with a preference for portunid crabs, and live in a wide variety of coastal benthic habitats, usually sand or mud bottoms.</p> <p>The major nesting beach for Kemp's Ridleys is on the northeastern coast of Mexico. The species occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Nesting in Florida is incidental, but adult Kemp's Ridleys can be found in Florida’s coastal waters (Meylan 1992).</p>	
Analyzed	leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	<p>The leatherback sea turtle was listed as endangered throughout its range in 1970. Nesting populations of leatherback sea turtles are especially difficult to discern because the females frequently change beaches. However, current estimates are that 20,000 to 30,000 female leatherbacks exist worldwide. Leatherbacks do not nest frequently enough in the United States to assess an accurate trend. In the Atlantic and Caribbean, the largest nesting assemblages are found in the U.S. Virgin Islands, Puerto Rico, and Florida. Nesting data for these locations since the 1980s suggest that the annual number of nests is likely stable; however, information regarding the status of the entire leatherback population in the Atlantic is lacking. The population faces significant threats from incidental take in commercial fisheries, marine pollution, harvest of eggs and flesh, and habitat destruction (NMFS 2003d).</p> <p>The leatherback sea turtle is the largest living species of turtle. The average curved carapace length for adult turtles is 60 inches, and the turtles can weigh from 440 to 1,500 pounds (NMFS 2003d). The bulk of the leatherback diet consists of jellyfish (Pritchard 1992).</p> <p>The leatherback turtle is an extremely wide-ranging species. Nonbreeding turtles in the Atlantic may occur from Canada to Argentina, while breeding adults nest on tropical, usually mainland, shores in the Atlantic, Indian, and Pacific oceans (Pritchard 1992). Critical habitat for the leatherback includes the waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands. During the summer, leatherbacks tend to occur along the east coast of the United States from the Gulf of Maine south to the middle of Florida (NMFS 2003d). No nesting occurs on U.S. beaches.</p> <p>There is no designated critical habitat for leatherback sea turtles in Florida.</p>	
Analyzed	loggerhead sea turtle	<i>Caretta caretta</i>	Threatened, Proposed Critical Habitat	<p>Loggerhead sea turtles were federally listed as threatened in 1978 because of past overhunting for its meat, leather, eggs, and fat. They winter in shallow waters and feed near the water surface, both of which make them susceptible to being caught in shrimp trawl nets and drowning (Texas Parks and Wildlife 2009).</p> <p>Loggerheads have characteristically large, block-like heads, strong jaws, and a ruddy brown carapace on top. They are among the larger sea turtles, as long as 45 inches in length and weighing 170 to 500 pounds. A slow swimmer compared to other sea turtles, this species is more likely to fall prey to larger, faster predators. Throughout their entire lives, they are at risk of becoming prey to different predators—from crabs when they are hatchlings to sharks when they are fully grown. Their life span is about 30 years, but can exceed 50 years. Loggerhead turtles are life-long carnivores. They feed on fish, crab, shrimp, sponges, squid, jellyfish, and various other animals throughout the stages of their lives. Loggerhead turtles can be observed in various environments: the brackish waters of coastal lagoons; the open sea; and at the bottom of sounds, bays, and estuaries where they remain dormant in winter. Their primary nesting beaches are along the southeastern coast of the United States, from North Carolina to Florida, where each female can lay as many as 190 eggs per nest. They are the only sea turtle that can nest outside the tropics, as long as the water temperature is above 68 degrees Fahrenheit (FWC 2010b). Loggerheads are known to nest on the sand beaches of Cape Sable, Highlands Beach, and islands with sand beaches. In 2009, more than 1,000 nests were estimated to occur within the park.</p> <p>In 2013, U.S. Fish and Wildlife Service and NOAA separately proposed to designate critical habitat for loggerhead sea turtles within their areas of jurisdiction, including land and water within Everglades National Park (USFWS 2013d; NMFS 2013). The U.S. Fish and Wildlife Service proposed critical habitat includes beaches and shoreline along portions of Cape Sable, Highlands Beach, and Shark Point, while the NOAA proposal includes the waters offshore of those areas. Important characteristics of these proposed critical habitats include unaltered sandy beaches (USFWS) and unimpeded access for hatchlings from shore to deeper waters (NOAA).</p>	

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
FISHES					
Analyzed	smalltooth sawfish	<i>Pristis pectinata</i>	Endangered, Critical Habitat	<p>The lone endangered fish species that occurs in the park is the smalltooth sawfish. The smalltooth sawfish is a tropical marine and estuarine elasmobranch (the ray and skate family) that was listed as endangered in 2003. Smalltooth sawfish may grow as long as 18 feet long and sport an elongated, blade-like snout studded with numerous teeth on either side. Habitat destruction and overfishing have eradicated this species from its former range of New York to Texas. The last remaining U.S. population inhabits the waters of Florida Bay (Florida Museum of Natural History 2010b) and the Charlotte Harbor Estuary (NMFS 2009a). Critical habitat for the smalltooth sawfish was designated by the National Marine Fisheries Service in September 2009 (NMFS 2009a, see figure 5 at the end of this table).</p> <p>The smalltooth sawfish diet consists of small schooling fish such as mullets and clupeids. They are also reported to feed on crustaceans and other benthic-dwelling organisms. According to a status review, sawfish inhabit sheltered bays with shallow coastal waters very close to shorelines in muddy and sandy bottoms (NMFS 2000). Sawfish seldom reside in waters deeper than 32 feet (10 meters).</p> <p>Designated smalltooth sawfish critical habitat encompasses most of the nearshore waters of Florida Bay and the Ten Thousand Islands region of Everglades National Park. Important characteristics of critical habitat include shallow (less than 3 feet) euryhaline estuarine waters resulting from freshwater flows to estuarine waters and red mangroves. These characteristics support young sawfish.</p>	
Dismissed	dusky shark	<i>Carcharhinus obscurus</i>	Species of Concern	Dusky sharks are found in the western Atlantic, ranging from Nova Scotia to Cuba to southern Brazil. They spend the summers in the north and migrate south in winter. They can be found in the surf zone to offshore depths of 1,312 feet (400 meters). They are not commonly found in estuaries. The principal threat to the sharks is from recreational fisheries. In 2000 possession was outlawed in commercial fisheries. Dusky sharks are susceptible to overfishing and by catch in longline and gillnet fisheries.	The dusky shark is not commonly found in estuary environments. Management actions proposed in this document would not directly affect the population of the sharks. The principal threat to the sharks is overfishing. The general management plan alternatives would not provide further protection of the sharks from this threat. Proposed actions such as larger protected areas in Florida Bay might provide indirect marginal benefits to the species through protection of important fisheries habitats. There would be no marked difference in the effects on sharks from the various alternatives; therefore, this species was not carried forward for full analysis.
Dismissed	opossum pipefish	<i>Microphis branchyurus</i>	Species of Concern	The opossum pipefish are a widespread diadromous species that spawn in brackish waters or the low-salinity areas of estuaries. The young live in the open ocean for an indeterminate time and return to fresh water to reproduce. In the United States, permanent populations only occur in southeastern Florida tributaries. In Florida, breeding occurs in freshwater tributaries with dense emergent vegetation dominated by <i>Panicum</i> spp. and <i>Polygonum</i> sp. The pipefish prey on crustaceans and small fish. Major threats to this species are habitat destruction from nonnative plant treatments, water control structures that prevent migration and alter hydrologic regimes, declining water quality, and increasing disease.	The population of the opossum pipefish in the brackish waters in the park depends on the hydrology and water quality of the Everglades ecosystem. Although ongoing projects designed to improve water flow and quality in the park may affect the pipefish, these actions are not part of this general management plan. It is not anticipated that actions proposed in the alternatives of this plan would affect the pipefish or their habitat. Therefore, this species was not carried through for full analysis.
Dismissed	saltmarsh top-minnow	<i>Fundulus jenkinsi</i>	Species of Concern	The saltmarsh topminnow is endemic to brackish waters from Texas to the western panhandle of Florida. They are generally associated with salt marshes and brackish water and breed in flooded marshes. Habitat alteration, dredging, and marsh erosion are the most serious threats to the species.	Based on National Marine Fisheries distribution maps for the saltmarsh topminnow, the species is not found within the park (NMFS 2009b). If it does occur in the park, it would most likely occur in the northwestern portion in the area of the Thousand Islands. Activities proposed in the alternatives for this portion of the park would not have detectable effects on the distribution or population of this species, and therefore this species was not carried through for full analysis.
Dismissed	Goliath grouper	<i>Epinephelus itajara</i>	Species of Concern	The goliath grouper occurs in the North Atlantic from Florida, south to Brazil. The current center of abundance of the Gulf of Mexico population of the goliath grouper is thought to be the Ten Thousand Islands region, where extensive mangrove habitat exists. This grouper occurs in shallow, inshore waters to depths of 150 feet. It prefers areas of rock, coral, and mud bottoms. Juveniles are found in mangroves and brackish estuaries. This grouper preys on crustaceans, fish, and young sea turtles. Juvenile mangrove habitat destruction has been a principal factor in the decline of the species in south Florida, particularly early in the 20th century (NMFS 2006b). Given its large size, slow growth, and slow reproductive rate, the goliath grouper is also susceptible to overfishing. In the United States, take of this species is prohibited (Florida Museum of Natural History 2010a).	Mangroves are abundant near this species’ center of abundance (Ten Thousand Islands). The alternative management actions do not markedly affect the mangrove habitat in this area of the park. Therefore there would be no expected change in the population or distribution of the species as a result of the proposed management actions, and this species was not carried through for full analysis.
Dismissed	key silverside	<i>Menidia conchorum</i>	Species of Concern	The key silverside is a small species occurring in swift-moving schools. It is currently found in the Florida Keys from Key West to Long Key. Its main habitats are tidal creek, lagoon, and pond waters of varying salinity. It is commonly found in the rhizomes of black mangrove trees or in areas of turtle grass and other macroalgae, where it is less vulnerable to predation. Habitat destruction through loss of ponds and black mangroves has resulted in a decline of this species. Introduced bluegill are resulting in loss of silverside populations as well.	This species is not currently known to occur in the park. If the species migrates to the southern boundary of the park, the pole/troll zones in the NPS preferred alternative and alternative 4 might provide some negligible to minor benefit to the species through protection of seagrass habitat. Because the impacts would likely only be negligible to minor, this species was not carried through for full analysis.

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Dismissed	mangrove rivulus	<i>Rivulus marmoratus</i>	Species of Concern	The mangrove rivulus is a small fish species that occurs in the mangrove system of Florida Bay and throughout keys. This species is extremely vulnerable to habitat modification and fragmentation, environmental alteration, and human development and encroachment. Much of its habitat has been isolated and fragmented as a result of the destruction of mangroves and impounding of high marshes.	The proposed management actions do not markedly affect the mangrove habitat in the park, although some protection from wave action would occur with idle speed, no-wake areas and pole/troll areas. Therefore, there would be no expected change in the population or distribution of the species as a result of the proposed management actions, and this species was not carried through for full analysis.
Dismissed	Nassau grouper	<i>Epinephelus striatus</i>	Species of Concern	Nassau groupers are predatory fish found from inshore to depths of about 330 feet in many areas of the Caribbean and south Atlantic. Adults are found near high-relief coral reefs and rocky bottoms, and juveniles are found at shallower depths in and around coral clumps covered with microalgae and above seagrass beds. They feed mostly on fishes and crabs. The Florida and Caribbean populations of the species are considered overfished by the National Marine Fisheries Service. The species occurs all along Florida’s coast and in marine areas of park. Fishing pressure is no longer occurring in the United States because it is illegal to possess a Nassau grouper. In addition, there is no record of any Nassau grouper spawning aggregations in the NMFS jurisdictional waters that would include Everglades National Park.	The proposed management actions would not directly affect the Nassau grouper population. The principal threat to this species is overfishing, particularly at spawning aggregation sites. The general management plan alternatives would not provide further protection of the species from this threat. There would be no marked difference in the negligible effects on sharks from the various alternatives; therefore, this species was not carried forward for full analysis.
Dismissed	Sand tiger shark	<i>Carcharias taurus</i>	Species of Concern (western Atlantic)	The sand tiger shark is a coastal species in the Atlantic and Gulf of Mexico, including all coastal areas of Florida. The shark is usually found from the surf zone down to a depth of 75 feet. It has also been noted in shallow bays, around coral reefs, and at depths of as much as 600 feet. Threats to the species include overfishing and low rates of reproduction, and juveniles are vulnerable to pollution in estuaries.	The proposed management actions would not directly affect the sand tiger shark population. Given the current threats to the species from overfishing and pollution, the management alternatives would not further protect the species from this threat. Proposed actions such as larger protected areas in Florida Bay might provide indirect marginal benefits to the species through protection of important fisheries habitats. There would be no marked difference in the effects on sand tiger sharks from the various alternatives; therefore, this species was not carried forward for full analysis.
INVERTEBRATES					
Dismissed	Stock Island tree snail	<i>Orthalicus reses reses</i>	Threatened	<p>Stock Island tree snails are large, buff-colored, conical snails, about 2 inches long. The species is hermaphroditic and lives about six years. The snails are active during the rainy season and enter a dormant stage during the dry months of December through May. Nests are built in September and contain about 8 to 20 eggs, which hatch in June. These snails graze on fungi and algae that grow on both smooth and rough-barked trees of hardwood hammocks. The historical range includes natural hammocks of Stock Island and Key West within the Florida Keys, but the species has recently been observed only in one hammock on Stock Island (USFWS 1992).</p> <p>The Stock Island tree snail has declined in population largely because of the destruction of habitat. There is no direct competitor with this species for food. Individuals are also lost to predation by cats and rodents. Recovery efforts have included collection of wild specimens for captive breeding. Additional sites in the Florida Keys are being investigated for reintroduction, and The Nature Conservancy has been contracted to enhance the current stock (USFWS 1992).</p>	Found only in tropical hardwood hammocks on Stock Island and Key West; distribution has been extended by collectors who have introduced them to Key Largo and the southernmost parts of the mainland (USFWS 1999h); known habitat is outside the general management plan potential area of affect.
Dismissed	Schaus swallowtail	<i>Heraclides aristodemus ponceanus</i>	Endangered	<p>The Schaus swallowtail butterfly was first described in 1911 from collections in the Miami area. From 1924 to 1981 there was a general decline in range and numbers. The species was listed as threatened in 1976 because of population declines caused by the destruction of its tropical hardwood hammock habitat, mosquito control practices, and over-harvesting by collectors. The Schaus swallowtail butterfly was reclassified as an endangered species in 1984 because its numbers and range had declined dramatically since its initial listing (USFWS 1999).</p> <p>The butterfly occurs exclusively in subtropical hardwood hammocks and ecotones. Hammocks are now extensive only in the Upper Keys in Miami-Dade and Monroe counties. About half of the remaining suitable habitat is in Biscayne National Park. Most of the population in that park is on Elliott Key, with smaller populations on Adams, Old Rhodes, Swan, and Totten keys.</p>	Known occupied habitat for this butterfly occurs only on north Key Largo, Crocodile Lake National Wildlife Refuge, and keys in Biscayne National Park—i.e., not in Everglades National Park (USFWS 2008d). Therefore, this species was not carried forward for full analysis.

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Dismissed	Miami blue butterfly	<i>Cyclargus thomasi bethunebakeri</i>	Endangered	<p>Primarily a south Florida coastal species, the Miami blue butterfly’s historical distribution ranged as far north as Hillsborough County on the Gulf Coast, Volusia County on the Atlantic Coast, and south to the Florida Keys and the Dry Tortugas. The species was believed to have been extirpated until it was rediscovered in Bahia Honda State Park in 1999; a second metapopulation was discovered in the Key West National Wildlife Refuge in 2006. Both areas are on the Florida Keys. The Miami blue butterfly was added to the list of federal candidate species in 2005 because of the overall magnitude of threats (high) and immediacy of threats (imminent) (FFWCC 2010a).</p> <p>The Miami blue occurs at the edges of tropical hardwood hammocks, in beachside scrub, and occasionally on pine rocklands. This butterfly lays its eggs on flowers, flower buds, and terminal growth of its host plants.</p> <p>Historically, this species was known to occur in the Royal Palm Hammock, Chokoloskee, and Flamingo areas of Everglades National Park, but the Miami blue is now believed to be extirpated from the park. Reintroduction attempts in 2004 did not establish viable populations.</p> <p>The Miami blue was emergency listed as endangered in August 2011, and then listed as endangered on April 6, 2012, upon publication of the final rule in the Federal Register (USFWS 2012b). No critical habitat has been proposed.</p>	<p>This species is believed to be extirpated from Everglades National Park, and the only known populations occur in the Florida Keys—in Bahia Honda State Park and the Key West National Wildlife Refuge. Therefore, this species was not carried forward for full analysis.</p> <p>Despite the fact that the Miami blue is believed to be extirpated from Everglades National Park, there remains potential for it to become established in the future within the park. In this manner, the park may contribute to its recovery. However, none of the actions proposed in the GMP alternatives are expected to adversely affect Miami blue butterfly recovery or potential habitat within the park, and all alternatives will generally provide equal levels of protection and maintenance of potential habitat. Future projects or actions that may affect the Miami blue butterfly in the park will be considered in coordination with USFWS and FWC.</p>
Dismissed	Florida leafwing butterfly	<i>Anaea troglodyta floralis</i>	Endangered, Critical Habitat	<p>The Florida leafwing is a medium-sized butterfly, measuring as long as 3 inches. It is restricted to the pine rocklands of Long Pine Key. Larvae depend on pineland croton (<i>Croton linearis</i>) as a food source. Adult Florida leafwings have been observed regularly in a widespread area of Long Pine Key over the last several years but do not appear to be abundant. The population size of Florida leafwings in Long Pine Key is estimated to be several hundred or fewer individuals (USFWS 2013e).</p> <p>Although individuals are observed in the park, this species has suffered range-wide decline outside the park. The Florida leafwing is now believed to be extant only within the boundaries of Everglades National Park (USFWS 2013e). Within the park, individuals and populations are threatened by displacement of host plants by nonnative invasive species, fire suppression activities, and improper fire intervals. Illegal collecting may also pose a threat to this species because of its rarity. The effects of these threats, alone and in combination, on populations of Florida leafwing in the park are largely unknown. USFWS (2013e, 2013f) recently proposed listing the Florida leafwing as endangered and included designation of critical habitat in the proposed rule. USFWS (2014b, 2014c) released the final rule to list the Florida leafwing as endangered and designate critical habitat. Critical habitat includes much of the pine rockland habitat within Long Pine Key. Important components of proposed critical habitat include large areas of native pine rockland communities that support the butterfly’s host plant, pineland croton. A natural disturbance regime, low levels of invasive plants, and absence of pesticides are also important within critical habitat.</p> <p>Prescribed fire is currently used in pine rocklands to maintain habitat for pineland croton. Post fire monitoring of pineland croton and of this butterfly species is also being carried out. The combination of prescribed fire, lack of soil disturbance and localized control measures maintains nonnative vegetation at very low levels in the park’s pine rocklands. Current management related to this species is expected to continue to benefit Florida leafwing populations by maintaining pine rockland habitat. These actions will be modified over time as new information on this species is better understood.</p>	<p>No development or other impacts to undisturbed areas in Long Pine Key are proposed in this general management plan. It is not anticipated that actions proposed in any of the alternatives in this plan would affect this species or any of the areas of critical habitat. Therefore, this species was not carried through for full analysis.</p>
Dismissed	Bartram’s hairstreak butterfly	<i>Strymon acis bartrami</i>	Endangered, Critical Habitat	<p>The Bartram’s scrub-hairstreak is a small butterfly, measuring 1 inch long. It is restricted to the pine rocklands of Miami-Dade County, both within and outside of Everglades National Park and on Big Pine Key in Monroe County. Larvae depend on pineland croton (<i>Croton linearis</i>) as a food source. Adult Bartram’s scrub-hairstreak butterflies have been observed regularly in a widespread area of Long Pine Key over the last several years but do not appear to be abundant. The population of Bartram’s scrub-hairstreak in Long Pine Key is estimated to be in the hundreds at most (USFWS 2013e).</p> <p>Although individuals are observed in the park, this species has suffered rangewide decline outside the park. Within the park, individuals and populations are threatened by displacement of host plants by nonnative invasive species, fire suppression activities, and improper fire intervals. Illegal collecting may also pose a threat to this species because of its rarity. The effects of these threats, alone and in combination, on populations of Bartram’s scrub-hairstreak in the park are largely unknown. The U.S. Fish and Wildlife Service (2013d, 2013e) recently proposed listing the Florida leafwing as endangered and included designation of critical habitat in the proposed rule. USFWS (2014b, 2014c) released the final rule to list the Florida leafwing as endangered and designate critical habitat. Critical habitat includes much of the pine rockland habitat within Long Pine Key. The important characteristics of critical habitat are the same as those described for the Florida leafwing, above.</p> <p>Prescribed fire is currently used in pine rocklands to maintain habitat for pineland croton. Post fire monitoring of pineland croton and of this butterfly species is also being carried out. The combination of prescribed fire, lack of soil disturbance and localized control measures maintains nonnative vegetation at very low levels in the park’s pine rocklands. Current management related to this species is expected to continue to benefit Bartram’s scrub-hairstreak populations by maintaining pine rockland habitat. These actions will be modified over time as new information on this species is better understood.</p>	<p>No development or other impacts to undisturbed areas in Long Pine Key are proposed in this general management plan. It is not anticipated that actions proposed in any of the alternatives in this plan would affect this species or any of the areas of critical habitat. Therefore, this species was not carried through for full analysis.</p>

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Dismissed	Cassius blue butterfly	<i>Leptotes cassius theonus</i>	Threatened S/A (similar in appearance)	The cassius blue butterfly is a common butterfly in South Florida. It is frequently encountered in Everglades National Park. Due to the difficulty in distinguishing this species from the Miami blue, the cassius blue butterfly was listed as threatened due to similarity of appearance to the Miami blue butterfly (USFWS 2012b). The rule prohibits collecting cassius blue butterflies within the historic range of the Miami blue butterfly.	Collection of cassius blue butterflies would not occur as a direct result of any of the activities proposed in this general management plan. As a result, the cassius blue butterfly was not carried through for analysis.
Dismissed	Ceraunus blue butterfly	<i>Hemiargus ceraunus antibubastus</i>	Threatened S/A (similar in appearance)	The ceraunus blue butterfly is a common butterfly in South Florida. It is frequently encountered in Everglades National Park. Due to the difficulty in distinguishing this species from the Miami blue, the ceraunus blue butterfly was listed as threatened due to similarity of appearance to the Miami blue butterfly (USFWS 2012b). The rule prohibits collecting ceraunus blue butterflies within the historic range of the Miami blue butterfly, which includes Everglades National Park.	Collection of ceraunus blue butterflies would not occur as a direct result of any of the activities proposed in this management plant. As a result, the ceraunus blue butterfly was not carried forward for analysis.
PLANTS					
Dismissed	Blodgett’s silverbush	<i>Argythamnia blodgettii</i>	Candidate	<p>Blodgett’s silverbush is a small, semi-woody, perennial plant that grows as tall as 2 feet. The leaves are long and slender, and the stems and leaves are covered with fine hairs. It is known to occur only at the edges of pine rocklands, in hammocks, and along coastal berms. It requires sunny sites and periodic low-intensity fires to reduce competition from larger woody species. This species can tolerate a degree of disturbance, having been identified in abandoned rock quarries (USFWS 2009a).</p> <p>Currently, fewer than 10,000 individuals are known to exist, with 90% of these restricted to 11 protected areas, including the eastern portions of Everglades National Park. This species is a candidate species for listing by the U.S. Fish and Wildlife Service. Habitat loss is the primary threat to this species, with extirpation having occurred even in protected areas as a result of development. Other threats include fire suppression, nonnative plant invasion, and changes to the regional hydrology. This species is also highly susceptible to extirpation by catastrophic events (USFWS 2009a).</p>	No development is proposed in undisturbed areas where this plant occurs, in any GMP alternative. Should this change, surveys would be completed prior to any ground disturbance to determine if this (or other special status species) is present, and appropriate mitigation would be provided. Therefore, this species was not carried through for full analysis.
Dismissed	Garber’s spurge	<i>Chamaesyce garberi</i>	Threatened	<p>Garber’s spurge is a small (0.5 inch long), perennial, herbaceous plant with hairy stems and oval leaves. The flowering and fruiting period is from March to December, and this plant is generally thought to reproduce by seed. Garber’s spurge is endemic to south Florida and formerly occurred in Dade and Monroe counties from the Miami area to the Lower Florida Keys—between rockland hammocks and rock pinelands and on beach ridges in saline coastal areas. It needs open, sunny areas that have frequent fires to maintain suitable habitat, and it prefers thin, sandy soils (USFWS 1991b, 1999c).</p> <p>The plant was listed as threatened in 1985 because of habitat loss from development. It apparently no longer exists on eight of the Florida Keys, and it has not been observed in the Miami area since 1949. The plant’s current populations are present at four sites in Everglades National Park in Dade and Monroe Counties and at one privately owned site on Big Pine Key in Monroe County. The population of this species is estimated to exceed 600,000 individuals in the Cape Sable area (Green et al. 2007a) and 4,800 individuals in Long Pine Key (Green et al. 2007b). No populations or individuals of Garber’s spurge are known to occur on or near developed trails, and none are found in areas generally accessed by visitors. Three of the known sites are in coastal locations, where there is a risk of destruction by storms or hurricanes. A potential threat in some locations is the lack of periodic fire to control successional vegetation that might overshadow this plant (USFWS 1991b, 1999c).</p> <p>In the South Florida Multiple Species Recovery Plan, one objective is to stabilize the Garber’s spurge population and then delist the species. This could occur when the remaining population is free from the threats of further development, fire suppression, and nonnative species invasion, and when population levels are determined to ensure 95% probability of persistence for 100 years (USFWS 1999e). Monitoring of Garber’s spurge in the park is scheduled to occur once every five years to track changes in populations.</p>	Visitor access and use of habitat occupied by Garber’s spurge in both Long Pine Key and the Cape Sable area is very limited. No populations or individuals are known to occur on or near developed trails and they this species is not found in areas generally accessed by visitors. These conditions would not change as a result of any actions Proposed in the GMP alternatives.
Dismissed	Pineland sandmat	<i>Chamaesyce deltoidea</i> spp. <i>pinetorum</i>	Candidate	<p>Pineland sandmat is a small, perennial, herbaceous plant that forms small tufts. The stems have long hairs and irregularly shaped leaves. It is known to occur only in pine rocklands along the Miami Rock Ridge in southern Dade County. It is not shade tolerant, and it requires periodic low-intensity fires to reduce competition by woody species.</p> <p>Loss of pine rockland habitat, fire suppression, and invasion by nonnative species have reduced the population of this species to around 10,000 individuals. This species is a candidate species for listing by the U.S. Fish and Wildlife Service. About 90% of these individuals occur in seven protected areas: Everglades National Park, Florida City Pineland, Navy Wells Pineland, Palm Drive Pineland, Pine Ridge Sanctuary, Rock Pit 39, and Seminole Wayside Park. Except for the national park, all of these sites are managed by Miami-Dade County. Pineland sandmat is covered under the U.S. Fish and Wildlife Service South Florida Multiple Species Recovery Plan, which emphasizes conservation of the remaining pine rockland communities (USFWS 2003b).</p>	In the park, the plant occurs near Long Pine Key. Threats to this species are not imminent because fire management is regularly conducted at the site of largest occurrence. No development in undisturbed areas at Long Pine Key is proposed in this plan. Should this change, surveys would be completed before any ground disturbance to determine if this (or other special status species) is present, and appropriate mitigation would be provided. Thus, this species was not carried on for full analysis.
Dismissed	Crenulate lead-plant	<i>Amorpha crenulata</i>	Endangered	<p>The crenulate lead-plant is an endangered shrub growing to about 8 feet high with compound leaves of 20 to 30 leaflets. Lead-plants blossom in the spring, bearing clustered flowers with a single, tiny petal and seed pods 0.25 inch long. They inhabit the pine rockland community and historically occurred along the slightly elevated south Florida limestone ridge, from southeastern Broward County to Long Pine Key in Everglades National Park.</p> <p>Because an estimated 98% of the Dade County pinelands outside Everglades National Park have been destroyed by development, the crenulate lead-plant now occurs mainly in protected areas, with less than 50 individuals known to exist in two metropolitan Miami parks. Fire suppression may also affect the species, because pine rocklands depend on periodic fires to prevent succession to hardwoods. Invasion of nonnative plants, such as Brazilian pepper and a large reed, present an additional threat. Crenulate lead-plant is now so limited in number that that any collecting,</p>	In Everglades National Park, crenulate lead-plant occurs as a single, planted individual that persists from cultivation in a developed area. This species was not historically found in the park and is not considered to be native to the park. As a result, this species was not carried through for full analysis.

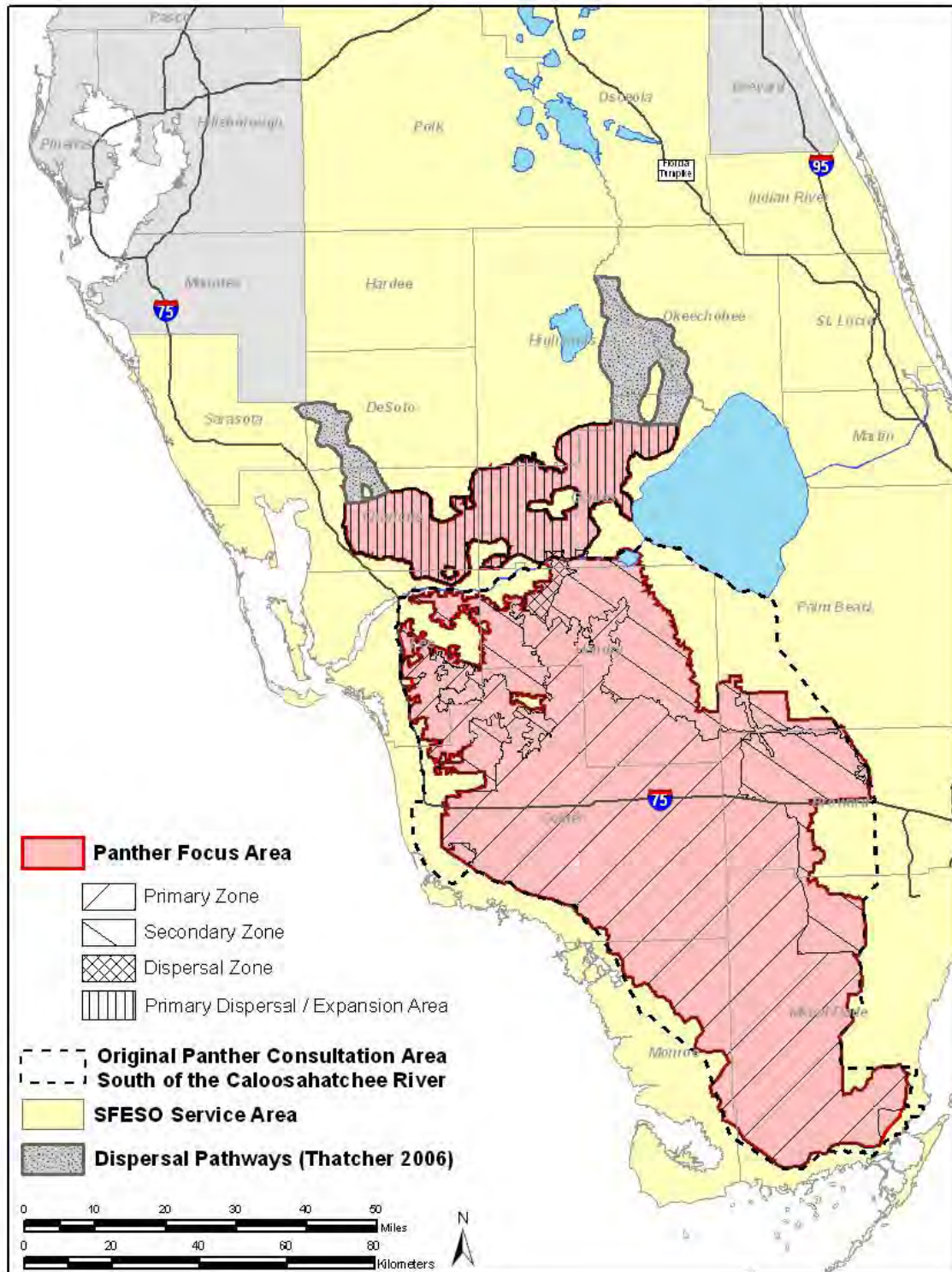
TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
				scientific or otherwise, could adversely affect its status (USFWS 1991a).	
Dismissed	Florida prairie clover	<i>Dalea carthagenensis</i> var. <i>floridana</i>	Candidate	<p>Florida prairie clover is a shrub that reaches 6 feet tall and bears small pea-like flowers on spikes. It is known to occur only in pine rocklands, edges of ham-mocks, and coastal uplands. Currently, this species is known to occur only in protected lands at Big Cypress National Preserve, at two Miami-Dade parks (the Deering Estate and Matheson Hammock), and along the eastern edge of the park.</p> <p>Most of the Florida prairie clover habitat has been destroyed by human activities. This species is also threatened by fire suppression and invasion of nonnative plants. The remaining population is estimated at fewer than 1,000 individuals, perhaps as few as 200 to 300. Catastrophic events such as a hurricane or tropical storm could imperil the species, given its limited range and low population.</p> <p>This species is a candidate species for listing by the U.S. Fish and Wildlife Service. No specific conservation activities are being undertaken to protect Florida prairie clover. The U.S. Fish and Wildlife Service has an ecosystem-based multiple species recovery plan for the threatened and endangered species of south Florida that emphasizes conservation of rockland communities (USFWS 2003c).</p>	Recent surveys to locate the Florida prairie clover in Everglades National Park have not been successful (NPS 2010). This species is considered to be extirpated from the park. Thus this species was not carried through for analysis.
Dismissed	Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	Endangered, Critical Habitat	<p>Cape Sable thoroughwort is a flowering herb that reaches approximately 3 feet in height and bears 25 or more small, fragrant, blue or violet flowers. The plant is most commonly seen in full sun or partial shade on the edges of hammocks and in coastal rock barrens. This species tolerates some disturbance and may become abundant following hurricanes. Cape Sable thoroughwort historically ranged through the Florida Keys and into the Cape Sable area of Everglades National Park.</p> <p>Cape Sable thoroughwort was proposed for listing as endangered in 2013, and was listed as endangered in January 2014 (USFWS 2013g). Critical habitat was also designated and includes significant acreage in coastal regions of Everglades National Park (USFWS 2014d). The primary threats to this species in the park are nonnative plant invasions and sea level rise, both of which may alter habitat and displace individuals. Important characteristics of critical habitat in the park are native hardwood hammock and buttonwood forests with semi-open canopy and calcareous soils.</p> <p>Nonnative plant control in the Flamingo region of Everglades National Park may indirectly benefit Cape Sable thoroughwort through habitat maintenance. NPS staff also monitor the status of populations by conducting periodic surveys of known sites and by surveying for additional sites within the park.</p>	No development or actions that may impact Cape Sable thoroughwort are proposed in this general management plan. It is not anticipated that actions proposed in any of the alternatives in this plan would affect this species or any of the areas designated as critical habitat. Thus this species was not carried through for analysis.
Dismissed	Everglades bully	<i>Sideroxylon reclinatum</i> ssp. <i>austrofloridense</i>	Candidate	<p>The Everglades bully is an upright shrub that reaches 3 to 6 feet in height. Its branches are smooth, slightly geniculate, and somewhat spiny, with thin, obovate or ovate evergreen leaves that are persistently pubescent (fuzzy) on their undersides, a distinguishing characteristic from the other two subspecies of <i>S. reclinatum</i>. The Everglades bully is restricted to pinelands with tropical understory vegetation on limestone rock (pine rocklands) (USFWS 2009c).</p> <p>The largest population of Everglades bully occurs in the Long Pine Key area of the park, an area of pine rockland surrounded by wetlands. The species has been seen in pinelands east of the park, the Nixon-Lewis Hammock (where the pinelands have since been destroyed), two privately owned sites, and four small occurrences in Miami-Dade County; a known population also exists in Big Cypress National Preserve, south of the Loop Road (USFWS 2009c).</p> <p>Abundance estimate for the species is 10,000 to 100,000 individuals. This species is a candidate species for listing by the U.S. Fish and Wildlife Service (USFWS 2009c).</p> <p>Habitat destruction and degradation remain the primary threats to this species. In Miami-Dade County, pine rocklands (including patches of marl prairie) have been reduced to about 11% of their former extent (USFWS 2009c). The Everglades bully is threatened to some extent by invasive nonnative plant species and fire suppression. Individuals of the Long Pine Key population are found on or adjacent to hiking trails, and occasionally off-trail hiking may result in trampling. In the long term, global climate change and sea level rise further threaten the species' habitat. No specific conservation activities are being undertaken to protect the Everglades bully. Miami-Dade County has undertaken efforts to conserve pine rocklands and tropical hardwood hammocks. Everglades National Park and Big Cypress National Preserve are conservation areas, with pinelands managed to maintain the natural vegetation, which includes the Everglades bully (USFWS 2009c).</p>	Within the park, this species occurs in the Long Pine Key area. Current management in the park includes an active plant control program as well as application of prescribed fire. No development in undisturbed areas at Long Pine Key is proposed in this general management plan. Should this change, surveys would be completed before any ground disturbance to determine if this species (or other special status species) is present, and appropriate mitigation would be provided. Therefore, this species was not carried through for full analysis.

TABLE 10. FEDERALLY LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF EVERGLADES NATIONAL PARK

	Common Name	Scientific Name	Status	Habitat Comments and Other Notes	Reasons for Dismissing from Detailed Analysis, if Dismissed
Dismissed	Everglades crabgrass	<i>Digitaria pauciflora</i>	Candidate	Everglades crabgrass, also known as Florida pineland crabgrass, is a is a blue-green to gray bunch grass that forms mounds of as much as 3 feet (1 meter) in diameter (Center for Plant Conservation 2010). This species is a rhizomatous perennial with flexuous or twisted leaf blades that are hairy on both surfaces. Reproduction is sexual, and the species fruits in the fall (USFWS 2009b). Everglades crabgrass occurs in rocky pinelands and is only known to occur within Long Pine Key in Everglades National Park and in Big Cypress National Preserve.	In the park, this species occurs in the Long Pine Key area. Current management in the park includes an active nonnative plant control program as well as application of prescribed fire. No development in undisturbed areas at Long Pine Key is proposed in this general management plan. Should this change, surveys would be completed before any ground disturbance to determine if this (or other special status species) is present, and appropriate mitigation would be provided. Therefore, this species was not carried through for full analysis.
				Everglades crabgrass occurs within Long Pine Key in the park, and in 2003 the species was discovered south of the Loop Road in Big Cypress National Preserve. The Big Cypress population is the first known population of the species outside the Long Pine Key area. Population estimates at Long Pine Key are estimated to be between 1,001 to 10,000 individuals and possibly greater than 10,000 individuals in the Big Cypress population (USFWS 2009b). Habitat destruction and degradation remain the primary threats to this species. In Miami-Dade County, pine rocklands (including patches of marl prairie) have been reduced to about 11% of their former extent. Two large occurrences of the crabgrass remain, protected within the Everglades and Big Cypress (USFWS 2009b). Everglades crabgrass is threatened to some extent by invasive nonnative plant species and fire suppression. Individuals of the Long Pine Key population are found on or adjacent to hiking trails, and occasionally off-trail hiking may result in trampling. In the long term, global climate change and sea level rise further threaten the species’ habitat. No specific conservation activities are being undertaken to protect the crabgrass. Miami-Dade County has undertaken efforts to conserve pine rocklands and tropical hardwood hammocks. Everglades National Park and Big Cypress National Preserve are conservation areas, with pinelands managed to maintain the natural vegetation, which includes the Everglades crabgrass (USFWS 2009c).	
Dismissed	Johnson's seagrass	<i>Halophila johnsonii</i>	Threatened	Johnson's seagrass has a disjunct and patchy distribution along the east coast of Florida, from Virginia Key in central Biscayne Bay north to Sebastian Inlet near Fort Pearce. The plant is most often found in coarse sand and muddy substrates in the intertidal zone of coastal lagoons. Water is usually deeper and more turbid than tolerated by other seagrasses, and tidal currents may be stronger. Threats include storm erosion, sedimentation (e.g., dredging), poor water quality, and habitat destruction (e.g., propeller scarring).	Ten areas are designated as critical habitat for Johnson’s seagrass, none of which are within Everglades National Park. The management actions proposed in this management plan would not affect the population or distribution of Johnson’s seagrass; therefore this species was not carried forward for full analysis.
Dismissed	Florida bristle fern	<i>Trichomanes punctatum</i> ssp. <i>Floridanum</i>	Candidate	Florida Bristle fern is a small herb that is endemic to the Florida peninsula. In southern Florida, this species is restricted to a few tropical hardwood hammocks in Miami-Dade County where it grows on exposed limestone of the vertical walls of solution holes and also at the bases of trees. Within Everglades National Park, Florida Bristle fern was collected once in 1909 at Royal Palm Hammock and the last known report of a natural population was made in 1917 (Gann 2013). One attempt to reintroduce this species into the park appears to have been made in the 1960s and that effort is believed to have been unsuccessful. Surveys carried out for this species in Royal Palm Hammock and at other hammocks in the vicinity failed to result in the relocation of Florida filmy-fern. Based on these surveys and the length of time that has passed since the last reported observation, this species is considered to be extirpated from the park.	Recent surveys to locate Florida Bristle fern in Everglades National Park have not been successful. This species is considered to be extirpated from the park. Therefore, this species was not carried forward for analysis.

[Note: Information pertaining to the fish species of concern was obtained primarily from the National Marine Fisheries Service (2010a) unless otherwise indicated.]



Source: USFWS 2006

FIGURE 4. FLORIDA PANTHER FOCUS AREA AND ZONES OF IMPORTANCE IN CENTRAL AND SOUTH FLORIDA

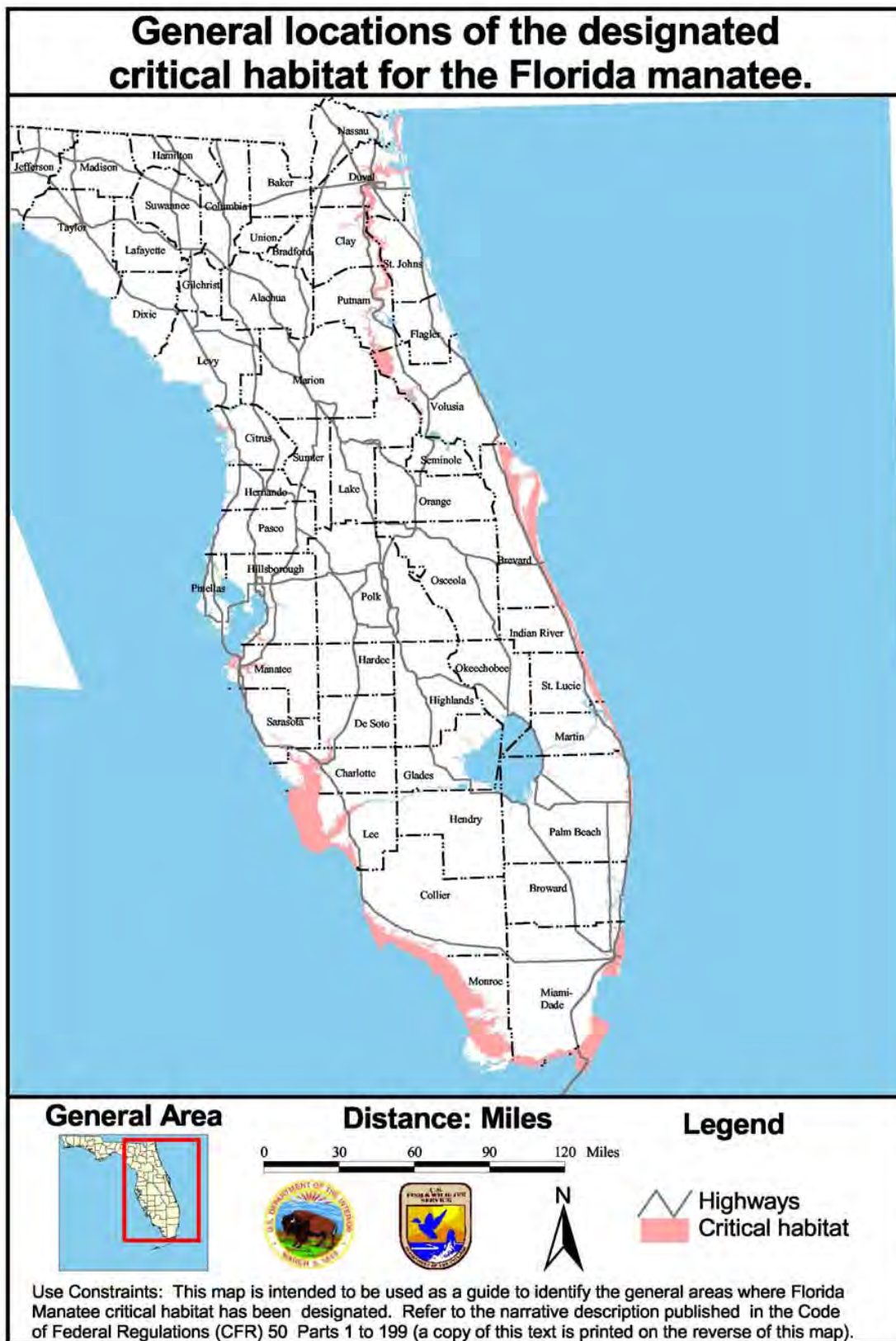


FIGURE 5A. MANATEE CRITICAL HABITAT

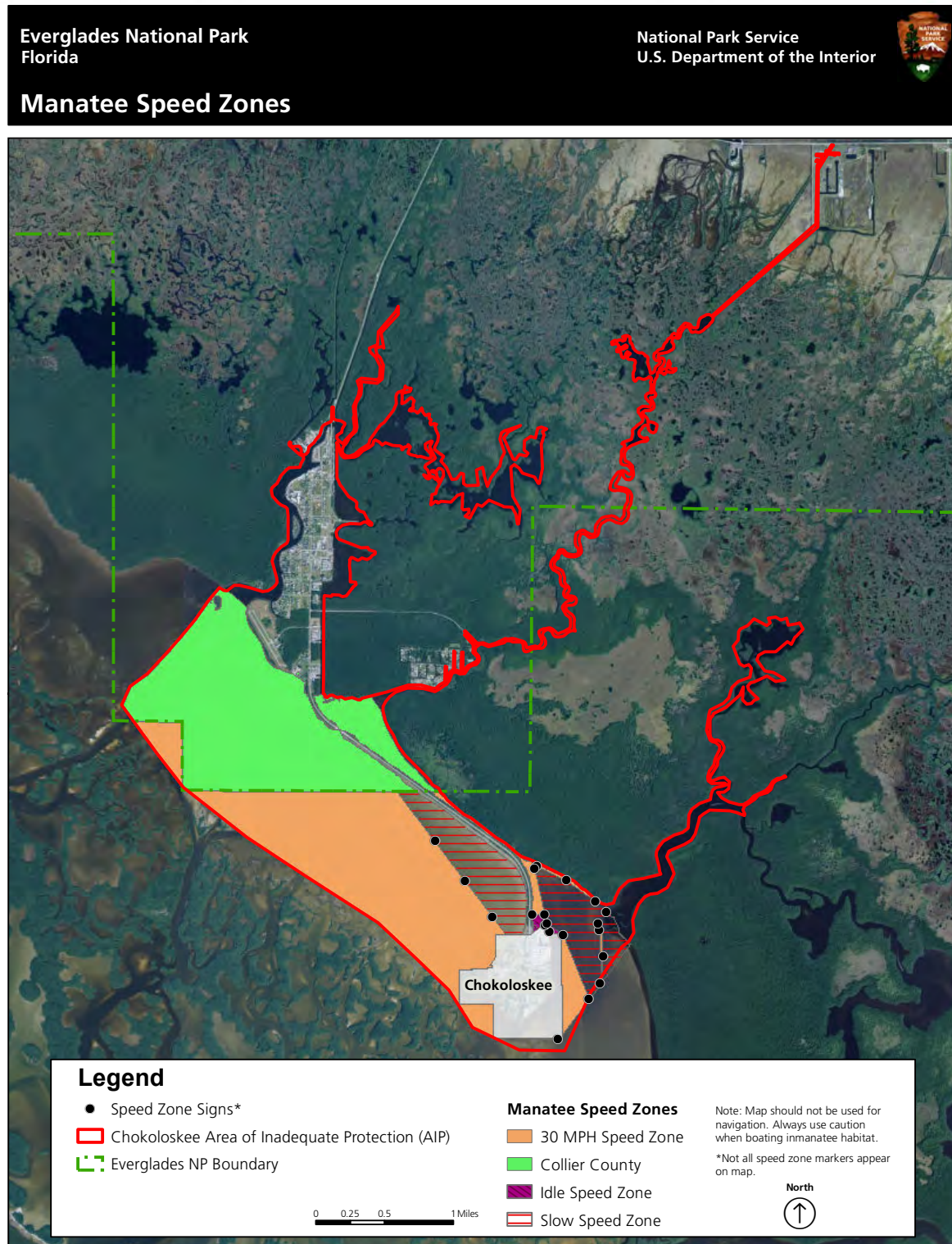


FIGURE 5B. MANATEE SPEED ZONES



FIGURE 6. SMALLTOOTH SAWFISH CRITICAL HABITAT

NATURAL SOUNDSCAPE

Natural Soundscapes at Everglades National Park

The natural soundscape is an important component of “the scenery and the natural and historic objects and the wild life” protected by the Organic Act of 1916. NPS management policies direct the National Park Service to preserve the park’s natural soundscape. Natural soundscapes exist in the absence of human-caused sound and are the aggregate of all the natural sounds that occur in a park or portion of a park; they are vital to the function and character of the park.

The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. The Service will restore to the natural condition wherever possible park soundscapes that have become degraded by unnatural sounds (noise), and will protect natural soundscapes from unacceptable impacts. Some natural sounds are part of the biological or physical resources of the park. Examples of such natural sounds in Everglades National Park include

- sounds produced by birds, frogs, or insects to define territories or attract mates
- sounds produced by bats or porpoises to navigate or locate prey
- sounds produced by physical processes such as wind in the trees, lapping of water, or claps of thunder

Characteristics of Sound. Sound consists of minute vibrations of pressure that travel through a medium such as air or water. Sound is measured in decibels (dB). The decibel is

commonly used to relate sound pressures to some common reference level. The loudness of a sound as heard by the human ear is estimated by an A-weighted decibel scale. This adjustment for human hearing is expressed as dB(A). For this discussion, the A-weighted values are used to describe potential effects on the park’s natural soundscape. Table 11 provides examples of A-weighted sound levels. Table 12 shows the effects that sounds have on humans.

Noise is generally defined as undesired sound that disrupts normal activities or diminishes the quality of the environment (Morfeey 2001). In outdoor conditions at a distance of 1 meter from the speaker, relaxed conversation occurs at a voice level of approximately 54 to 56 dB(A), and normal and raised voices at levels of approximately 60 to 66 dB(A) (Berglund and Lindvall 1995).

Natural Soundscapes. Natural sounds in Everglades National Park include the sounds of blowing wind, bird vocalizations, and many other sounds found in nature. 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 park. Maintaining an unimpaired natural soundscape is as important to the wildlife of the Everglades as it is to park visitors, and impacts on the soundscape must be considered. Research shows that noise can affect an animal’s physiology and behavior, and if it becomes a chronic stress, noise can be injurious to an animal’s energy budget, reproductive success, and long-term survival. Noise affects wildlife in both terrestrial and marine environments in the park (Radle 2007).

TABLE 11. SOUND LEVELS FOR COMMON OCCURRENCES

Reference Sound	dB(A) Level
Normal breathing	10
Whispering at 5 feet	20
Quiet residential area, crickets (16 feet)	40
Distant bird calls	45
Light traffic at 100 feet	50
Normal conversation at 5 feet	60
Two-stroke snowmobile (30 mph at 50 feet)	70
Helicopter landing at 200 feet	80
Heavy truck or motorcycle (25 feet)	90
Thunder	100
Heavy surf at 3 feet	107
Military jet at 110 feet	120
Shotgun firing	130

Source: NPS 2009a, 2010

TABLE 12. EFFECTS OF SOUND

Sound Levels (dBA)	Relevance
35	Blood pressure and heart rate increase in sleeping humans (Haralabidis et al. 2008)
45	World Health Organization's recommendation for maximum noise levels inside bedrooms (Berglund et al. 1999)
52	Speech interference for interpretive programs (EPA 1974)
60	Speech interruption for normal conversation (EPA 1974)

Source: NPS 2008

At Everglades National Park, natural sounds prevail throughout the backcountry, and therefore most of the park. A report of an ambient sound study titled "Measurement of Natural Soundscapes in South Florida National Parks" found that protected shorelines were the quietest sites, while dense

forests were the loudest sites in the parks (Downing et al. 1999). This study also found that daytime is the quietest period for ambient sound and nighttime hours are the loudest.

Human-caused sounds at Everglades National Park are created mostly by vehicles, aircraft,

motorized watercraft including airboats, heavy equipment, and construction activity. Some threats to the natural soundscape come from activities on lands adjacent to the park boundaries such as construction and agricultural operations. Additionally, aircraft over flights (private, commercial, or sightseeing) may also adversely affect soundscapes because aircraft occasionally fly over the interior of the park. Helicopters and airboats are occasionally used by park staff to conduct operations in interior locations of the park.

Existing Sound Levels in Everglades

National Park. Although the park's water trails are a popular way to explore and enjoy its wilderness, they do not offer respite from man-made sounds. Thus there are issues of sound control as well as the need for better, quieter equipment where operations require motors (Coalition of NPS Retirees 2008).

The NPS Natural Sounds Program conducted acoustical monitoring in Everglades National Park in the summer of 2008 and winter of 2009 to gather information about natural and existing ambient sound levels and types of sound sources (NPS 2008a and 2009o). The ambient sound level is the composite, all-inclusive sound associated with a given area during a given period of time. The natural ambient sound level is generally used as a baseline for park management purposes and represents an estimate of what the acoustical environment might sound like without the contribution of human-made sounds (NPS 2009c). However, the natural ambient sound level for the Everglades has not yet been determined. Exceedance levels (L_x) are metrics used to describe acoustical data. Exceedance levels represent the dBA exceeded x percent of the time during the given measurement period (e.g., L_{90} is the dBA that has been exceeded 90% of the time). L_{90} is currently the closest approximation to the natural ambient sound level available at the park (Lelaina Marin, NPS Natural Sounds Program, Fort Collins, Colorado, pers. comm. with Aaron Sidder, Parsons, February 2010).

The Natural Sounds Program collected data at nine sites throughout the park during the summer of 2008 and winter of 2009. Sounds from wildlife in the park can contribute substantial energy in frequency bands that are far removed from the portion of the spectrum occupied by noises from human activities (i.e., transportation noise). The full frequency spectrum levels (12.5–20,000 Hz) are likely to substantially overstate the existing conditions in the park (Lelaina Marin, NPS Natural Sounds Program, Fort Collins, CO pers. comm. with Aaron Sidder, Parsons, February 2010). Frequencies affected by transportation fall within a range of 100–800 Hz, though this range does not correspond to a specific vehicle or type of transportation. Table 13 shows the daytime (0700–1900) and nighttime (1900–0700) L_{90} exceedance levels during the summer season at both the full frequency spectrum and the frequencies affected by transportation. Similarly, table 14 shows the daytime (0700–1900) and nighttime (1900–0700) L_{90} exceedance levels during the winter season at both frequency ranges. The data indicate that Everglades National Park is a relatively quiet soundscape.

Natural sounds generally predominate throughout the park. Some of the common natural sounds in the Everglades come from birds, frogs, or insects; sounds produced by bats or porpoises to navigate or locate prey; and sound produced by physical processes such as wind in the trees, lapping of water, or claps of thunder. Human-generated noise in the park is predominantly from vehicle traffic, aircraft over flights, and administrative activities that involve motorboat, airboat, and/or aircraft use; these sounds are usually confined to developed areas, popular boating (or airboating) areas, campgrounds, and major roads, although administrative airboat use and aircraft over flights occur throughout the park. Sound levels vary according to the season, relating to the number of park visitors. The impact of human-made sounds may also fluctuate with variations in weather conditions (including temperature, wind, and humidity) and vegetation in an area.

**TABLE 13. EXCEEDANCE LEVELS FOR EXISTING CONDITIONS IN
EVERGLADES NATIONAL PARK: SUMMER LEVELS**

Frequency (Hz)	L ₉₀ Exceedance levels (dBA) 0700 to 1900	L ₉₀ Exceedance levels (dBA) 1900 to 0700
100-800	25.3-52.6	14.6-36.3
12.5-20,000	32.9-42.4	40.6-52.6

Source: NPS 2008

**TABLE 14. EXCEEDANCE LEVELS FOR EXISTING CONDITIONS IN
EVERGLADES NATIONAL PARK: WINTER LEVELS**

Frequency (Hz)	L ₉₀ Exceedance levels (dBA) 0700 to 1900	L ₉₀ Exceedance levels (dBA) 1900 to 0700
100-800	23.5-32.4	7.0-29.1
12.5-20,000	29.9-35.8	32.9-39.8

Source: NPS 2009b

Frontcountry areas near campgrounds and roads often have higher sound levels. Mechanical noises, such as those produced by aircraft, airboats, chainsaws, or construction equipment, may temporarily mask these natural sounds. There can be human-caused noise in the backcountry such as sounds related to NPS management activities and recreational activities such as boating.

The natural soundscape throughout the park is affected by aircraft noise from a variety of over flight sources. These include high-altitude, commercial jet traffic; military activity; general aviation; NPS administrative operations, such as resource management, prescribed fire activities, emergency response, and facility maintenance; and municipal and commercial air traffic from surrounding counties.

Helicopters are frequently used to access the backcountry when it is determined to be the minimum requirement needed for work in the vast wilderness of the park. In 2009, the park recorded more than 3,000 wilderness

landings. The acoustical impact of a helicopter is a function of the size and the type of engine used as well as the movement of the rotor blades through the air (NPS 2009a).

The East Everglades Addition is susceptible to human-generated noise similar to the rest of the park, but the Addition is additionally affected by commercial and private airboat use, which is not allowed elsewhere in the park. However, park rangers and researchers use airboats in the designated wilderness areas of the park when appropriate. A study for the Florida Fish and Wildlife Conservation Commission showed that the airboats generated peak instantaneous noise levels between 95 dB(A) and 110 dB(A) at 50 feet at maximum operating conditions (Glegg et al. 2005). Airboat noise can vary depending on a variety of factors (e.g., propeller type, engine type, atmospheric conditions), but airboats consistently generate substantial noise at close distances.

Climate Change. While the anticipated increase in sea level may change human access

and could change the boundaries between terrestrial landscapes and aquatic landscapes, any predicted impacts on soundscapes would be extremely speculative and difficult to quantify.

WILDERNESS CHARACTER

For a description of existing designated terrestrial and submerged wilderness, please refer to the “Wilderness at Everglades National Park” Subsection in chapter 3. Wilderness character is ideally described as the unique combination of (1) natural environments that are relatively free from modern human manipulation and impacts; (2) opportunities for personal experiences in environments that are relatively free from the encumbrances and signs of modern society; and (3) symbolic meanings of humility, restraint, and interdependence in how individuals and society view their relationship to nature (Landres et al. 2008). Using the definition of wilderness from section 2(c) of the Wilderness Act of 1964, four qualities of wilderness are relevant, as follows (Landres et al. 2008):

Untrammeled: Wilderness is essentially unhindered and free from the actions of modern human control or manipulation.

Natural: Wilderness ecological systems are substantially free from the effects of modern civilization.

Undeveloped: Wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation.

Solitude or Primitive and Unconfined Recreation: Wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

The area may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Untrammeled

Historically, the larger Everglades area has been heavily manipulated with an intricate series of canals, levees, and drainage systems in an attempt to drain the watery landscape. Expanded dredging efforts between 1905 and 1910 transformed large tracts from wetland to agricultural land. Developers cut more canals, built new roads, and removed mangroves from the shorelines and replaced them with palm trees. Canals, roads, and buildings gradually displaced native habitats. After the designation of the park in 1947, much of the dredging inside the park stopped, but the Central and Southern Florida project—to build an elaborate system of roads, canals, levees, and water-control structures stretching throughout south Florida—ensured continued outside alterations that still impact the park (NPS 2009e). Today, human intervention is required to undo or mitigate many hydrologic changes that have altered the natural hydrologic regime.

Human intervention is required to control the invasive nonnative plant and animal species that have taken hold in the Everglades. Also human intervention or control is required to restore seagrass areas that have been damaged by motorboat propellers and groundings.

The manipulation of ecological systems in the park infringes on the untrammeled qualities of its wilderness areas, and there are many plans to restore natural conditions to the park (see the last two sections of chapter 1). Some of these plans manipulate portions of the park’s ecological systems with the aim of restoring natural conditions.

Natural and Undeveloped

Much of the park’s designated wilderness is largely natural and undeveloped. The interior of the park, in particular, maintains its natural quality, far from the influence of roads or development along Tamiami Trail or the main park road. Additionally, the Wilderness Waterway traverses large spans of the park

that are free from development and remain in their natural state.

The submerged marine wilderness (see glossary) in Florida Bay has been compromised in recent years by boat groundings and propeller scarring of seagrass in addition, scarring occurs when boat propellers dredge new channel/access routes or boaters maintain existing, unmarked human-made channel/access routes (NPS 2008c).

In the park, wilderness areas may include facilities such as marked trails, campsites or chickees, toilets, and signs. Such structures are as compatible as possible with their surroundings and are typically removed when no longer needed. Because of the history of human occupation and development in the region, wilderness areas in the park may include remnant structures or evidence from before designation such as canals, levees, or agricultural areas. There are three dams dating from the early 20th century on canals near Florida Bay.

There are approximately 250 “structures” (relatively small pieces of equipment, some enclosed in a metal box and some accessed by a small boardwalk or platform in hard-to-access locations) within the park’s wilderness areas. There are also many research plots that are marked with stakes, posts, tags, etc. This equipment is used for research and monitoring primarily in freshwater and marine environments for a wide range of scientific and resource management purposes (e.g., to investigate water quality or monitor threatened and endangered species, vegetation, or habitat).

The study “Airboat/ORV Trail Inventory for the East Everglades Addition Lands” (University of Georgia 2006) mapped, classified, and inventoried airboat and off-road vehicle trails in the East Everglades Addition from 1999 aerial imagery. The study documented evidence of substantial airboat activity in the northern half of the Addition. It also compared airboat trails that were evident

in the 1999 aerial photos with trails evident in aerial photos taken in 1994 and 2003, and determined that airboat trails are declining over time. Specific findings included the following:

- Category 1 trails (>33 feet [>10 meters] wide) have declined 57%, from 105 miles to 45 miles (169 kilometers to 73 kilometers), while the commercial airboat business has been growing. This implies that airboat tour companies are following more consistent routes.
- Category 2 trails (10–33 feet [3–10 meters]) wide have remained fairly constant in location and length, 115 miles [185 kilometers) in 1994 down to 102 miles (164 kilometers) in 2003, indicating that these trails are subject to persistent use by private and limited commercial tours. These trails continue to be the most widely used private airboat trails.
- Category 3 trails (<10 feet [<3 meters] wide) have declined 91%, from almost 10,861 miles (17,479 kilometers) in 1994 to 1,246 miles (2,005 kilometers) in 2003. This reduction indicates that as private airboat use has declined in the East Everglades, the grasses are able to recover from occasional, dispersed use.
- Open water areas mostly in the vicinity of commercial airboat operations (polygons representing deep water areas of high airboat use) have declined 77%, from 633 acres (256 hectares) to 148 acres (60 hectares).

Airboat use for administrative and research purposes occurs on some of the airboat routes within the East Everglades and on a limited number of other routes in other areas of the park to support operational, scientific, and resource management needs.

Outstanding Opportunities for Solitude or Primitive, Unconfined Recreation

Primitive (nonmotorized) forms of recreation are allowed in wilderness. At Everglades National Park these include hiking, canoeing, and kayaking. Marked water trails are provided for nonmotorized boaters. The 99-mile-long Wilderness Waterway is open to paddlers, and paddle-only wilderness trails are available near Flamingo. Cross-country boat and foot travel is allowed, but a backcountry permit is required for all overnight trips. The interior wilderness receives very little use by the public. There are numerous opportunities for backcountry camping at isolated and primitive sites, primarily in the southern and western portions of the park.

Human-caused sound can be an unwanted intrusion into the solitude of the park. These sounds are usually confined to developed areas, popular airboating (in the East Everglades) and boating areas, campgrounds, and along major roads. From October 2008 through April 2009, there were more than 16,500 backcountry visitors, combined, in the Flamingo and Gulf Coast districts (pers. comm. between Fred Herling, Everglades National Park Supervisory Park Planner, and Aaron Sidder, Parsons. 10/2010). Administrative and research activities that are conducted with the aid of helicopters or airboats also affect opportunities for solitude within the national park. As discussed under the preceding “Natural Soundscape” discussion, in 2009 the park recorded more than 3,000 helicopter landings in the park’s designated or potential wilderness areas. Nonetheless, opportunities for solitude abound with nearly 1.3 million acres of wilderness in the park.

Other Features: Cultural Resources

The Wilderness Act states that a wilderness “may also contain ecological, geological, or other features of scientific, educational,

scenic, or historical value.” This fifth quality, unlike the other four, is unique to the Everglades wilderness based on the features that are inside the wilderness (NPS 2012).

There are many cultural resources in both the existing designated wilderness and in the East Everglades Addition, including ethnographic, archeological, and historic resources. Cultural resources clearly fit within this fifth quality of wilderness character because they are tangible features that have educational and historical value.

The cultural resources in the wilderness area are covered in detail in the “Cultural Resources” section below.

Climate Change

Changes anticipated because of climate change would not be expected to impact the undeveloped and untrammeled quality of backcountry and wilderness areas the park. However, boundaries of protected areas may become easier to access and may require greater education of the public and management of visitor access to protect the wilderness resources.

CULTURAL RESOURCES

Archeological Resources

The first archeological investigations of the Everglades, conducted in the late 19th and early 20th centuries, were focused primarily along Florida’s southwest coast. Beginning in the late 1930s, subsequent investigations laid the groundwork for understanding of the Glades Tradition period in south Florida (ca. 500 BC–AD 1700), which was divided into three sub-periods differentiated and dated by ceramic types. The NPS Southeast Archeological Center (SEAC) conducted a comprehensive survey of the park between 1982 and 1984. Using aerial imagery and a predictive site location model based on vegetation characteristics, SEAC archeologists identified 191 sites during follow-up field

surveys. A summary of the SEAC investigations (“The Archeology of Everglades National Park: A Synthesis”) was prepared by John Griffin in 1988 (Griffin 1988).

In 1996, 196 archeological sites inside the park were listed in the National Register of Historic Places under a SEAC-prepared multiple property nomination. The nomination included four districts (the Bear Lake Mounds, Monroe Lake, Shark River Slough, and the Ten Thousand Islands districts), and three individual sites (the Anhinga Trail, Cane Patch, and Rookery Mound sites). Resources listed in the nomination commonly consist of middens, shell/earthen works, and other mound features with associated artifacts reflecting occupation from the Glades Tradition period, sometimes extending to historic and modern period Seminole and European American occupation. Although some of the sites have been disturbed, they retain overall good integrity with the potential to yield further information and expand the understanding of indigenous life ways and cultural adaptation/interaction in the Everglades (NPS, Schwadron 1996).

The Mud Lake Canal on Cape Sable, an aboriginal canal associated with the Bear Lake Mound complex, is believed to have been constructed during the Glades II period (AD 750–1200) by ancestors of the Tequesta people. The canal extends about 4 miles, linking Bear Lake and the waters of Whitewater Bay with Florida Bay. It likely provided safe passage, easy access to aquatic resources, and a route to facilitate exchange and tribute among groups. The canal was designated a national historic landmark in 2006, exhibiting exceptional national significance as the best preserved example of a rare prehistoric engineering feat (Wheeler 2005).

In 2004, the Southeast Archeological Center initiated a phased archeological survey and assessment of selected portions of the Eastern Everglades Addition, the area added to the eastern half of the park under the Everglades Protection and Expansion Act of 1989. Few

systematic archeological surveys of these lands had been conducted in the past, although 40 sites were recorded in the area before the 2004 investigations. The primary objectives of the SEAC investigations were (1) to locate, test, and provide baseline condition assessments for potential archeological sites in the East Everglades Addition, and (2) to test a geographic information system (GIS) predictive model. The model suggested that the highest potential for archeological sites correlated with hardwood hammock tree islands. Following the initial site survey and testing phase, systematic test excavations were conducted for several selected sites, along with additional testing of low potential site areas, to evaluate the accuracy of the predictive model (NPS, Schwadron 2002, 2007a).

The 2004–2005 SEAC investigations of the East Everglades Addition resulted in the identification and recording of 42 new archeological sites. All the sites were found to be in good condition, exhibiting only light to moderate disturbance despite the frequent presence of former hunter’s camps and cabins on the same tree island locations. Five archeological sites were found to provide well-preserved deposits supporting occupation from the Middle Archaic period (5000–3000 BC) to the Late Archaic period (3000–500 BC), the oldest sites identified to date in the park. The findings are anticipated to alter understanding of early prehistoric migration and settlement of south Florida. Most artifacts collected, however, were from the subsequent Glades period. The predictive model used in the survey was found to be a highly accurate means of predicting archeological site locations in the park (NPS, Schwadron 2007a).

In consultation with the NPS office of the National Register of Historic Places and the Florida state historic preservation office, the Southeast Archeological Center has also recently initiated a national historic landmark (NHL) investigation of prehistoric shell works sites in the Ten Thousand Islands area along the western perimeter of the park. The NHL

nomination process includes the development of a thematic study and historic contexts for the sites and the preparation of individual property nominations. Archeological fieldwork and testing will be conducted in support of the NHL study to address major research questions and to lay the foundation for a long-term, multiyear program to intensively investigate the sites. Of the 17 known shell works sites in the Ten Thousand Islands area, 12 are within the park. The largest sites are likely to represent large villages or the political seats of local chiefdoms (NPS, Schwadron 2006).

Another project (scheduled to begin in 2013) will develop a site probability model for submerged prehistoric sites in Florida Bay. The project will be jointly undertaken by the University of Miami Rosenstiel School of Marine and Atmospheric Sciences and the National Park Service Climate Change Adaptation Program. The U.S. Army Corps of Engineers also plans to gather baseline archeological data for sites in the Shark River Slough Archeological District and associated sites in the East Everglades Addition area. These investigations will assess the resource effects of future water delivery operations planned as part of the Everglades restoration efforts. In 2012, a historic trash dump was documented and evaluated in the location of the Gulf Coast District Developed Area. The dump, comprised predominantly of mid-20th century glass and other domestic refuse, was determined ineligible for the National Register of Historic Places.

The range of site types identified by archeological investigations in the park typically falls into several distinct categories. Among these, accretionary middens consist of unplanned deposits of cultural waste materials such as animal bones, shell, carbonized wood, plant materials, ceramic debris, and stone/shell tool fragments. These materials are intermixed within two primary contexts: earth middens (characterized by a matrix of dark organic soils), and shell middens (consisting primarily of shell debris from oysters and other marine shellfish). Shell middens are

commonly found along the margins of coastal rivers and in coastal mangrove swamps. Some extensive shell middens are thought to represent former village locations, while other smaller middens may be the remains of temporary or seasonal camps. Earth middens, located on isolated inland hammocks and tree islands, are widely distributed throughout the Shark River Slough and elsewhere within mangrove areas. The archeological data preserved in these middens can provide valuable information to expand understanding of cultural ecology, subsistence patterns, and other aspects of prehistoric indigenous populations (NPS, Schwadron 2002).

Prehistoric earthworks are another site type, representing planned construction for such functions as house and temple bases, and observatory platforms. Earthworks are often pyramidal in shape and are usually constructed of soil and marl. As an extremely rare site type in south Florida, earthworks have correspondingly heightened archeological importance for expanding understanding of Everglades prehistory, particularly the Glades Tradition period. Shell works are also intentionally constructed sites where shells were piled to form high mounds, ridges, raised platforms, canals, and other structural features. Shell work sites date from possible pre-Glades times (ca. 1000 BC) through the entire Glades Tradition period, extending to historic Calusa and possibly Spanish occupation. Burial mounds represent another constructed site type, with human remains interred in some cases with grave goods and ceremonial objects. These mounds (constructed variously of earth, sand, shell, and stone) are sometimes found in and next to middens. Inundated sites (located in wet areas such as swamps, bogs, rivers, and sloughs) were often located on upland areas that have become submerged due to rising sea levels, damming, dredging, and other environmental changes. These sites have a high potential for preserved organic materials and perishable artifacts such as wood and textiles that could yield important data on paleoenvironments. Although inundated sites may be associated

with all cultural periods, archeologists are giving greater attention to the potential for Paleo-Indian and Archaic period sites within inundated contexts because of the expanded land base that existed during the drier climate of those periods (NPS, Schwadron 2002).

Historic archeological resources, representing sites associated primarily with nonindigenous people who arrived in south Florida after the time of first European contact in the 16th century, are also present in Everglades National Park. These sites provide valuable research information concerning Spanish, European American, present-day American, and Seminole settlement and activities (NPS, Schwadron 2002). Among the site types known to exist (or anticipated) on the basis of historic activities are fishing and hunting camps, fish processing facilities and ice plants, tannic acid plants, charcoal production sites, road construction camps, military outposts, sugar cane mill sites, farmsteads, private recreational development, and oil exploration sites. The archeological data associated with historic domestic settlement is associated in part with structural features such as the remnants of houses, outbuildings, cisterns, and gardens. Artifacts commonly include ceramic and glass fragments, metal hardware, tools, and personal items. The integrity and cultural significance of most of these historic archeological resources is currently unknown.

To date, over 250 archeological sites have been recorded in the park's Archeological Sites Management Information System (ASMIS) database. Of this number, 196 sites are listed in the National Register of Historic Places, either as individual sites or as part of larger districts. The prehistoric Mud Lake Canal is designated a national historic landmark. Specific information regarding site locations is restricted to assist protection efforts.

Climate Change. Increased storm frequency and intensity along with rising sea levels are anticipated consequences of climate change. Damaging storms and erosion could adversely impact archeological resources such as

prehistoric shell mounds and buried sites, diminishing their archeological integrity and informational potential. Some terrestrial sites may be at risk of submersion as sea levels rise.

Historic Structures, Sites, and Districts

Historic structures are defined as constructed works, consciously created to serve some human activity. Historic structures can be buildings, monuments, dams, canals, bridges, roads, nautical vessels, defensive works, temple mounds, ruins, and outdoor sculpture (NPS-28: Cultural Resource Management Guideline 1997). Prehistoric structures are discussed in the previous archeological resources section.

Old Ingraham Highway and Associated Canals. The Ingraham Highway was constructed between 1915 and 1922 to link Homestead with Flamingo and Cape Sable. Construction of the 41-mile-long highway, the first road to penetrate the Everglades, was undertaken by the Florida East Coast Railway Company and its subsidiaries, the Model Land Company and the Dade Muck Company. In 1912, the railroad company completed a rail line from the Florida mainland to Key West, and the company sought to capitalize on its newly acquired land acquisitions in south Florida to promote settlement and agricultural development. Toward these ends, the Model Land Company acquired 210,000 acres in the Cape Sable area that it intended to drain and sell to investors for fruit, vegetable, and sugar cane production. The Florida East Coast Railway Company, in cooperation with the state and the Florida Federation of Women's Clubs, also provided vital support toward the establishment of Royal Palm State Park in 1916. The Ingraham Highway (named in honor of James E. Ingraham, vice president of the railroad company) was initially extended as far as Royal Palm for the 1916 dedication of the state park (NPS, Trebellas 2000a; NPS, Ogden et al. 2009a).

Construction of the highway through the difficult environmental conditions of the Everglades was a daunting task marked by frequent delays and mounting costs. The conditions led to the development of innovative construction techniques, and a steam dredge (later abandoned at Cape Sable) was used as the primary piece of machinery. A typical section of completed roadway consisted of a roadbed of limestone and earth fill, with a graded, rolled, and oiled surface.

The approximately 50-mile-long Homestead Canal was excavated alongside the roadway to provide drainage and fill material for road construction. The East Cape and Buttonwood Canals (completed in the early 1920s) were part of the canal network constructed to drain Cape Sable for development and to provide road-building material. The canal network forms part of the park's Wilderness Waterway. Completion of the Ingraham Highway and its associated network of canals failed to bring the level of lasting development and settlement envisioned by the railroad and its land promoters. Real estate near Flamingo and Cape Sable could not reasonably compete with more accessible and desirable lands near Lake Okeechobee and Miami (NPS, Paige 1986).

In the 1960s, the National Park Service constructed a new road that ran from the eastern park entrance west toward Long Pine Key, eventually connecting with the Old Ingraham Highway. Most of the first 12 miles and last 17 miles of the paved section of the Ingraham Highway were incorporated into the current park road from Florida City to Flamingo. Although the National Park Service abandoned 12.5 miles of the old highway south of the current park road, some of the abandoned road section was adapted for administrative roads and trails. Because the Ingraham Highway impeded the flow of fresh water through the Everglades, portions of the highway crossing Taylor Slough were removed in the 1990s to create more natural hydrologic patterns and restore ecosystem functions.

A Cultural Resource Assessment of the Old Ingraham Highway and Homestead, East Cape and Buttonwood Canals (NPS, Buttram et al. 2009) provides documentation and condition assessments of the highway and its associated resources, and evaluates the eligibility of these resources for the National Register of Historic Places as a historic district. The physical integrity of these historic structures has been altered in varying degrees over the years by the removal of road sections, paving, erosion, widening, and the placement of canal plugs to impede the flow of saltwater into interior waterways. However, the Old Ingraham Highway and the East Cape, Homestead, and Buttonwood canals are considered eligible for the national register for their historical associations with the development of south Florida and subsequent conservation efforts (e.g., the establishment of Royal Palm State Park, Everglades National Park, and recent restoration undertakings). The district's period of significance is recommended to extend from 1915 to the present (NPS, Buttram et al. 2009). The Florida state historic preservation office concurred with the national register eligibility of these properties and the park has submitted a draft national register nomination.

Nike Missile Base Site HM-69. Buildings and structures associated with a Nike Missile Base installation (HM-69) are located at the "Hole-in-the-Donut" area of Everglades National Park in the Pine Island district. The installation was part of the United States strategic defense efforts to deter a possible missile attack from Cuba or bombs from Soviet aircraft. It was constructed during 1963–64 under a special use permit issued by the National Park Service to the U.S. Army Air Defense Command. Construction occurred during a period of prolonged Cold War tensions between the United States and the Soviet Union, particularly heightened in the aftermath of the Cuban Missile Crisis of 1962. Nationwide deployment of the Nike missile defense system also peaked in 1963, with some 134 Nike Hercules batteries placed near the nation's major population centers. HM-69 was among four Nike Hercules batteries and

four HAWK batteries in the Miami-Homestead defense area. Unique within the missile defense system, the south Florida Nike sites were integrated with HAWK missile systems to provide an all-altitude defense capability. HM-69 operated until it was deactivated in 1979; it was among the last group of active Nike Missile Base sites in the continental United States (NPS, Welling & Dickey 2003; NPS, Leynes 1998a).

The missile complex at HM-69 consisted of a launch area and battery control/administration area (about 1 mile apart) linked by a paved access road. About 146 Army soldiers were stationed at the complex. Missiles were assembled, tested, launched, and stored at the launch area. The launch area was built on fill dredged from a borrow pit along the south-west edge of the site. Because of the high water table, the missiles at HM-69 were stored in three aboveground reinforced concrete and steel buildings (currently used by the park for storage and hurricane shelters). The storage shelters were protected by U-shaped earthen berms. The battery control area was directly north of the launch site, and open sight lines were maintained between the two locations. Among the functions housed at the battery control area were administrative offices, barracks, mess hall, officers' quarters, and the equipment and radar systems needed for target identification and missile guidance. The Nike system was intended to be mobile, and battery and radar control equipment was maintained in on-site trailers (NPS, Welling and Dickey 2003).

Nike Missile Base Site HM-69 was listed on the National Register of Historic Places in July 2004 as a historic district, with 22 contributing buildings and structures. A cultural landscape inventory of the district has been completed. The nomination notes that the district retains a high degree of integrity of setting, feeling, and association. The site's overall preservation and good condition have been achieved in part by NPS adaptive use of several of the former missile base buildings and structures for park operations, including the building currently used for the Daniel Beard Center.

Although the original missiles, radar towers, and some support buildings and trailers have been removed, most of the associated buildings and structures remain intact (NPS, Welling and Dickey 2003). Historic structure reports and detailed artwork documenting all site structures have been completed to guide future preservation efforts. Plans have also been developed to mitigate lead contamination identified on the earthworks and in the interior of the structures. The park conducts guided public tours of the missile site's launch area and procured a historic missile in 2012 to aid site interpretation.

Flamingo. Flamingo was initially established in the late 19th century as a small, isolated village. Residents of the community supported themselves primarily by fishing, hunting, and producing charcoal. Although completion of the Ingraham Highway failed to bring the level of development to Cape Sable envisioned by investors, the road provided a direct connection between Flamingo and Homestead and facilitated the transport of supplies and services to the remote village. Despite these improvements, all of Flamingo's permanent structures were destroyed by the Labor Day hurricane of 1935, and the community continued as a small enclave of families in the aftermath of the storm (NPS Buttram et al. 2009). Former residents who survived the storm were displaced from Flamingo upon NPS acquisition of the Flamingo area.

NPS development at Flamingo began as part of the NPS design and construction initiative known as "Mission 66." The National Park Service undertook this nationwide program in 1956 (intended to be completed by 1966) largely to address the need for new facilities and infrastructure to accommodate the dramatic upsurge in visitation that followed World War II. In contrast with the emphasis on rustic design that had previously characterized NPS architecture, Mission 66 designers incorporated modern building materials and design elements (e.g., flat or gently pitched roofs, concrete and prefabricated components, large plate-glass

windows, and open interior spaces). The architectural program, described as Park Service Modern, functionally integrated overall site and facility designs to more efficiently manage the circulation needs of increasing numbers of visitors traveling by private automobile. Visitor centers emerged during this period as centralized facilities serving visitor use and park administrative needs (NPS 2000b).

Everglades National Park, together with other selected parks in the national park system, became test sites and eventual showcases of Mission 66 planning and design principles. Renowned NPS architect, Cecil Doty, designed the complex of public use buildings at Flamingo and incorporated modern design elements such as the use of concrete block, flat roofs, swirling concrete ramps, and terraces supported by thin columns. Key stone, a locally procured building material, was also used. The first phase of construction began in 1956 with the Flamingo visitor center, administrative offices, guest lodge, employee housing, and support infrastructure. Additional site development occurred through the mid-1960s (NPS 2000b; NPS 2009b).

In 2005, Flamingo was battered by hurricanes Katrina and Wilma, and visitor services and facilities were closed for an extended period. Several buildings were completely destroyed, including the amphitheater, picnic and campground comfort stations, camp tender's residence, and several housing units. The amphitheater and comfort stations were reconstructed in 2008. In 2006, the state historic preservation office concurred with the finding of the *Flamingo Commercial Services Plan* regarding the national register eligibility of the visitor center, service station, 1950s–1960s staff and concessioner housing buildings, and the maintenance area boat canopy. The Florida state historic preservation officer also added the fish cleaning station as a contributing structure. However, other properties such as the marina store, maintenance buildings, lodge, and duplex cottages were considered ineligible

largely because of extensive storm damage and/or previous alterations that compromised their integrity. The lodge, portions of the maintenance buildings, and the duplex cottages were demolished in 2009. Despite the loss of numerous key landscape features, elements of the historic Mission 66 cultural landscape continue to retain integrity (NPS 2011a). A cultural landscape inventory and historic structures report for all contributing buildings and structures in the Flamingo Mission 66 Developed Area were completed in 2011.

Other Mission 66 Buildings and Structures.

The Shark Valley observation tower is identified as another outstanding expression of Mission 66 aesthetics and design principles in the park. The ca. 1964 modernistic 65-foot-tall tower with distinctive spiral access ramp is constructed of formed concrete. An associated round concrete restroom/service building is adjacent to the tower. About half-way along the tram tour route, the tower provides visitors with expansive views into the surrounding sawgrass marsh of Shark Valley. Despite some alterations to the restroom building and missing glass from the top lookout room (closed to the public), the structure retains a high level of integrity (Brian Coffey, NPS Southeast Regional Office, memo to Steve Whissen, NPS Denver Service Center, 2005). Although a formal determination of national register eligibility for Shark Valley has not been completed, a historic structure report is underway that will provide adequate documentation to assist a formal eligibility determination.

The Royal Palm visitor center has been substantially altered since its original construction, and it no longer reflects its earlier association with the Mission 66 period. Among the alterations are a new gable roof, removal of original windows, and the addition of glass block in several areas of the building.

Pine Island was developed as a residential and maintenance area during Mission 66. These one-story ranch style buildings with carports are on a wide cul-de-sac, and exhibit a variety

of architectural plans and materials. Some of the buildings, damaged by hurricane Andrew in 1992, have had their original gabled roofs replaced with new hipped roofs. A one-story, flat-roofed Mission 66 camp tender's residence is also adjacent to the Long Pine Key campground. The maintenance facilities at Pine Island retain a high degree of integrity. Although formal determinations of national register eligibility have not been completed, the area may be eligible to the National Register as a district, which would include the residences, maintenance buildings, roads and circulation networks, and other landscape features.

Other minor developments along the main park road are also considered potentially eligible for the national register. A project scheduled to begin in 2013 will document and assess all Mission 66 resources in the park as part of a parkwide Mission 66 national register district. Although the Gulf Coast developed area was constructed during the Mission 66 period, this area (including the boat basin, seawall, visitor center, and three park housing units) was determined ineligible for the national register due to its lack of inherent significance and diminished integrity.

East Everglades Island Camps. Several former camps are on the hammocks and tree islands of the East Everglades; they were used by hunters and various airboat tour companies (New South 2010). These properties came into NPS ownership in 2002. Camp structures include bunkhouses, sheds, outhouses, and other features that are generally in poor condition and in some instances present visitor safety issues and environmental hazards. Most of the simple wood-frame buildings and structures were constructed from inexpensive building materials such as plywood, corrugated metal, and rolled asphalt. Some contain furniture and appliances, and discarded debris (e.g., generators, propane tanks, auto batteries, and other trash) is commonly strewn about the sites.

Along with park staff, NPS Southeast Regional Office historian Brian Coffey examined nine of the campsites in 2004 to provide a preliminary assessment of their historical significance. With the exception of the Duck Camp (constructed ca. 1950), the camps are thought to be less than 50 years old. The abandoned Duck Camp was formerly used by the Miami Rod and Gun Club, and is considered the only camp possibly eligible for the National Register of Historic Places. The camp includes a large bunkhouse and a cluster of outbuildings that could be adapted for site interpretation and exhibit space. Coffey noted that the long history of human use of the tree islands, from prehistoric occupation to the modern hunting and airboat camps, was likely to be more historically important than any current expression of vernacular architecture (NPS 2004a).

Tamiami Trail and Airboat Operations. In 2005 cultural resources investigations were conducted in support of the proposed construction of a bridge on Tamiami Trail (Highway 41) by the U.S. Army Corps of Engineers. The purpose of the project is to restore more natural water flow to the northeast portion of Shark River Slough. The highway has acted as a barrier, impeding the north-to-south flow of fresh water from entering Everglades National Park. The bridge construction project is part of long-term restoration objectives for the Modified Waters Delivery project (New South Associates 2006).

A phase I archeological survey did not identify archeological material within the test areas. However, the following historic sites and structures were investigated in the project area and evaluated for eligibility for the National Register of Historic Places:

Tamiami Trail and Canal—The Tamiami Trail was completed in 1928 to provide an overland connection between Miami and Tampa. Construction of the highway took 13 years and represents a major engineering feat. The Tamiami Trail and the adjacent canal that was dredged as part of the highway construction

effort are both recommended eligible for the National Register of Historic Places. The Florida state historic preservation office has concurred with the overall eligibility recommendation; however, portions of the canal north of the East Everglades area have been altered and no longer retain integrity.

Coopertown Airboats—The Coopertown establishment is a privately operated airboat operation and restaurant along Tamiami Trail. The property has been in operation since the 1940s, and it was determined eligible for the national register; the state historic preservation office has concurred with the determination.

Airboat Association of Florida—This nonprofit conservation organization was established in 1951. The association's operations are on private property along Tamiami Trail and include a clubhouse, caretaker's home, and grounds. A site survey was conducted in 2009 (New South) and the property's historic structures were considered eligible for the national register. The Gladesmen Study (New South 2010) also recommended that the property be considered eligible as a traditional cultural property.

Gator Park—Gator Park is a privately operated airboat operation along Tamiami Trail. The property includes a concrete block building thought to have been constructed in the 1950s as a gas station, a nonhistoric outbuilding, a campground, a wildlife show area, and airboat docking facilities. The property was determined ineligible for the national register.

Climate Change. Increased storm frequency and intensity along with rising sea levels are anticipated consequences of climate change. Increasing storms and high winds have the potential to adversely impact historic structures, diminishing their architectural and historical integrity as character-defining structural and architectural features are damaged or irreparably lost.

CULTURAL LANDSCAPES

By NPS definition, a cultural landscape is a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions (NPS-28).

Cultural landscapes typically fall into one or more of the following four categories:

Historic designed landscapes—Landscapes deliberately and/or artistically created in conformance with recognized styles.

Historic vernacular landscapes—Landscapes that reflect patterns of settlement, land use, and development over time, often conveying insights into a peoples' values and attitudes toward the land. Vernacular landscapes are commonly the result of informal or unplanned development, and they can be found in large rural areas and small suburban and urban districts.

Historic sites—Landscapes significant for association with important events, activities, and individuals (e.g., battlefields, presidential homes, etc.).

Ethnographic landscapes—Landscapes associated with contemporary groups that are typically used or valued in traditional ways.

Cultural landscape inventories have been initiated or programmed for some of the park's historic sites and districts. More comprehensive cultural landscape reports may be prepared in the future that includes recommendations for management and treatment of significant landscapes. The 2011 cultural landscape inventory for the Flamingo Mission 66 developed area documents the history and evolution of site development and analyzes landscape features and patterns to

assess whether they contribute to the landscape's historical significance in the context of Mission 66 design principles. A comparison of existing resources and conditions with historic maps, photographs, and other records assisted the evaluation of landscape integrity. Among the factors documented in the report are natural systems and features, spatial organization, vegetation, patterns of access and circulation, constructed water features, views and vistas, buildings and structures, and small-scale features (NPS 2011a).

The Nike Missile Base (HM-69) has been determined to be a cultural landscape, and a cultural landscape inventory has been completed (NPS 2011b). Other potentially significant cultural landscapes may be associated with the Ingraham Highway historic district, designed remnants of the former Royal Palm State Park (including elements constructed by the Civilian Conservation Corps during the 1930s), and archeological districts and ethnographic resources. The level of integrity among these landscape resources is expected to vary according to the nature and extent of subsequent development disturbance and other environmental factors at these locations. Also recent work in the Ten Thousand Islands area suggests shell works sites are also important cultural landscapes.

Elements potentially contributing to the significance of cultural landscapes in the park include vegetation types (e.g., trees and other plantings placed as part of original site designs), overall site organization and spatial relationships, patterns of circulation, and small-scale features (e.g., walkways, walls, ditches). Continuing efforts to identify and evaluate cultural landscapes in accordance with the criteria of national register significance will further the park's comprehensive cultural resource management objectives and be an important consideration for any new development proposal affecting the park's historic and cultural resources.

Climate Change. Increased storm frequency and intensity along with rising sea levels are anticipated consequences of climate change. Increasing storms and high winds have the potential to adversely impact cultural landscapes, diminishing the integrity of landscape features (spatial organization, land use patterns, circulation systems, topography, vegetation, and other character-defining elements).

ETHNOGRAPHIC RESOURCES

Ethnographic resources are defined by the National Park Service as

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-28)

Ethnographic resources typically hold significance for traditionally associated groups whose sense of purpose, existence as a community, and development as an ethnically distinctive people are closely linked to particular resources and places. The groups for whom ethnographic resources hold significance may include park neighbors, traditional residents, and former residents who have moved from the area but maintain their former attachments. Ethnographic resources may include burial locations; places important for subsistence and spiritual/ceremonial purposes; plant materials and procurement areas; migration and travel routes; and sites associated with events, beliefs, and traditional stories.

During the 18th and 19th centuries, the pressures of European expansion and intertribal conflicts forced members of the Creek Nation (identified as the Seminole during the 18th century) to leave their ancestral homelands in southern Georgia and Alabama and resettle further south in remote areas of Florida. The Seminole Wars of the

first half of the 19th century resulted in the dramatic depopulation of the Seminole people. Those surviving tribal members who resisted relocation to Oklahoma reservations took refuge among the protective hammocks and swamplands of present-day Everglades National Park and Big Cypress National Preserve. The Seminole in Florida have been divided into two separate federally recognized nations: the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida. These tribes were federally recognized in 1957 and 1962, respectively. The Seminole Nation of Oklahoma represents the descendants of tribal members who relocated to Oklahoma from Florida following the Seminole Wars. The Council of the Original Miccosukee Simanolee Nation Aboriginal People represents nonfederally recognized tribal members. Everglades National Park managers consult with the Council of the Original Miccosukee Simanolee Nation Aboriginal People despite its nonfederally recognized status; NPS staff respects the tribe's ancestral ties to the Everglades and the tribe's interests/issues as public stakeholders.

Some ethnographic resources in the park have particular significance to the culturally associated tribes. Park staff regularly consult with the associated tribes regarding issues of mutual interest. Ongoing consultation is important to ensure appropriate management of ethnographic resources and to ensure that resources are not inadvertently disturbed by park-related activities and proposed development. The locations of these ethnographic resources are not publicly disclosed in efforts to respect tribal preservation and privacy concerns.

The Miccosukees are generally reluctant to share certain aspects of their culture and traditions with those outside the tribe, and they have relied on nontribal spokesmen to represent them in consultations. Because of the tribal concern for maintaining confidentiality, park managers are occasionally challenged to protect ethnographic resources when information may be limited regarding the presence, nature,

and location of these resources. However, the tribe regards all archeological sites that may retain tribal/ cultural associations (e.g., middens, village mound sites, burial locations) as having cultural and/or sacred importance, and the tribe believes that these sites should be protected and left undisturbed. The Miccosukees have a repatriation plan that outlines the protocols for the repatriation of human remains and associated funerary objects, sacred objects, and objects of cultural patrimony found in Florida. The tribe also claims cultural affiliation with the ancestral Calusa Indians who formerly inhabited the Everglades; therefore the tribe retains repatriation interests for cultural materials determined to be of Calusa origin (NPS 2007b, appendix G).

Recent ethnographic investigations have also identified the importance of the Everglades to the "modern Gladesmen" culture, a group comprised for the most part of Anglo-American settlers in south Florida who have historically subsisted on the resources of the wetland environment. The unique folk customs, independent lifeways, and identity of the Gladesmen have been passed down through several generations. Many Gladesmen were skilled at navigating the difficult waterways of the interior Everglades in small skiffs. They hunted and fished for extended periods, living in temporary encampments. The Gladesmen were often valued as guides by explorers and researchers because of their keen observations of nature and knowledge of the Everglades ecosystem (New South Associates 2009). Many of the traditions acquired by the historic Gladesmen are reflected in the lifeways of modern Gladesmen.

An ethnographic study and evaluation of Gladesmen traditional cultural properties (which are ethnographic resources meeting the criteria of significance for the National Register of Historic Places) was conducted in 2008 for the U.S. Army Corps of Engineers for the *Comprehensive Everglades Restoration Plan* and the CERP Master Recreation Plan. A literature review and oral interviews with

selected members of the modern Gladesmen folk culture were carried out as part of the investigations. Thirteen properties associated with the Gladesmen culture were identified within three broad classifications: commercial sites, noncommercial sites, and waterways/road systems; several sites represent hunting and fishing camps and the sites of commercial airboat operations. Two sites were recommended eligible as traditional cultural properties (New South Associates 2010)—one (the Airboat Association of Florida site) is adjacent to the park.

The Gladesmen sites identified by the above investigations are outside Everglades National Park. However, the campsites, waterways, roads, etc., reflect similar historical patterns of use to those associated with the East Everglades Addition tree islands and other areas within the park. As such, the National Park Service will evaluate the ethnographic importance of sites associated with the Gladesmen culture in the park as part of overall cultural resource management considerations.

The National Park Service has initiated an ethnographic overview to identify and characterize the broad range of ethnographic resources in the park. An ethnographic/visitor use study of the East Everglades Addition will also begin in the near future.

Climate Change. Increased storm frequency and intensity along with rising sea levels are anticipated consequences of climate change. Damaging storms and erosion could adversely impact ethnographic resources and places important to the park's culturally associated peoples. Some terrestrial sites/ resources may be at risk of submersion as sea levels rise.

Museum Collections

Museum collections from several south Florida NPS units (Everglades, Biscayne, and Dry Tortugas national parks; Big Cypress National Preserve; and De Soto National Memorial) are stored at the South Florida

Collections Management Center. The center currently occupies portions of the Daniel Beard Center and the Robertson Building in the park's Pine Island District. Most of the museum archival materials are stored in the Robertson Building where research offices are also housed. The combined collection from these five NPS units is estimated at more than 6 million objects—including natural history specimens; historic and ethnographic artifacts; artwork; and a large archival collection of documents, photographs, audio and video tapes, and films.

The NPS Southeast Archeological Center in Tallahassee, Florida, provides curatorial storage for most of the estimated 1.8 million archeological objects and artifacts collected from the south Florida parks. The Southeast Archeological Center's collection management facility meets NPS standards for the protection, storage, and use of archeological collections (NPS 2007b).

Although the SFCMC staff has implemented numerous physical improvements and management strategies to improve conditions for the museum collections, the South Florida Collections Management Center does not meet the full range of NPS environmental standards for the storage of museum collections. The facilities lack a fire suppression system and do not have sufficient space to properly store the collections or accommodate new acquisitions. Specialized equipment is also required to ensure the long-term preservation of the collections in the hot and humid environment of south Florida. The heating, ventilation and air-conditioning (HVAC) system has not provided adequate protection against mold growth, which has presented risks to staff health and the collections. However, the park has installed desiccant systems at the Beard Center and Robertson Building to help control relative humidity and curtail the growth of molds. Although the HVAC system maintains temperatures within the acceptable range for collection storage, maintaining proper humidity levels and preventing wide-scale humidity fluctuations has been problematic.

Some collection items have incurred damage from pest infestations. There is also inadequate work space for staff and researchers (NPS 2007b).

Everglades National Park currently provides personnel and administrative support for the South Florida Collections Management Center. The park curator was formerly responsible for all collections management, but is now assisted by additional staff (permanent registrar; permanent archivist; permanent, subject to furlough, archives technician; term museum technician; and other annually funded temporary personnel). The need for adequate museum collections staff was identified as an essential requirement to ensure the proper management and documentation of the collections and to address the large backlog of uncataloged and unprocessed collection items (NPS 2007b).

The Collection Management Plan, South Florida Parks, 2007 presented recommendations for remedial actions and long-term treatment and management of the SFCMC collections. The plan noted that it would not be cost-effective to enlarge the existing facility and mitigate existing problems and deficiencies. Rather, the plan recommended the construction of a new state-of-the-art curatorial facility. The NPS Southeast Archeological Center is anticipated to remain the primary repository for archeological items from the various park units (NPS 2007b).

In accordance with the NPS National Museum Storage Strategy (approved by Congress in 2007) the Collection Management Plan supported the retention of a centralized collections facility under a partnership agreement among the south Florida parks to achieve the most cost-effective and efficient operations. However, the plan recognized that the current South Florida Collections Management Center is inadequate and emphasized the need for all south Florida parks to commit funds, staffing, and other assistance to support effective operations (NPS 2007b).

VISITOR EXPERIENCE AND OPPORTUNITIES

Everglades National Park is a public park for the benefit and enjoyment of the people. More than 85% of the park consists of a vast, wetland wilderness (1.3 million acres of more than 1.5 million acres total). The limited developed areas are either near the park boundaries or along the main park road from the Ernest F. Coe Visitor Center to Flamingo.

Most of the park is set apart as a permanent wilderness, preserving essential primitive conditions that include the natural abundance, diversity, behavior, and ecological integrity of the flora and fauna (see chapter 1). The unique wilderness character, the water resources, and the wildlife of the park are fundamental to the purpose and significance of the Everglades. The National Park Service believes that the park should be managed to maintain the unique character of the Everglades and allow visitor opportunities that are related to its purpose and significance, including the following:

- boating (motorboats, canoes, and kayaks)
- wildlife viewing experiences throughout the park, both in frontcountry and backcountry areas
- access to frontcountry recreation for visitors unable to explore the vast backcountry of the park by boat
- access to backcountry for visitors interested in solitude and primitive recreation
- frontcountry and backcountry camping opportunities
- education focused on the unique natural and cultural heritage of the park (diverse ecosystems and wildlife, historical water flows, human history)
- opportunities for visitors to understand the complex flow of water from Lake Okeechobee through the Everglades in both historic and current contexts

- opportunities for visitors to understand adaptive management measures applied to protect the park's unique subtropical natural and cultural resources and visitor experience

This section focuses on the opportunities and experiences available to visitors at Everglades National Park.

Primary Interpretive Themes

The National Park Service believes that a key component of the Everglades experience includes opportunities to learn about the park's primary interpretive themes—the ideas and concepts about the Everglades that are the core of all interpretive programs and media (see “Primary Interpretive Themes” in chapter 1).

Information, Interpretation, and Education

Everglades National Park provides a varied array of educational and interpretive opportunities to help visitors experience the park. The following section details some of the opportunities available at the park.

Visitor Centers and Visitor Contact Stations. Everglades National Park has several visitor centers and contact stations to provide visitors with orientation, interpretation, and educational information and opportunities.

Ernest F. Coe Visitor Center—The Ernest F. Coe Visitor Center is just inside the main park entrance near Homestead, and this is the closest visitor center to the Miami area. The visitor center offers a wealth of information about the park and the natural and human history of the area. Open year-round and with rangers and volunteers to answer questions, the visitor center provides educational displays, informational brochures, and orientation films. The Ernest F. Coe Visitor

Center often has special art exhibits on display from local artists. A variety of educational items and souvenirs are available in the adjoining bookstore. The visitor center is a short distance from many popular hiking trails (NPS 2009k).

Royal Palm Visitor Contact Station—The Royal Palm visitor contact station has a limited staff presence, some interpretive exhibits, a bookstore, and storage space used by the park staff.

Gulf Coast Visitor Center—The Gulf Coast Visitor Center is 5 miles south of Tamiami Trail in Everglades City and serves as the gateway for exploring Ten Thousand Islands, a maze of mangrove islands and waterways that extends to Flamingo and Florida Bay. The visitor center offers educational displays, orientation films, informational brochures, and backcountry permits. Boat tours and canoe rentals are also available (NPS 2009k).

Flamingo Visitor Center—The Flamingo Visitor Center is about 38 miles south of the park entrance at the southern end of the Florida peninsula. Flamingo offers educational displays, informational brochures, and backcountry permits. Campground facilities, a marina store, and a public boat ramp are nearby. There are several hiking and canoeing trails in the area. Canoe, kayak, and bicycle rentals are available at the marina store, as are boat tours.

Shark Valley Visitor Contact Station—The Shark Valley Visitor contact station is on Tamiami Trail (Highway 41), about 25 miles west of the Florida Turnpike. Shark Valley offers educational displays, a park video, an underwater camera, and informational brochures. Guided tram tours, bicycle rentals, snacks, and soft drinks are available from Shark Valley Tram Tours, Inc. Two short walking trails are near the main tram loop.

Chekika—Formerly a state recreation area and now a part of the park, Chekika is a free day use area open seasonally (December–April) from dawn to dusk. Chekika is prone to

flooding during the summer. It has a picnic area with a lawn, tables, and several shelters shaded by tall tropical hardwood trees. This patch of higher and drier ground is known as a hammock, or tree island. The park provides portable restrooms and drinking water. Chekika has a short hiking trail along a boardwalk that crosses a sawgrass wetland and climbs onto the hardwood hammock. Chekika also serves as a jumping-off point for cyclists looking to bike along the paved roads and canal banks in the park's East Everglades Addition (Leposky 2009). During the winter, on-site volunteers help maintain the facilities.

Guided Tours and Ranger Programs. Guided tours and ranger programs are available to the public from many park locations. Ranger programs are available during both the wet and dry seasons, with programs varying depending on the season. The park offers ranger programs through the Shark Valley visitor contact station, the Gulf Coast Visitor Center, the Flamingo Visitor Center, and the Royal Palm visitor contact station. Most of the ranger-guided programs are available during the winter (December-April) and vary in availability throughout the week.

Royal Palm Contact Station and Ernest Coe Visitor Center—Many ranger-guided programs are offered at Royal Palm and Long Pine Key, including coffee with a ranger, nature walks at the many interpretive trails in the area, bike tours, a car caravan, a gator walk, and an evening program. Interpretive videos are available at the Ernest F. Coe Visitor Center. Once a month, an after-dark Nocturnal Encounters program is offered to families and interested visitors. These visitor centers also offer limited interpretation of the ongoing restoration efforts in the Hole-in-the-Donut area.

The Ernest F. Coe Visitor Center offers a slough slog to visitors. This off-trail hike gives a hands-on view of the River of Grass and reveals the hidden world of a cypress dome (NPS 2009b).

Tours of the historic Nike Missile Base site are offered daily during the winter season. The guided tours interpret the site's role in the Cold War defense system in south Florida.

Gulf Coast—The Gulf Coast Visitor Center offers ranger-led programs including boat tours, canoe trips of varying degrees of difficulty, nature walks, bike tours, and an Everglades-at-night program (NPS 2009b). The Gulf Coast boat tour of Ten Thousand Islands departs from the Gulf Coast marina area. Tours operate every day, year-round.

Flamingo—Flamingo area boat tours explore the Whitewater Bay backcountry and Florida Bay. Flamingo offers a varied slate of ranger-led activities, including canoe trips, bird and botany walks, nature walks, educational talks about the park, a car caravan to points along the main park road, and an evening program (NPS 2009l).

Florida Bay—Numerous commercial tours operate within Florida Bay. These include eco tours, canoe/kayak tours, and, predominantly, fishing tours into the bay. Some of these tours originate outside the park.

Shark Valley—Shark Valley Tram Tours offers two-hour, naturalist-led tours through the northern region of Everglades National Park. Visitors on the open air tour are introduced to the River of Grass and the wildlife inhabiting it. At the midway point of the trip, visitors can stroll up the spiral ramp and platform of the Shark Valley observation tower for a panoramic view of the heart of the Everglades (Shark Valley Tram Tours 2010). Shark Valley also offers multiple ranger-led bike tours and nature walks (NPS 2009b).

Airboat Tours—Airboat tours in the East Everglades Addition are available through commercial operations along the Tamiami Trail. Four airboat tour companies operate within the park: Coopertown, Everglades Safari, Gator Park, and Everglade Airboat Tours.

Environmental Education Program. Since the early 1970s, teachers have been partnering with Everglades National Park's Education Program to help prepare students to play a role in preserving and protecting this fragile wetland. In winter the park offers free, ranger-led, curriculum-based programs to the students of south Florida, as well as teacher training. Other environmental education programs include the following:

Shark Valley— Students board an open-air tram for a 15-mile round trip with a ranger. Pre-visit preparation reinforces the concepts of water flow, food chains, native cultures, flora and fauna.

Royal Palm / Long Pine Key— Rangers guide students on a walking tour of the Anhinga Trail boardwalk. Teachers pair up with rangers to teach the students about the park's fragile habitats.

Camp Program at Hidden Lake and Loop Road Education Centers— During overnight and multiday stays, students participate in activities such as dry and wet hikes, canoeing, evening programs, star gazing, archeology or Miccosukee Indian study, journaling and artistic expression, water debate, and a tram trip.

Recreational Activities

Visitors to Everglades National Park value the resources that relate to the park's purpose and significance—the protected natural ecosystem of the Everglades and its unique qualities, including its flora and fauna; the scenic landscape; and the vast expanses of wilderness unmarked by human development.

Unsurprisingly, locations and destinations within the park that allow these types of experiences are popular. The Anhinga Trail with its abundant wildlife, Shark Valley tram tours that take visitors into the sawgrass prairie and educate them about the landscape, and boat tours out of the Gulf Coast and Flamingo that explore the extensive waters of Ten Thousand Islands and Florida Bay all

cater to the desires of park visitors (NPS 2008b).

Visitors value the Everglades for its quiet and peaceful terrain and the prospect of finding solitude amongst the mangroves or in the River of Grass (NPS 2008b). The numerous water trails throughout the park allow visitors to explore the park's extensive backcountry by motorboat, canoe, or kayak. Florida Bay and Ten Thousand Islands are marine environments that provide excellent boating and fishing options for those seeking solitude and adventure. The park's most fundamental resource is the ecosystem itself, and its value is reflected in the desires and actions of visitors to the park.

The diverse habitats of the Everglades offer visitors a plethora of activities that include hiking, canoeing, kayaking, boating, biking, fresh and saltwater fishing, and camping in the expansive wilderness (NPS 2009k).

Recreational activities can vary greatly across different areas of the park and are detailed in the following sections.

Hiking. Everglades National Park offers a variety of hiking opportunities that allow visitors to explore the diverse habitats of the park (NPS 2009k). From half-mile, self-guided boardwalks, to 7.5-mile single-track dirt paths, to the 15-mile Shark Valley tram loop, every district in the park provides hiking options except for the Gulf Coast district. Flamingo, in particular, provides miles of hiking options, with the Coastal Prairie Trail among the most popular in the park. The main park road provides access to numerous interpretive boardwalks and hikes in the Pine Island district, including Long Pine Key Trail, another of the park's popular hikes. During the wet season, access to hiking trails in the park may be limited in areas that become submerged.

Bicycle Opportunities. Bicycle travel is permitted on park roads open to motor vehicles and on the 7-mile Long Pine Key nature trail, on which bicycle use is specifically permitted. Bicycle rentals are

available at Flamingo, and there are two trails in the area that currently allow bicycling—the Snake Bight Trail and Rowdy Bend Trail (NPS 2009h). Visitors can bike the 15-mile Shark Valley tram loop, and bicycle rentals are available at the Shark Valley Tram Tour facility.

Camping. The park offers both frontcountry and backcountry camping opportunities. Visitors can stay at developed frontcountry sites with amenities such as restrooms, water, and RV hookups. Frontcountry campsites in the park are all accessible by car, accommodate tents and RVs, and offer both individual and group settings.

Backcountry camping at the park allows visitors to experience the park’s vast wilderness. The park has 47 backcountry campsites that are accessed by canoe, kayak, or motorboat, though a few can be accessed by hikers. Visitors can select between a variety of ground sites, beach sites, and elevated camping platforms called chickees (NPS 2009c). There are backcountry campsites throughout the park in Florida Bay, the Ten Thousand Islands, Whitewater Bay, and Pine Island area.

A backcountry permit is required for all wilderness campsites. Permits are only issued the day before or the day of the start of a camping trip. Permits are not issued over the telephone. The majority of backcountry permits are issued from the visitor centers at Flamingo and the Gulf Coast site in Everglades City for visits into the park’s marine backcountry. A small number of permits are issued for park freshwater areas from the park headquarters building in Homestead (NPS 2009k).

Fishing. One-third of Everglades National Park is covered by water, creating excellent boating and fishing opportunities. Snapper, sea trout, redfish, bass, and bluegill are plentiful. Saltwater fishing areas include Florida Bay, Ten Thousand Islands, and elsewhere in the park’s coastal zone. Florida Bay is a world-renowned tarpon fishery.

Freshwater and saltwater fishing require separate Florida fishing licenses. No commercial fishing is permitted in Everglades National Park (NPS 2009k). No spearfishing is permitted.

Airboating. Commercial airboating opportunities are available in the East Everglades Addition. Four companies provide airboat tours (Coopertown, Gator Park, Everglades Safari Park, and Everglade Airboat Tours). The first three companies identified own land within the authorized park boundary and operate their businesses from these sites. On their properties the land uses are for parking, a restaurant, gift shop/ticket office, restrooms, fenced wildlife areas with walking paths, wildlife show areas, and in the case of Coopertown, a private residence and at Gator Park an RV campground and borrow pit/lake. The last business listed (Everglade Airboat Tours) does not own land in the park and operates tours from the public airboat launch site adjacent to the Coopertown property. This site and a launch site north of Chekika along SW 237th Avenue also provide private airboat access into the East Everglades Addition. Private airboating is not permitted in the park outside the East Everglades Addition.

The study “Airboat/ORV Trail Inventory for the East Everglades Addition Lands” (University of Georgia 2006) documented evidence of substantial activity in the northern half of the Addition. The study compared aerial photographic evidence of airboat trails from 1994, 1999, and 2003 and determined that airboat trails are declining in number and extent over time. Narrow, “single pass” airboat trails tend to be short lived, although there is a network of wider trails formed through repeated use that remains relatively stable over time. (The results of this study are discussed in more detail in the “Wilderness Character” section of this chapter.)

Boating. Visitors can explore Florida Bay, Whitewater Bay, and Ten Thousand Islands by motorboat, canoe, or kayak. Each area has its own characteristics and habitats to explore.

Boating in the waters of the park is for the skilled. Treacherous passes cut through long banks of mud and seagrass, separating the basins of the shallow coast in Florida Bay. Other areas, especially in Ten Thousand Islands, have many oyster reefs and sandbars. Safely exploring this region while protecting the sensitive underwater habitats requires the ability to read the water. Shallow areas are rarely marked. Visitors should know the draft (depth) and limits of their boat and have the ability to read and use nautical charts (NPS 2009k).

Patterns and levels of boat use in the park are documented in a January 2009 study titled “Aerial Survey of Boater Use in Everglades National Park.” This study is discussed further in the following “Visitor Use” section of this chapter.

The Wilderness Waterway is a 99-mile water trail open to motorboaters and canoe/kayak users. The Wilderness Waterway begins at the Gulf Coast and winds through mazes of mangrove-lined creeks and bays before ending at Flamingo. The waterway is minimally marked and can be difficult to navigate; it should be used only by experienced boaters. Permits for Wilderness Waterway can be acquired at the Flamingo and Gulf Coast visitor centers.

Paddling—There are many opportunities to explore the park’s natural beauty in canoes and kayaks. Both the Flamingo and the Gulf Coast districts offer multiple water trails designated for paddle-use only. Backcountry campsites provide paddlers with destinations for overnight trips.

The Wilderness Waterway is used by canoers and kayakers; it requires at least eight days of paddling to complete the entire 99-mile trail from the Gulf Coast to Flamingo.

Florida Bay—Recommended motorboat routes in Florida Bay are currently identified on National Oceanic and Atmospheric Administration charts and in the *Florida Bay Map and Guide*. Florida Bay has scattered

channel/access route markings and limited idle-speed/no wake areas, but there is unrestricted boat access throughout most of Florida Bay. No recreational use is permitted in wildlife habitat protection areas throughout the bay to protect nesting and rookery areas. All of the keys in Florida Bay are closed to recreational uses except for North Nest, Little Rabbit, Carl Ross, and Bradley keys. Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) is closed to public access.

In 2011, a pole/troll nonmotorized boating zone was implemented for Snake Bight in Florida Bay.

Motor Vehicle Access. Transportation to and within the park is primarily by private vehicle or vessel. There are numerous regional public transportation routes within Miami-Dade County, some of which extend to the Homestead/Florida City area. None of these routes access the park, and there are no approved plans to extend these routes to the park.

In 2004 a study was conducted for the National Park Service of the feasibility and cost of several options for alternative transportation to the park (HTNB 2005). These options included connections between the Miami-Homestead gateway area to (1) the main park entrance along the main park road and then all the way to Flamingo, and (2) Tamiami Trail destinations along the park’s northern boundary. These options have been incorporated into the action alternatives in this plan.

Climate Change. Since at least the mid-2000s, park managers have been carefully considering, in the context of climate change, how to (and whether to) construct or upgrade visitor and operational facilities in flood-prone zones. For example, fixed docks have been replaced with floating docks or removable platforms, and NPS staff housing at Flamingo has been replaced with elevated/hardened/re-locatable units that are more resistant to sea level rise and storms.

Recreational opportunities for visitors, such as birding, fishing, and boating, could change if water levels and species shift in terms of area, or if species' population levels change.

VISITOR USE

Annual and Seasonal Visitation

This section focuses on visitor use characteristics at Everglades National Park—how many people visit the park and when, where they come from, how long they stay, and how weather can affect visitation. Following park establishment in 1947, visitation climbed rapidly, topping more than a million visitors per year in 1964. The highest yearly recreation visitation, 1.53 million visitors, was recorded in 1972. Visitor use declined sharply over the next decade, eventually dropping to 550,000 in 1982; the lowest in two decades. Annual recreation visitor use increased again thereafter, averaging about 1,005,000 during 1990–2011 (NPS 2012a).

The cycle of increasing and declining visitation has been repeated several times during the park's existence, reflecting the influences of economic climate, fuel prices, and weather, particularly severe tropical storms that discourage leisure travel. Annual recreation visitation dropped to 850,000 in 2005 following hurricanes Katrina and Wilma. Damage caused by those storms caused the only overnight lodging accommodations in the park (at Flamingo) to close, and the storms also affected campground support facilities there. As a result, overnight visitor use to the park dropped by 80%. A commercial services plan for Flamingo was completed in conjunction with the GMP planning effort. This plan will guide redevelopment of Flamingo, including redevelopment of overnight lodging, enhanced visitor opportunities, and expanded services such as tours, food/ beverage, and recreational equipment rentals (NPS 2012a).

Note that the reported visitor use figures capture most, though not all of the recreation

visitor use at the park. This is because the following types of use are not counted: visitors taking commercial airboat tours offered by four companies in the East Everglades. Addition, private airboat users, dispersed land-based use in remote areas not tracked by traffic counters, and fishing and sport boats entering the park from coastal waters. (The latter type of use has increased in recent years; see next paragraph). A lack of data precludes statistically reliable estimates; however, park staff believe the unreported use is in the range of 300,000 to 450,000 visitors per year (Supervisory Planner Fred Herling, Everglades National Park, pers. comm. with Ron Dutton 2009).

An "Aerial Survey of Boater Use in Everglades National Park" conducted in 2008 (J. S. Ault et al.) indicates that boater use in Everglades National Park has more than doubled during the last three decades, and that boats are entering the park from additional points of origin such as through the Florida Keys and from the Naples and Marco Island area to the north. This finding is consistent with the number of recreational vessels registered in the south Florida region more than doubling during the last three decades. Other studies of tourism and recreational fishing and boating activity in the Florida Keys, including Florida Bay, also support boat-based entry into the park from adjacent areas of the Keys. In fact, the majority of boating and fishing use in the Keys, including charter and guided fishing, occurs offshore and in the near-shore flats areas outside the park. These areas would not be directly affected by management actions associated with the GMP (Leeworthy and Wiley 1997; Leeworthy et al. 2010; and Fedler 2013).

Overnight visitors, including backcountry campers using chickees, accounted for about 85,800 of the total reported recreation visitation. Overnight use has declined substantially following hurricanes Katrina and Wilma.

Recreation visitation to the Everglades is highly seasonal. Peak monthly visitation,

typically in the 130,000 to 150,000 range, occurs in February or March. Monthly visitation is typically the lowest in September, when 30,000 to 50,000 visitors come to the park (see figure 7). Seasonal weather differences are a major influence on recreation use, with heat and mosquitoes discouraging visitation during the summer; the tropical storm season deterring tourism to south Florida in the fall and thereby visitor use to the park; and pleasant, mild winters promoting “snowbird” migration and increased visitor use during that time of year. Contrary to the rest of the park, Florida Bay visitation is highest during the summer when the weather conditions for boating and waterborne recreation are best.

The general seasonal pattern in overall recreation visitation applies to overnight use as well (figure 8). Whereas monthly visitation during the high season is about three times the visitation during the low season, the ratio for overnight stays during the high season is in the range of 10 to 15 times higher than overnight stays during the low season. Stays at Flamingo Lodge historically accounted for about 30% to 35% of the total overnight use at the park. Frontcountry tent camping (individual and group), backcountry camping, and RV camping accounted for about equal shares of the remainder. Overnight lodging has not been available in Flamingo since the existing Flamingo Lodge was damaged by tropical storm Katrina.

As shown in figure 9, recreation use at Everglades varies substantially from year to year, with adverse weather (tropical storms/hurricanes in particular), being among the most influential factors in that variation. The extent of this influence depends on the frequency, severity, timing, and location of storms, as well as the aftereffects in terms of damage to park facilities and access routes (both internal and external to the park). Relatively mild storms have little effect on visitation. Major storms such as Andrew, Katrina, and Wilma can cause substantial damage to facilities within and outside the park. Annual recreation use declined by

approximately 25% in the wake of tropical storms Katrina and Wilma (figure 9), and that effect has lingered with the continued lack of available overnight lodging and certain other services at Flamingo. Although not suffering the same degree of damage to facilities as occurred at Flamingo, substantial reductions in recreation visitor use also occurred elsewhere in the park.

More recently, visitation levels have increased at Royal Palm, the main entrance, and Shark Valley, while the number of recreation visitors at Everglades City and the number of boat visits continue to decline.

Visitor Origin and Length of Stay

Year-round residents of Florida are the single largest group of visitors (about 25%) to Everglades National Park. Extended stay/seasonal residents account for about 10% of all visits, while vacationers from Michigan, Pennsylvania, Indiana, and New York collectively account for roughly another 20%. Travelers from the remaining states, whether in Florida for an extended stay or shorter vacation, also account for about 25% of the recreation visits. The remaining visitors to the Everglades, about 20%, are international, drawn by south Florida’s favorable international reputation for climate, beaches, outdoor recreation, and tourism opportunities, and lifestyle and culture. Everglades National Park is both a contributor to and a beneficiary of that reputation. Canadians, Germans, French, Dutch, and British nationals account for about 80% of international visitors.

Most recreation use in the Everglades (75% in 2008) is day use. Among day users, the duration of stay is relatively long, with about half of day users staying five hours or longer. Many day visitors to the Everglades also spent one or more nights in the area outside the park, either with friends or relatives, at vacation homes, or in local lodging accommodations. Of the 25% who stayed a day or longer, most characterized their visit as

one or two days. However, 11% of all visitors stayed three days or longer (NPS 2008).

The 2008 visitor survey (NPS 2008), conducted only among users on the mainland portion of the park, revealed the following notable visitation characteristics:

- the top five sites visited—Shark Valley, Royal Palm area / Anhinga Trail, Flamingo, the Ernest F. Coe Visitor Center, and the Gulf Coast Visitor Center / Ten Thousand Islands area [Note: these results reflect a “snapshot in time” during two one-week periods and may not reflect overall general visitor use patterns over time.]
- approximately 35% to 40% of the parties responding to the survey reported two or more entries to the park during their visit [Note: the multiple entries could be during the same day, on different days, or via different entry points, e.g., Shark Valley and the main entrance.]
- more than 20% indicated that visiting Everglades National Park was the primary reason for their trip to south Florida
- adults between the ages of 51 and 75 accounted for more than half of the users surveyed

Climate Change. Climate change might affect seasonal use patterns at the park. Differences in the timing and level of precipitation, drought, sea level changes, and changes in tropical storm patterns could influence seasonal migration and access for dispersed

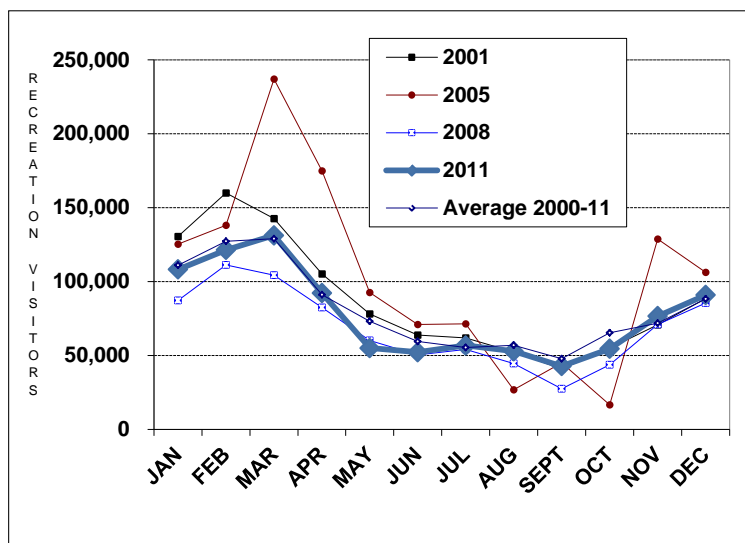
recreation. Climate change might also affect the vegetation and wildlife resources that draw many visitors to the park.

REGIONAL SOCIOECONOMIC ENVIRONMENT

Introduction

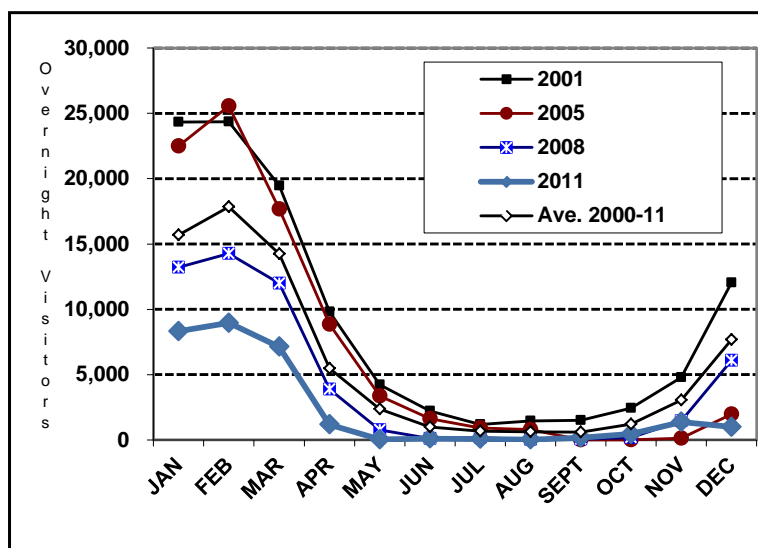
The park’s vast area provides many interfaces with adjacent land use and the nearby communities. The park and the adjacent lands and nearby communities are the socioeconomic region of influence for this assessment. The region of influence extends from metropolitan urbanized Miami-Dade County on the east, to the Gulf Coast on the west (Collier County), and south to include the mid-Florida keys (Monroe County). Because economic and demographic data are generally available at the county level, data are typically presented for Collier, Miami-Dade, and Monroe counties in this document. Nearby land uses around the park include farming, forests, orchards, and nurseries for landscape plants; industrial, rural, and suburban scale development; environmental restoration areas; undeveloped natural areas; transportation corridors; and the coastal waters of the Gulf of Mexico and Florida Bay.

Most of the park, including most of Florida Bay and the uninhabited keys and coastal areas along the Gulf of Mexico, is in Monroe County. Extensive commercial and residential development, much of it focused on tourists and seasonal residents, exists on the larger keys adjacent to the park’s southern boundary in Florida Bay.



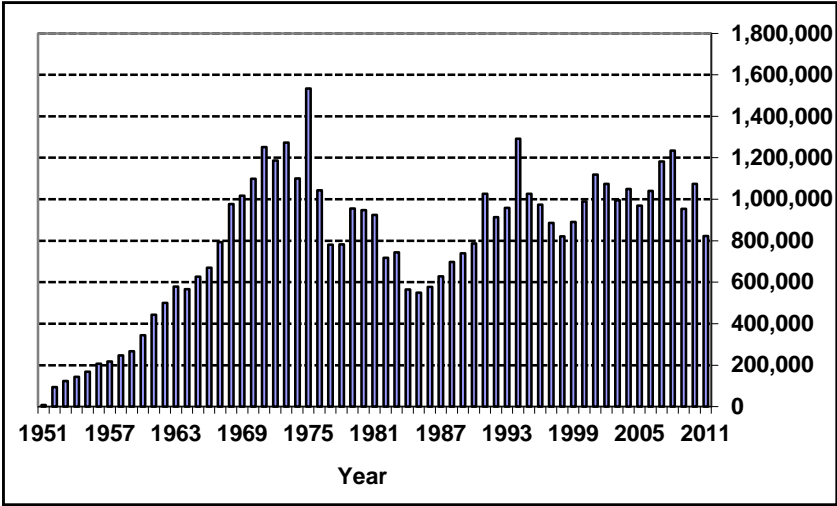
(Source: NPS 2012b)

FIGURE 7. MONTHLY RECREATION VISITATION AT EVERGLADES NATIONAL PARK



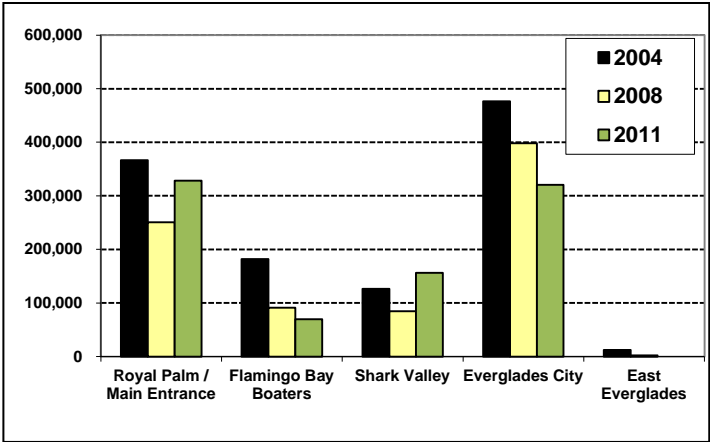
(Source: NPS 2012b)

FIGURE 8. MONTHLY OVERNIGHT VISITOR USE AT EVERGLADES NATIONAL PARK



(Source: NPS 2012a)

FIGURE 9. RECREATION VISITS BY YEAR TO EVERGLADES NATIONAL PARK



(Source: NPS 2009b)

FIGURE 10. RECREATION VISITS TO KEY DESTINATIONS BEFORE (2004) AND FOLLOWING (2008) HURRICANES KATRINA AND WILMA

The eastern portion of the park, including the East Everglades Addition, is in southwestern Miami-Dade County. Miami-Dade County, along with neighboring Broward County and Palm Beach County further north, form the Miami-Fort Lauderdale-Pompano Beach Metropolitan Statistical Area. This entire metropolitan area serves as a gateway for visitors to Everglades National Park from the east. However, Homestead and Florida City are the closest towns to the park headquarters, the main entrance, and Flamingo. Although the core of the Miami area is urbanized, a substantial amount of farm, undeveloped, and rural residential land remains near the park, acting as a buffer between the park and the urban Miami area. However, much of this land also has been converted in recent years to accommodate new suburban development.

The far northwestern portion of the park is in Collier County, which also comprises the Naples-Marco Island Metropolitan Statistical Area. The community of Everglades City is the immediate gateway to the northwest portion of the park—including some of the Ten Thousand Islands area and the Wilderness Waterway. Naples, the major gateway community to the park for the west coast of Florida, is northwest of Everglades City.

The northern boundary of the park, moving from east to west, is comprised of water conservation areas associated with the *Comprehensive Everglades Restoration Plan*, the southern portion of the Miccosukee Indian Reservation, the southern portion of Big Cypress National Preserve, and the southern boundary of other public and private properties. With the exception of the Miccosukee Indian Reservation and Miccosukee Reserved Area, little residential or commercial development exists along the park's northern perimeter.

Population

Between 1990 and 2000, Florida gained more than 3.0 million residents, with a further gain of 2.8 million residents between 2000 and

2010. These gains ranked Florida among the most rapidly growing states in terms of population growth over the past two decades. In 2010, Florida's population of 18,801,311 ranked fourth in the nation behind California, Texas, and New York (U.S. Census 2010).

From 2000 to 2010, Florida's population increased by 2.8 million people—the third highest among the states. Net migration of nearly 2.0 million residents from other states and nations, accounted for nearly 85% of the state's population growth. Among the other states, only Texas gained more than 1.0 million residents via migration. Most domestic migrants to Florida came from New York.

In 2010, the three-county region of the park contained nearly 2.9 million residents, about one of every six of the state's residents. Most of this population is concentrated along the east coast in Miami-Dade County (2.5 million). Collier County had more than 321,000 residents, and Monroe County had approximately 73,000 inhabitants (table 15).

Substantial population growth has occurred in Collier and Miami-Dade counties since 1990. Miami-Dade County registered a population increase of 559,341 residents, or 29% between 1990 and 2010. Although lower in number than the population gains in Miami, the gateway communities of Florida City and Homestead grew faster; Florida City's population increased by 87% (to more than 11,000) and Homestead's population more than doubled (to 60,512). The rapid population growth resulted in the subdivision and development of much farm land east of the park to more urban uses.

Collier County's population more than doubled between 1990 and 2010, a net gain of 169,421 residents that raised the county's population above 321,000. Most of the residential development to house this growth occurred in unincorporated areas of the county around Naples. Everglades City, the community nearest the park in the northwest portion of the park, had 400 residents in 2010.

Some new year-round and seasonal housing is being developed in the Everglades City area.

Monroe County, which includes the Florida Keys, has a limited amount of privately owned developable land. As a result, its resident population is substantially lower than Collier and Miami-Dade counties, approaching 80,000 in 2000. Growth continued through 2004. However, the county lost nearly 6,500 residents in the years following hurricanes Katrina and Wilma in 2005, which resulted in major property damage in the keys.

A portion of the Miccosukee Reserved Area borders the park on its northern boundary.

The reserved area is the center of the Miccosukee population. The tribe reports approximately 650 enrolled members, although it is unclear how many members live in the reserved area (Miccosukee Tribe 2008).

In addition to its year-round residents, south Florida experiences a substantial seasonal population influx of “snow birds” escaping winter in the more northerly states and attracted by the region’s favorable winter climate. (Snowbirds generally are elderly, mostly retired, individuals who spend at least

**TABLE 15. RESIDENT POPULATION OF COUNTIES AND SELECTED CITIES AND TOWNS
NEAR EVERGLADES NATIONAL PARK**

Area	1990	2000	2010	Total Change 1990–2010	Total % Change 1990–2010
Collier County	152,099	251,377	321,520	169,421	111%
Everglades City	321	479	400	79	25%
Naples	19,505	20,976	19,537	32	0%
Miami-Dade County	1,937,094	2,253,362	2,496,435	559,341	29%
Florida City	6,011	7,843	11,245	5,234	87%
Homestead	28,387	31,909	60,512	32,125	113%
Miami	358,548	362,470	399,457	40,909	11%
Monroe County	78,024	79,589	73,090	-4,934	-6%
Islamorada	7,083	6,846	6,119	-964	-14%
Key West	24,832	25,478	24,649	-183	-1%
Three-County Region	2,167,217	2,584,328	2,891,045	723,828	33%
Florida	12,937,926	15,982,378	18,801,311	5,863,385	45%

Source: U.S. Census Bureau 2000 and 2011a

30 consecutive days somewhere else. Some snowbirds may be considered seasonal or temporary residents, particularly if they rent apartments or own second homes.) A 2005 study from the University of Florida

estimated more than 800,000 snowbirds in Florida at the peak of the winter season. That estimate likely translates to several million snowbirds during the season (Smith and House 2006 and 2007). Miami, Fort

Lauderdale, Palm Beach, Naples and the Florida Keys are among the more popular destinations for snowbirds. The timing of this influx corresponds to periods of higher visitor use at the park.

Another seasonal population influx occurs in conjunction with the region's agricultural industry and its demand for labor, much of which is met by migrant farm workers. A study conducted in 2000 estimated more than 35,000 such workers and family members in Collier and Miami-Dade counties (Larson 2000). Many of these workers worked on large farming operations east and northwest of the park. Visitor use profiles do not indicate if the migrant farm worker population generates substantial visitor use to the park. Furthermore, the migrant farm worker population is likely declining because of the conversion of farm lands to residential and commercial development in recent years. According to the 2007 Census of Agriculture, the combined acreage of land in farms in the three counties declined by 94,000 acres (or 35%) in the five-year period 2002 to 2007 (USDA 2009).

Tourists are another population category for the park, with Miami and south Florida being a major tourism and convention destination for international and domestic visitors. Approximately 12 million overnight visitors are estimated to come to south Florida each year, with a record 13.4 million visitors in 2011. South Florida is also a major departure point for the vacation cruise industry; approximately 7.7 million passengers sailed from Miami and Fort Lauderdale in 2011 (Greater Miami Convention and Visitors Bureau 2012). Many of these passengers extend their stay in the Miami area, arriving before or staying after their cruise to take in other sights, attractions, and activities, including visits to the park. Clients booked by cruise lines and travel agents are a major market for the commercial airboat operators in the East Everglades Addition.

These recreational opportunities, including wildlife viewing, fishing, bicycling, nature

study, access to scenic views, and other environmental resources in the park contribute to the appeal of the region for these seasonal residents and visitors, as well as vacation/second home development that is an integral part of the economy.

Economic Overview

As measured by the number of full- and part-time jobs, the size of the economies for the three counties mirrors their population, ranging in 2010 from 1.42 million in Miami-Dade County to 53,885 in Monroe County. Total employment across the three counties exceeded 1.64 million in 2010 (see table 16). Before the beginning of the national economic recession in late 2007, the regional economy had expanded along with population growth since the year 2000, with a net gain of 234,093 jobs registered in the three counties. From 2000 to 2007, metropolitan Miami-Dade County posted the largest net gains, 178,496 jobs. The number of jobs based in Collier County increased by more than one-third during that same period. Even though its population declined during that period, Monroe County registered a net gain of 3,449 jobs. In part, that increase reflected activity associated with post tropical storms Katrina and Wilma reconstruction.

There are both similarities and differences among the three counties in terms of economic composition and diversity. None of the three are heavily industrialized. Rather, their economies tend to be more service and trade-oriented (table 17). Compared to the nation, state, or other two counties, Miami-Dade County's economy is more heavily concentrated in the transportation (because of the seaport and airport), wholesale and retail trade, and education and health care sectors. Tourism, outdoor recreation, snowbird migration, and the many older residents in the county all contribute to that pattern.

Monroe County was a minor contributor to the overall number of jobs in the region,

accounting for only about 3.3% of the regional total in 2010. The distribution of jobs, by major industry, in Monroe County reflects the economy's strong dependence on tourism. More than 20% of the county's jobs were in the accommodations and food services sector.

High percentages of jobs in other services, including the recreation and entertainment, information, finance, insurance, real estate, and government sectors, also occurred in Monroe County. There were relatively fewer jobs in manufacturing, education, and health care sectors in the county—the latter in part likely a reflection of the availability of these services in Miami-Dade County.

The rapid population growth and associated new housing and commercial development that have been an important economic driver in Collier County is evident in employment data showing that the construction and information, finance, insurance, and real estate sectors combined to account for more than 24% of all jobs (compared to less than 18% nationally). The share of jobs in the food services and accommodations sector was also higher than either the nation or Miami-Dade County, but not to the same degree as in Monroe County.

South Florida's strong economy in the 1990s and early 2000s contributed to unemployment being consistently below statewide and national levels. In 2000 the unemployment rates for the three counties ranged from 2.9% for Monroe County to 5.1% for Miami-Dade County, with statewide unemployment at 3.8% of the labor force. Despite expansion of the labor force by more than 1.2 million workers between 2000 and 2007, unemployment remained low across the region and state through 2007 because economic growth fueled labor demand. The number of unemployed actually declined in Miami-Dade and Monroe counties during that period. Collier County experienced a slight increase in the number of unemployed and unemployment rates, but this occurred against a backdrop of a 120% increase in resident population.

Labor market conditions in the region declined markedly during the recent national economic recession, precipitated by a slowdown in new construction, and tourism and vacation travel, two important segments of the regional economy (table 18).

TABLE 16: TOTAL FULL-TIME AND PART-TIME EMPLOYMENT, 2000 AND 2010

Area	2000	2010	Absolute Change	Percent Change
Collier County	144,498	171,740	27,242	18.9%
Miami-Dade County	1,276,003	1,416,227	140,224	11.0%
Monroe County	53,639	53,885	246	0.5%
Three-county Total	1,474,140	1,641,852	167,712	11.4%
Florida	8,933,114	9,866,177	933,063	10.4%

Source: U.S. Bureau of Economic Analysis 2012

TABLE 17: EMPLOYMENT BY MAJOR INDUSTRIAL CATEGORY, 2010

	Collier	Miami-Dade	Monroe	Florida	U.S.
Goods-Producing					
Natural Resources and Mining	4.1%	0.7%	3.1%	1.7%	2.7%
Construction	7.2%	4.2%	7.9%	5.2%	5.1%
Manufacturing	1.8%	2.9%	0.7%	3.5%	7.0%
<i>Subtotal</i>	<i>13.0%</i>	<i>7.8%</i>	<i>9.4%</i>	<i>10.3%</i>	<i>14.9%</i>
Services-Producing					
Transportation	1.6%	5.6%	2.3%	3.0%	3.2%
Information, Finance, Insurance, Real Estate	17.3%	12.3%	12.3%	13.2%	11.7%
Wholesale and Retail Trade	13.7%	15.6%	12.4%	14.6%	13.7%
Education and Health Care	11.7%	13.9%	6.6%	13.1%	13.4%
Accommodation & Food Services	9.4%	7.2%	20.5%	8.0%	7.0%
Other Services*	25.4%	26.5%	22.4%	25.5%	21.9%
<i>Subtotal</i>	<i>79.1%</i>	<i>81.2%</i>	<i>76.4%</i>	<i>77.5%</i>	<i>70.8%</i>
Government	7.9%	11.1%	14.2%	12.3%	14.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

* Includes professional and technical services, management of companies, administrative and waste services, arts, entertainment and recreation, and other services

Source: Derived from U.S. Bureau of Economic Analysis 2012

Employment data indicate that more than 66,000 jobs were lost in the region during the period of the recession, officially dated from December 2007 through June 2009 (NBER 2010). This figure includes more than 10,000 construction jobs lost in Collier County due to the dramatic slowdown in new residential development. In the wake of those job losses, unemployment rates more than doubled, reaching double-digit levels in Collier and Miami-Dade counties.

In 2010, more than 170,000 prospective workers were unemployed, representing an increase of more than 113,000 unemployed as compared to 2007. Although high levels of unemployment persist, the three-county

region has since realized gains in employment that offset more than 40% of the earlier declines.

Income and Poverty

In 2000, the total personal income of residents in the three-county area was \$70.9 billion, \$57.9 billion of which accrued to residents of Miami-Dade County. By 2010, total personal income of the three counties had climbed to \$114.4 billion—an increase of 61.4% and 4 percentage points higher than the 57.3% increase registered statewide (table 19).

TABLE 18. UNEMPLOYMENT AND UNEMPLOYMENT RATES FOR SELECTED PERIODS

	2007		2010		2011	
	Unemployed	Unemp. Rate	Unemployed	Unemp. Rate	Unemployed	Unemp. Rate
Collier County	6,523	4.3%	16,751	11.6%	15,269	10.3%
Miami-Dade County	52,538	4.4%	153,926	12.5%	142,836	11.3%
Monroe County	1,186	2.7%	3,260	7.1%	3,001	6.4%
Florida	371,641	4.1%	1,030,146	11.3%	970,362	10.5%

[Note: Unemp. = unemployment]

Source: U.S. Bureau of Labor Statistics 2012

TABLE 19. TOTAL PERSONAL INCOME, 2000 AND 2010

Area	2000	2010	Total Income % Change 2000–2010	Population % Change 2000–2010
Collier County	\$ 10,011,970,000	\$ 18,650,524,000	86.3%	28%
Miami-Dade County	\$ 57,922,341,000	\$ 91,410,768,000	57.8%	11%
Monroe County	\$ 2,941,452,000	\$ 4,304,355,000	46.3%	-8%
Three-County Total	\$ 70,875,763,000	\$ 114,365,647,000	61.4%	12%
Florida	\$457,539,355,000	\$719,828,478,000	57.3%	18%

Source: Bureau of Economic Analysis 2012

In 2010, the three counties together accounted for nearly 16% of the total statewide personal income. Personal income growth in all three counties outpaced the combined effects of population growth and general inflation during the period, indicating an improvement in general economic welfare among residents. Among the three counties, and despite a reduction of more than \$2.3 billion in income between 2008 and 2009, Collier County had the largest relative increase, more than 86%, to \$18.6 billion.

Nonearned income in the form of dividends, interest, rent, and personal current transfers are important sources of income for local residents. Nationally, nonearned income accounted for 35% of the total personal income in 2010 (table 20). The comparable share for the state was 46%. However, in both

Monroe and Collier counties, nonearned income accounted for more than half of the total personal income. In other words, the resident populations of those two counties derived more income from investments, government retirement receipts, and Medicare and Medicaid than was paid to all workers employed in the respective counties at the time. The contribution of nonearned income to total income in Miami-Dade County was midway between the statewide and national averages. The high levels of nonearned income are an indication of the relatively large retired and seasonal populations living near the park.

The favorable economic conditions present across much of the region in the years preceding the recent recession are reflected in local per capita personal incomes (PCPI) and

the local incidence of poverty (tables 21 and 22). (PCPI is the total personal income divided by the total resident population of an area. Personal income includes income from all sources—wages, investments, social security, etc.).

PCPI for Florida, which was below that national average in 2000, was nearly the same as the national average by 2007. However, the recessionary effects on personal income were relatively heavier in Florida than elsewhere

across the nation, such that statewide PCPI in 2010 lagged the national average by 5%.

As a result of strong gains in personal income over between 2000 and 2007, Collier and Monroe counties ranked first and second in terms of PCPI among Florida's 67 counties in 2010. Miami-Dade County's per capita personal income of \$36,520, although below the corresponding statewide and national averages, represented a narrowing of the gap compared to previous years, ranking it 25th.

TABLE 20. COMPOSITION OF TOTAL PERSONAL INCOME, 2010

	Collier	Miami-Dade	Monroe	Florida	U.S.
Net Labor Earnings	32%	61%	46%	55%	65%
Dividends, Interest and Rent	55%	17%	42%	25%	17%
Personal Current Transfers	13%	23%	12%	21%	18%
Total Personal Income	100%	100%	100%	100%	100%

Source: Bureau of Economic Analysis, 2012

TABLE 21. PER CAPITA PERSONAL INCOME

Area	2000	2010	% Change 2000–2010	% of Florida Average 2010	CARC* 2000–2010
Collier County	\$39,412	\$57,788	46.6%	151%	3.9%
Miami-Dade County	\$25,639	\$36,520	42.4%	96%	3.6%
Monroe County	\$37,028	\$58,799	58.8%	154%	7%
Florida	\$28,512	\$38,210	34.0%	100%	3.0%
United States	\$29,847	\$39,937	33.8%	105%	3.0%

* CARC = Compounded Annual Rate of Change

Source: U.S. Bureau of Economic Analysis 2012

TABLE 22. MEDIAN HOUSEHOLD INCOME AND INCIDENCE OF POVERTY, 2010

	Collier County	Miami-Dade County	Monroe County	Florida	United States
Individuals in Poverty (% of Residents)	15.7	20.3	12.6	16.5	15.3
Median Household Income	\$53,341	\$40,145	\$50,388	\$47,802	\$50,046

Source: U.S. Census Bureau 2011c

Prior to the recession, poverty rates in Collier and Monroe counties had consistently been lower than the rates for Florida and the United States during the past two decades, while those in Miami-Dade County had been slightly above the state and national rates. Poverty rates have climbed across the nation in the wake of the recession. In 2010, the poverty rate in Monroe County was 12.6% and in Collier County was 15.7%, which compared favorably to a statewide rate of 16.5% and a national rate of 15.3%. The poverty rate in Miami-Dade County was 20.3% (table 22). That same year, the median household income in Collier County of \$53,541 was 12% above the statewide average, while that in Miami-Dade County was 16% below the statewide average. Collier County's median household income was fifth-highest among Florida's 67 counties. Monroe County ranked eighth among Florida's counties in terms of median household income.

Selected Demographic, Social, and Economic Characteristics

In 2010, residents of the three-county area tended to be older than the general population in the nation (37.2 years), with median ages ranging from 38.2 years in Miami-Dade County to 46.9 years in Collier County (table 23). The percentages of residents 62 years and older in these counties are also higher than the national average, although Miami-Dade and Monroe counties were below the statewide average.

Labor force participation rates among those residents 16 and older range from 52.7% in Collier County to 63.9% in Monroe County, the former another reflection of the older population in the county. Labor force participation in Miami-Dade County is below the national average, but slightly above the statewide average.

TABLE 23. SELECTED DEMOGRAPHIC DATA, 2010

	Median Age (years)	Persons 62 Years & Older	Labor Force Participation (16 & older)	Race: Nonwhite
Collier County	46.9	30.9%	52.7%	16.1%
Miami-Dade County	38.2	17.0%	61.1%	26.2%
Monroe County	46.4	17.1%	63.9%	10.5%
Florida	40.7	20.9%	60.0%	25.0%
United States	37.2	16.2%	63.9%	27.6%

Source: U.S. Census Bureau 2011a, b

The resident populations of all three counties are predominately white, with minority populations ranging from a low of 10.5% in Monroe County to a high of 26.2% in Miami-Dade County. Minorities in Miami-Dade County comprise a larger share of the total population than do minorities in either the state or nation. Blacks, African Americans, and Asians are the predominant minorities in all three counties. Approximately 6,600 American Indians reside in the three-county

region (Census 2011), most of whom live in Miami-Dade County.

Economic Contributions of Everglades National Park

The park is an element of the overall tourism/recreation/visitor economy of south Florida. Spending by visitors to the park; NPS personnel; and capital outlays, research,

environmental restoration, and operating and maintenance expenditures by the National Park Service and other entities support local businesses and generate tax revenues, which help support the state and local government. Although sustaining the local economy is not an explicit objective of the National Park Service or the park in developing the GMP, support for a healthy ecosystem and the related recreational opportunities that are then possible, such as sport fishing and wildlife viewing, are consistent with the park's mission and ultimately contribute economic support to the local and regional economy.

The importance of tourism and recreation to Monroe County's economy has been shown in a number of studies. One recent study estimated nearly 3.3 million person-trips and 13.9 million person-days of visitation to the Florida Keys in 2007–2008. The economic contributions associated with those trips supported an estimated 32,017 jobs and \$970.3 million in annual income; the former representing approximately 60% of all jobs and the latter about 44% of all income in the county. (Leeworthy et al. 2010) A more focused study of the economic contributions attributable to fishing in the Florida Keys flats area estimated that 1.8 million fishing days occurred in the Florida Keys in 2012, supporting 7,536 jobs and \$229.1 million in income in southern Florida (Fedler 2013). An earlier study estimated that recreational pursuits of Monroe County residents in the Florida Keys supported approximately 2.8% of the total income and more than 2,400 jobs in the county (Leeworthy and Wiley 1997). Other results from the three studies showed that the majority of all activity and spending occurred in Key West and the Lower Keys and that recreational and sport fishing accounted for approximately 10% of all recreation in the Keys. None of these three studies reported results for the portion of the Keys and Florida Bay located within the park, but data in the 2010 Leeworthy study indicates that flats and backcountry fishing in the upper keys, which includes the portion of Florida Bay in the park represents less than

1.0% of all fishing in the Keys/Flats, or approximately 0.1% of the total recreation use.

Visitor Spending. The peak recreation visitation reported at Everglades National Park was 1,534,328 visitors in 1972. Over the 22-year period 1990–2011, recreation use of the park has fluctuated dramatically, from about 820,000 to 1,300,000 recreational visits, averaging approximately 1,005,000 (not including visitors associated with private and commercial airboat operations based in the East Everglades Addition). Overnight visitors to the park, including backcountry campers using the chickees, historically accounted for over 100,000 of the annual visits. However, weather, hurricanes in particular, have a dramatic influence on visitation as is evident in figure 11, which displays the declines in visitation following hurricane Andrew in 1992 and hurricanes Katrina and Wilma in 2005. Overnight visitor use declined sharply in the wake of damages to the lodging and camping facilities at Flamingo caused by the latter two storms, averaging less than 39,000 visits annually over the five-year period (2007–2011).

A study of the economic contributions of units of the national park system, based on visitor origin, length of stay, type of overnight accommodations, and typical spending of park visitors, estimated total annual visitor spending of \$136.5 million associated with recreation visits to the park in 2010 (Stynes 2011). The total includes entry fees collected by the park; outlays for accommodations, fuel, food and beverage purchases; boat, canoe, and other equipment rentals; and other miscellaneous expenditures. The latter include purchases made at the visitor center bookstores operated by the Everglades Association. The Everglades Association is a nonprofit cooperating association that supports education, interpretation, and research in the park and three nearby NPS units.

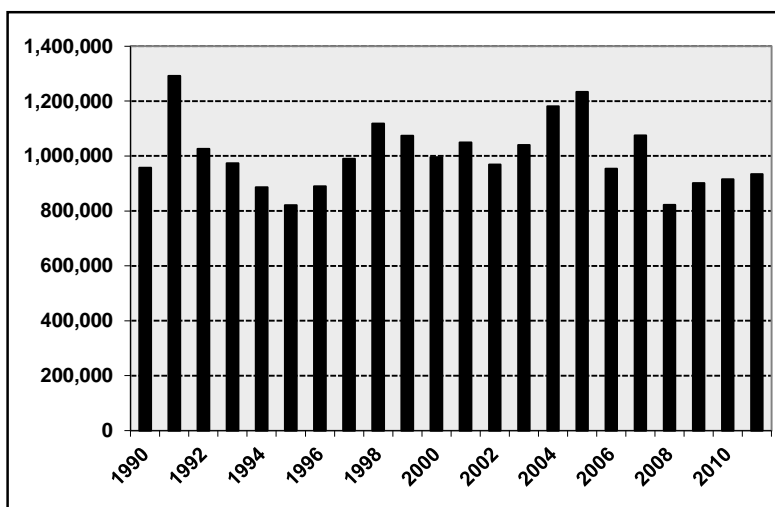


FIGURE 11. ANNUAL RECREATION VISITS TO EVERGLADES NATIONAL PARK, 1990–2011

The bulk of spending was by nonlocal visitors staying overnight in area motels and hotels and camping. Guide and outfitter fees also account for substantial visitor spending, particularly in the Upper Keys (Fedler 2013; Leeworthy et al. 2010).

The visitor spending supported an estimated 1,956 jobs, with an estimated annual income of \$72.2 million in the regional economy. These estimates may not fully account for the seasonal employment and income effects associated with the private and commercial airboat and associated recreation/entertainment operations operating in the East Everglades Addition. These four operations have a combined seasonal peak employment of 50 to 60 jobs.

Although the jobs supported by park visitor spending represent only about 0.1% of the total regional employment, the visitor spending and jobs supported are important to many businesses near the key activity centers, e.g., those in Everglades City and the Florida Keys, as well as to the concession operations and fishing guides whose livelihoods are tied to the park. The park recognizes the important contributions of recreational and other public use in the park to the local

economy, quality of life of residents, and to the attraction of the area to visitors.

- Many of the jobs supported by the visitor spending are associated with commercial services/concessions in the park. Such services include canoe, kayak, and bicycle rentals; a marina with convenience store/bait shop; concession-managed RV and tent campground facilities; boat and tram tours; limited food and beverage sales; and books/educational materials/souvenir/gift sales. Other jobs supported by the spending include eco-tours and canoe/kayak tour operators who operate in the park under commercial use authorizations. Commercial fishing *per se* is not permitted in the park, however fishing by individuals using professional guides and outfitters, who also operate under commercial use authorizations, is permitted. The number of commercial use authorizations has varied between 350 and 400 during the past several years. Many fishing guides and tour operators who work in the area are seasonal and come from outside south Florida.

- **Park Operations and Maintenance.** The annual budget for NPS operations at Everglades National Park also contributes to the regional economy, as spending for utilities, supplies, and services support additional business sales, jobs, and income. Spending of their income by NPS employees also stimulates the economy and generates tax revenues to help support state and local governments. These effects are in addition to those associated with visitor spending.

The annual base operating budget at the park for fiscal year (FY) 2011 was \$17.0 million. The base budget was supplemented by donations; funding for equipment purchases and specific construction and environmental monitoring and restoration projects, including this management plan; fees from concessions; and a portion of the entry and camping fees. That budget supported 181 full-time-equivalent employees in 2011. The NPS payroll and normal park operations spending support an estimated 104 additional jobs and labor income of \$4.2 million within the region (Stynes 2011). Communities in all three counties realize economic benefits from the park's operation because of the geographic distribution of the key law enforcement, maintenance, and visitor centers/contact stations.

In addition to park staff, supplemental funds support a variety of contractors who provide construction, maintenance, and other services to the park, as well as scientific researchers with other organizations. Estimates of the number of jobs supported by such spending are not available, but the number is likely substantial given that such spending totaled more than \$15 million in FY 2010.

Partner organizations provide additional benefits to the regional economy in the form of purchases of goods and services to support their research, educational, community outreach, and other missions conducted in support of the park, as well as the spending by members and guests at events and activities

hosted by the organizations. In addition, a cadre of volunteers numbering 1,536 in FY 2011 provided 65,022 hours, or 32.0 FTE employees, of support for park operations, maintenance, interpretation, and other visitor services. The economic value of that volunteer effort is nearly \$1.4 million.

Payments in Lieu of Taxes. As a result of the federal lands included in the park, all three counties receive payments in lieu of taxes (or PILT). Administered by the Department of Interior, the PILT program distributes payments to county governments containing qualified federal lands within their boundaries, with such payments helping to offset the diminished property tax receipts resulting from federal ownership. Payments are based on the level of funding appropriated by Congress, the number of acres of qualified lands in a county, population, and several other factors. For FY 2012, PILT payments to the three counties were \$1,275,089 to Collier County, \$853,512 to Miami-Dade County, and \$1,122,390 to Monroe County (USDI 2012).

PARK OPERATIONS

Commercial Visitor Services

Commercial services are in the developed locations of the park and provide a variety of services to visitors.

Flamingo. The Flamingo area has the most commercial visitor services of any area in the park. Commercial services here include, or have included in the past, a restaurant; a marina with an adjoining gift shop; commercial boat tours; canoe, kayak, and bicycle rentals; and guest lodging. A commercial services plan for Flamingo was approved in 2008 and an environmental assessment evaluated the impacts of facility improvements at Flamingo. Although a decision document (Finding of No Significant Impact) was issued in 2008, several factors have required the National Park Service to reassess decisions regarding the nature of proposed development at Flamingo. These

factors include current and anticipated federal funding levels, improved understanding of what would make a viable concessions contract at Flamingo, and the site's susceptibility to major storm events and sea level rise.

This reassessment led to issuance of a revised plan in 2012 to more accurately reflect implementation of portions of the *Flamingo Commercial Services Plan* that have not already been implemented.

Commercial Airboating in the East Everglades Addition. Currently, four commercial airboat businesses operate in the East Everglades Addition, largely independently, with little real oversight or guidance from the National Park Service. The park's 1991 Land Protection Plan determined that private ownership was inconsistent with the intent of the 1989 Expansion Act and ecosystem restoration efforts. Thus, acquisition of all private properties has been a priority since 1989. In 2012 Congress appropriated funds to acquire the remaining privately owned parcels in the East Everglades Addition, including the commercial airboat sites along Tamiami Trail. In addition to addressing real estate acquisition, any continuing commercial airboat operations must do so under terms of a new concessions contract, consistent with the 1989 Expansion Act provisions related to commercial airboating (see "Commercial Airboating" subsection under the "Special Mandates" section in chapter 1) and other applicable laws and policies. Information on recreational aspects of commercial airboating is included in the "Visitor Experience and Opportunities—Recreational Activities" section of this chapter.

Facilities and Infrastructure

Infrastructure at Everglades National Park includes a diverse set of facilities or assets, such as structures, roads, parking areas, picnic areas, utility and wastewater systems, maintained landscapes, campgrounds, and

communication systems. Increased operational requirements, reduced funding, and lapsed staff positions have caused the staff to defer routine maintenance of some facilities. Deferred maintenance is work that should ideally have been done at specific times but was not, primarily due to budget constraints. Deferred maintenance often leads to costly repairs over time.

The National Park Service monitors deferred maintenance in park units using the Facility Management Software System. The National Park Service is striving to reduce the deferred maintenance backlog throughout the national park system by prioritizing and funding projects through various sources, including the Federal Lands Recreation Enhancement Act. The park updates information relating to the condition and importance of its assets daily in the facility management tracking system.

Structures. Everglades National Park staff members are responsible for maintaining about 157 buildings, 14 of which are historic. Examples include visitor centers, administrative buildings, ranger and visitor contact stations, maintenance shops, employee residences, and a marina. Additionally, the park maintains frontcountry and backcountry (e.g., chickees and associated restrooms) campsites throughout the park.

Some of the facilities in the park are outdated, obsolete, and/or are reaching the end of their useful life. The shortcomings of particular facilities are noted below.

- The Key Largo ranger station is a wood frame structure that is 80 years old and functionally obsolete.
- The Florida Bay Interagency Science Center is composed of three buildings (an office building, a leased wet lab, and a dormitory), which provide support for the science functions. The office building received extensive maintenance and rehabilitation in

2009–10 and is considered to be in good condition. The other two buildings are scheduled to be removed from the site, after two modular precast concrete buildings are in place.

- The South Florida Collections Management Center is in portions of the Daniel Beard Center and the Robertson Building. The former was built in the 1960s, and the latter was built in the 1950s. Neither was designed for museum collection preservation. The collections storage is currently substandard and inadequate in terms of its operational efficiency, size, and preservation standards, and the building lacks public spaces for the exhibition of the collection.
- The Shark Valley visitor contact station is undersized, outdated, and inefficient. It is scheduled for replacement in and will be relocated to the east end of the Shark Valley visitor complex.
- The Tamiami ranger station is old, in poor condition, and is not centrally located.
- The Gulf Coast visitor, concessions, and operation facilities are outdated, too small, energy inefficient, and generally at the end of their useful life, and they do not meet the flood or storm codes. The facilities' shortcomings and conditions cause operational inefficiencies and a near-continuous maintenance burden. There is an old waste disposal site that covers a large portion of the open grassy area north of the visitor center parking lot, which may limit flexibility regarding site improvements.
- East Everglades administrative and operational activities (e.g., ranger, fire,

maintenance, etc.) operate out of adapted former residences within the East Everglades Addition. These structures are not well-suited to park operational uses, which leads to operational inefficiencies.

- The facilities at Chekika are sufficient as a visitor day use destination, although they would need to be updated for camping.

Roads. The park manages and maintains all road rights-of-way in the park. The primary vehicle travel corridor through Everglades National Park is the main park road. The main park road is an extension of State Highway 9336 (Ingraham Highway) that runs 38 miles from the park entrance to the Flamingo visitor area. It provides access to many park attractions, including interpretive trails, hiking trails, campgrounds, picnic areas, boat launches, and canoe trails. The other roads in the park are connector, special purpose, or administrative roads.

In the Pine Island district, the main park road provides access to sites such as the Ernest F. Coe Visitor Center, Pine Island, Long Pine Key, the Royal Palm Visitor Center, the Hidden Lake Education Center, and the Daniel Beard Center.

The Tamiami Trail (Highway 41), which provides access to the Shark Valley visitor contact station, is a federal highway just outside the park's north boundary. At Shark Valley, tram tours are available along the 15-mile tram loop, which is only accessible to trams, bicycle and foot traffic, and administrative vehicles.

The Chekika visitor area is accessible from SW 168th Street, which enters the park from Krome Avenue. These two former county roads, SW 168th Street and SW 237th Avenue, are now within the park as a result of the East Everglades Addition. These roads have not yet been turned over to Everglades National Park but are maintained by the park.

County roads provide access to the Gulf Coast Visitor Center from Tamiami Trail. These roads also continue to Chokoloskee, which has many facilities and attractions.

Hiking Trails. Everglades National Park includes more than a dozen hiking and interpretive trails, ranging in length from 0.5 mile to 15.0 miles. The main park road provides access to many short boardwalk hikes in the sawgrass prairie that expose visitors to the River of Grass ecosystem; some of these hikes include Anhinga Trail, Pa-hay-okee Overlook, and the Mahogany Hammock. The Flamingo area offers visitors the most options for hiking, with nine trails of varying difficulty and development. Of the Flamingo trails, the Coastal Prairie Trail is the most popular. The trails vary in terms of terrain, habitat, and interpretive opportunities. Although most trails are for hiking only, bicycles are permitted on some of the more developed trails in the park. The Pine Island and Flamingo districts offer the most hiking trails in the park, but Shark Valley and Chekika also have a couple of options. There are no hiking trails in the Gulf Coast district. During the wet season, access to hiking trails in the park may be limited in areas that become submerged.

Water Trails. In addition to hiking trails, there are many opportunities to explore the park's natural beauty in canoes and kayaks. Visitors can explore Florida Bay, Whitewater Bay, and Ten Thousand Islands by motorboat, canoe, or kayak. The Ten Thousand Islands are a labyrinth of water and mangroves. The islands harbor an abundance of life, and the shallows serve as nursery grounds for countless marine species. The islands also provide multiple opportunities for canoe and kayak trips (some jointly on Big Cypress National Preserve lands), including the Turner River, Halfway Creek, Sandfly Island, and East River canoe trails (NPS 2009d).

The Flamingo area has many water trails available to canoe and kayak users. These include the Hells Bay Canoe Trail, the Noble Hammock Canoe Trail, the West Lake Canoe

Trail, the Mud Lake Canoe Trail, and the Bear Lake Canoe Trail. Flamingo also provides access to Florida Bay and Whitewater Bay. Both of these bays are popular destinations for motorboaters. Florida Bay has some boundary and channel/access route markings, and Whitewater Bay also has some minimal route markings.

The Wilderness Waterway is a 99-mile water trail that meanders through miles of backcountry from the Gulf Coast to Flamingo. There are numerous backcountry campsites along the waterway, and it provides ample opportunities for solitude and exploration of the park's backcountry waters. The waterway is open to motorboats, canoes, and kayaks, but some portions are designated as idle speed, no-wake areas. The waterway is minimally marked and can be difficult to navigate. Multiple paddle trails spur off the Wilderness Waterway.

Campgrounds and Campsites. The park's campgrounds and campsites are described below.

Frontcountry Camping— The Long Pine Key Campground is 7 miles from the main entrance, just off the main road. It has 108 drive-up sites for tents and RVs, including one group site. There are restrooms, water, and a sewer dump station with fresh water fill, but no showers or hookups. A picnic area is nearby, with fire grates and restrooms. A pond for fishing, an amphitheater for winter programs, and several hiking trails are also in the area (NPS 2009i).

Flamingo Campground— The Flamingo Campground is at the end of the main park road in Flamingo. It has 234 drive-in sites (55 with a view of the water), 3 walk-up group sites (on the water's edge), and 40 walk-up sites (9 on the water's edge). It also provides cold water showers, two dump stations, picnic tables, grills, and an amphitheater for winter programs. Electrical hookups were installed in the RV area (T-loop) in 2010. Flamingo has several hiking trails and canoe trails, and

opportunities for saltwater fishing are plentiful (NPS 2009f).

There is currently no camping permitted at Chekika; it is open as a seasonal, day use area only.

Backcountry Camping—Everglades National Park has nearly 50 backcountry campsites throughout the park, which include a variety of ground sites, beach sites, and elevated camping platforms (chickees). Backcountry sites generally consist of a chickee and primitive restroom. Most sites are accessible by canoe, kayak, or motorboat, though a few may be reached by hikers. None of the park's backcountry sites are available by car. Backcountry sites are concentrated mostly in the Ten Thousand Islands region and around Whitewater Bay. There are multiple campsites in Florida Bay and two off the Old Ingraham Highway, south of Royal Palm.

Boat Launches and Marina. There are three public motorboat launches in the park. There are two at Flamingo—one to enter the Buttonwood Canal and one to enter Florida Bay. The third launch at West Lake is for small boats (motors under 6 horsepower). There are public airboat launches (for use by eligible individuals only) at the Coopertown airboating facility and one just north of Chekika in the East Everglades Addition.

In addition to these launches, the park also has nonpublic launches at the Tamiami ranger station, Frog City, and Pine Island for airboats used by park rangers and researchers.

The marina at Flamingo is used by park staff, commercial boat tours, and the public. The marina at the Gulf Coast Visitor Center is used only by park staff and commercial boat tours and is not accessible to public vessels.

Accessible Facilities. The Ernest F. Coe Visitor Center has telephone headsets with volume control that provide audio description of an interpretive display. The theater displays the park's orientation film and other films with open captions. Assistive listening devices

are available upon request for use in interpretive programs (NPS 2009g).

The Shark Valley and Gulf Coast visitor centers offer assistive listening devices on request for interpretive programs. The park's orientation film is also available with closed captions, upon request. Interpretive programs and visitor center displays, whenever possible, have been made accessible to visitors with limited hearing capacities (NPS 2009g).

The Ernest F. Coe, Royal Palm, Flamingo, Shark Valley, and Gulf Coast visitor centers are all wheelchair accessible via ramp or elevator. The parking lots at each of the visitor centers also contain accessible parking spaces that are clearly identified. Wheelchairs are available on loan on a first-come, first-served basis at Royal Palm, Flamingo, and Shark Valley visitor facilities (NPS 2009j).

The many wheelchair-accessible trails have a firm and stable surface (paved or boardwalk). The following are wheelchair accessible and less than 0.75 mile in distance:

- Anhinga Trail
- Gumbo Limbo Trail
- Pineland Trail
- Pa-hay-okee Overlook
- Mahogany Hammock Trail
- West Lake Trail
- Bobcat Hammock

Other trails at Long Pine Key and Flamingo used to be two-track roads. These may be muddy or passable depending on the season. The Long Pine Key and Flamingo frontcountry campgrounds both have accessible campsites. Each contains wheelchair accessible restrooms. The parking lot has clearly identified accessible parking spaces (NPS 2009j).

One backcountry site is accessible to visitors with mobility impairments—the Pearl Bay Chickee; this area is about a 4-hour canoe trip

away from the main park road. It features handrails, a canoe dock, and an accessible chemical toilet (NPS 2009j).

Many of the concession-led boat tours from Flamingo and the Gulf Coast Visitor Center are wheelchair accessible. The Shark Valley tram tour is accessible as well; trams contain a ramp for wheelchairs. The tour includes a stop at an observation tower with a steep ramp; it may be accessible with assistance (NPS 2009j).

The Ernest F. Coe Visitor Center, at the park entrance near Homestead, presents audio recordings of the Everglades environment. There are also various tactile opportunities to experience the wildlife displays. The restroom and theatre signs are available in Braille. The Flamingo Visitor Center contains a museum exhibit with both print and audio displays. The Shark Valley visitor contact station and Gulf Coast Visitor Center offer a touch table for tactile opportunities. The restroom signs are in Braille (NPS 2009m).

Operational Facilities. The park's main administrative offices are in the park headquarters, the Krome Center in Homestead, and Pine Island. The National

Park Service owns all of the structures in the park with the exception of a building at Pine Island owned by the Everglades National Park Natural History Association. The main maintenance facility at the park is at Pine Island. There are maintenance facilities for the Gulf Coast (Everglades City), Tamiami (Northeast District), and Flamingo. There is also a maintenance storage building at Chekika in the East Everglades.

Climate Change. As mentioned earlier, park managers have been carefully considering, in the context of climate change, how to (and whether to) construct or upgrade visitor and operational facilities in flood-prone zones. Current projections for sea level rise during the life of this plan (20–30 years) do not exceed 7–9 inches, although rising sea levels could be exacerbated by storm surges. Sea level rise is not projected to be so severe that park facilities would become unusable, provided that new and replacement facilities continue to be planned and designed with climate change in mind. Examples include specifying hurricane-resistant structures, elevated structures, floating structures, temporary structures, mobile structures, and structures that can be disassembled and relocated.

IMPACT TOPICS ELIMINATED FROM DETAILED ANALYSIS IN THIS PLAN

AIR QUALITY

Everglades National Park enjoys a class I clean air status. Lands with this designation are subject to the most stringent regulations. Very limited increases in pollution are permitted in the vicinity. This high air quality is a valuable park resource, enhancing visitation by providing clean air and high visibility to match the unique ecosystem experience. The Clean Air Act of 1963 (42 USC 7401) requires federal land managers to protect air quality, and NPS *Management Policies 2006* direct air quality to be analyzed when planning park projects and activities. None of the actions described in this management plan would violate any air quality standard or result in a cumulative net increase of any criteria pollutant under federal or state ambient air quality standards. Implementation of any of the alternatives described in this management plan would have negligible effects on air quality, and the park's class I air quality would be unaffected.

FEDERAL SPECIAL STATUS SPECIES (SELECTED SPECIES)

The following federally threatened or endangered species were dismissed from detailed analysis: red-cockaded woodpecker, Cape Sable seaside sparrow, Audubon's crested caracara, Stock Island tree snail, Schaus swallowtail butterfly, crenulate lead-plant, Garber's spurge, and Johnson's seagrass. Please see table 10 in chapter 4, "Federal Special Status Species" subsection, for the reasons these species were dismissed. Information for retained and dismissed species was combined into this one table for ease of review by agencies having jurisdiction over these species.

NIGHT SKIES

In accordance with section 4.10 of NPS *Management Policies 2006*, the National Park Service strives to preserve natural lightscapes, which are natural resources and values that exist in the absence of human-caused light. At Everglades National Park, the National Park Service strives to limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements, ensure that all outdoor lighting is shielded to the maximum extent possible, and keep light on the intended subject and out of the night sky. The actions proposed in the alternatives would not affect the existing exterior lighting of park developments, visitor centers, or parking areas.

More lighting would be used for localized facility upgrades within existing developed areas and in at least one new location. Impacts would be negligible to minor because the lights would be shielded, directed to keep light on the intended subject, and localized. As a result, light would not adversely affect the night sky elsewhere in the park.

PRIME AND UNIQUE FARMLANDS

Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique agricultural land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. Lands within the park are not available for farming and therefore do not meet the definitions.

FLOODPLAINS

Executive Order 11988 instructs federal agencies to avoid, to the extent possible, the long- and short-term, adverse impacts associated with the occupancy and modification of floodplains and wetlands, and to avoid direct or indirect support of development in floodplains and wetlands wherever there is a practicable alternative. Director's Order 77-2 (NPS 2002a) addresses development in floodplains.

Topography throughout the park is characterized by low elevation and broad areas of very low relief (less than 10 feet above sea level). This places the entire park within the 100-year floodplain. South Florida's canals, levees, and water control structures were created to manage and drain excess water from this vast floodplain during periods of high water. Water levels in the coastal canals are kept low during the wet season to allow for storage and conveyance of floodwaters. The canals and levees are managed to protect developed and agricultural areas surrounding the park from flooding and to control water elevations.

Since the establishment of Everglades National Park in 1947, the park's mission has been to preserve resources, including hydrologic conditions within the park and the south Florida ecosystem. Because the park, as a whole, lies in the 100-year floodplain, park facility development, rehabilitation, or reconstruction in the floodplain has been the only practicable alternative. Therefore, most park infrastructure and facilities are at risk of flooding during hurricanes or other major storms. For Everglades National Park, this means considering risk and protection of visitors, park staff, museum collections, concessioners, property, and essential infrastructure when making management decisions.

Floodplains have not been delineated for the park by the Federal Emergency Management Agency through the National Flood Insurance Program. Floodplains within the park have

been altered over time and would experience no more than negligible adverse effects by the actions of the alternatives; actions taken in floodplains would be short-term and support long-term floodplain functions. In accordance with Executive Order 11988: "Floodplain Management" and Director's Order 77-2: *Floodplain Management*, a Floodplain Statement of Findings for the Gulf Coast development area (only) is included in appendix F of this document. Other infrastructure in the park exists in floodplains, but an assessment determined that there is no practicable alternative to leaving the infrastructure in place because nearly the entire park is in a floodplain. It was also determined that appropriate impact minimization efforts have been made, such as elevating structures on piers and implementing evacuation preparedness plans.

ENERGY EFFICIENCY AND CONSERVATION POTENTIAL

Under any alternative, the National Park Service would continue to implement its policies of reducing costs, eliminating waste, and conserving resources by using energy-efficient and cost-effective technology. The National Park Service would continue to look for energy-saving opportunities in all aspects of national park operations. Because the National Park Service would promote energy efficiency under any alternative, this impact topic was dismissed from further consideration in this document.

INDIAN TRUST RESOURCES

Secretarial Order 3175 requires that any anticipated impacts on Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry

out the mandates of federal law with respect to American Indian and Alaska Native tribes.

None of the actions that might be implemented as a result of the plan alternatives would change any existing conditions or practices concerning American Indian treaty or statutory rights or cultural interests that the tribes traditionally associated with the park maintain in relation to the park. However, such recognition does not translate into the creation of a trust resource because these actions take place in the context of preserving and managing the resources for the benefit of all Americans as required by the Organic Act and subsequent legislation. There are no Indian trust resources as defined in the order in the park. Therefore, this topic was dismissed from further consideration.

ENVIRONMENTAL JUSTICE

Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (USEPA 1998). Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” tasks “each Federal agency [to] make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The memorandum accompanying Executive Order 12898 identifies four important ways to consider environmental justice under the National Environmental Policy Act.

1. “Each Federal agency should analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such

analysis is required by the National Environmental Policy Act.

2. Mitigation measures identified as part of a NEPA assessment or a “Record of Decision” (ROD), should, whenever feasible, address significant and adverse environmental effects of proposed federal actions on minority populations, low-income populations, and Indian tribes.
3. Each Federal agency must provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation in consultation with affected communities and improving the accessibility of public meetings, crucial documents, and notices.
4. Review of NEPA compliance (such as EPA’s review under section 309 of the Clean Air Act) must ensure that the lead agency preparing NEPA analyses has appropriately analyzed environmental effects on minority populations, low-income populations, or Indian tribes, including human health, social, and economic effects.”

In addition, Executive Order 13175, “Consultation and Coordination with Indian Tribal Governments,” directs federal agencies to (1) establish regular and meaningful consultation and collaboration with Indian tribal officials in the development of federal policies that have tribal implications; (2) strengthen federal government-to-government relationships with Indian tribes; and (3) reduce the imposition of unfunded mandates upon Indian tribes.

Addressing environmental justice concerns begins with the effective community participation in the NEPA process. Throughout the planning process, the park staff and planning team actively solicited public participation as part of the planning process; prepared and distributed multiple newsletters; met with various interest groups; and gave equal consideration to input from all persons regardless of age, race, income status, or other socioeconomic or demographic factors.

Consideration of environmental justice concerns continues with a determination of the existence of potentially affected publics in proximity to a federally proposed action. If a potentially affected population is identified, the assessment focuses on whether the action would result in disproportionately high and adverse impacts. In the case of the park, an analysis of demographic and income data from the 2000 Census indicates that the prevalence of racial and ethnic minorities in Collier and Monroe counties, as well as individuals below the poverty thresholds, was generally comparable to the statewide averages. The share of minority and low-income residents in areas closest to the park, for example Everglades City, was below the statewide averages. As a result, the planning team concluded that a potentially affected population for environmental justice concerns is not present in those two counties.

The percentages of non-Indian racial and ethnic minorities and individuals in poverty in the Miami-Fort Lauderdale Consolidated Metropolitan Statistical Area were higher than for Florida as a whole, satisfying the threshold for a potentially affected environmental justice population. However, no residential areas of concentrated low-income and non-Indian minority populations are adjacent to or near the park. That fact, combined with the lack of boundary adjustments or establishment of major new road access to the park, again resulted in the conclusion that a potentially affected population for environmental justice concerns is not present with respect to this plan.

Under the two executive orders cited above, federally recognized Indian tribes and reservations close to federally managed lands automatically have status as a potentially affected population. There are no tribally owned lands or mineral resources, or lands or minerals held in trust for Indian tribes by the federal government within the park. However, the Tamiami Trail Reservation Area (Miccosukee Reserved Area), one of three reservations of the Miccosukee Tribe of Indians of Florida, is adjacent to the park, just

west of Shark Valley. The Tamiami Trail Reservation Area, currently the site of most tribal operations, a tribal cultural center, and the homes of many tribal members (Miccosukee Tribe 2010). The Krome Avenue Reservation Area is northeast of the park, at the intersection of Krome Avenue and Tamiami Trail. This reservation is the site of the Casino at Miccosukee Resort and Gaming Center and the Miccosukee Tobacco Shop.

Park management and staff engage in an ongoing government-to-government consultation effort with the Miccosukee Tribe. This effort provides opportunities to address issues of concern to either party, including those that might fall within the scope of environmental justice. None of the alternatives propose boundary adjustments, major changes in road access, or other actions that could result in disproportionately higher and adverse effects on human health or environmental effects on the Miccosukee Tribe or individual members, although some effects on traditional use might occur due to changes in management in the East Everglades (see the “Cultural Resources” section).

Based on the conclusions presented above, environmental justice was dismissed as an impact topic receiving detailed analysis in “Chapter 4: Environmental Consequences.”

ECOLOGICALLY CRITICAL AREAS, WILD AND SCENIC RIVERS, OTHER UNIQUE NATURAL AREAS

Everglades National Park is by its very nature both an ecologically critical area and a unique natural area. Impacts to the park and its resources are discussed in detail in the various impact topics included in chapter 5, so this topic is not discussed as a separate topic.

There are no wild and scenic river designations within the national park. Therefore, this topic was dismissed from detailed analysis.

CARBON FOOTPRINT

For the purpose of this planning effort, “carbon footprint” is defined as the sum of all emissions of carbon dioxide and other greenhouse gases (e.g., methane and ozone) that would result from implementation of the action alternatives. Understanding the carbon footprint of each alternative is important for determining its contribution to climate change.

It has been determined that the action alternatives described in this document would emit only a negligible amount of greenhouse gases that contribute to climate change; therefore, this impact topic has been dismissed from detailed analysis in this document. The reasons for dismissing this impact topic are that (1) no new road construction is proposed under any alternative, and (2) changes to facilities are largely in-kind and should have an overall benefit due to newer sustainable building practices. Because of the negligible amount of greenhouse gas emissions that would result

from each alternative, a quantitative measurement of their carbon footprint was determined by the planning team not to be practicable.

CONFORMITY WITH LAND USE PLANS

The actions included in this document are compatible and not in conflict with local land use plans because the project seeks to restore environmental conditions and improve the quality of life and recreational access in the park. Therefore this topic was not analyzed in detail in this document.

PUBLIC HEALTH AND SAFETY

The proposed developments and actions in the alternatives would not result in any identifiable adverse impacts on human health or safety. Therefore this topic was dismissed from further analysis.



Pinelands ecosystem

ENVIRONMENTAL CONSEQUENCES 5



Red Mangrove in Florida Bay

INTRODUCTION

The National Environmental Policy Act requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided. In this case, the proposed federal action would be the adoption of a *General Management Plan / East Everglades Wilderness Study* for Everglades National Park. This chapter analyzes the environmental impacts of implementing the four alternatives on natural resources, cultural resources, visitor use, visitor experience and opportunities, the regional socioeconomic environment, and NPS operations. The analysis is the basis for comparing the beneficial and adverse effects of implementing the alternatives.

Because of the general, conceptual nature of the actions described in the alternatives, the impacts of these actions are analyzed in general, qualitative terms. Thus, this environmental impact statement should be considered a programmatic analysis. For the purposes of analysis, it is assumed that all of the specific actions proposed in the alternatives would occur during the life of the plan.

This environmental impact statement generally analyzes several actions, such as the development of recreational facilities (e.g., trails and campsites), the construction of facilities for visitor orientation and NPS operations, and the designation of lands as wilderness. If and when proposed site-specific developments or other actions are ready for implementation following the approval of the general management plan, appropriate detailed environmental and cultural compliance documentation would be prepared in compliance with the National Environmental Policy Act of 1969 and the National Historic Preservation Act of 1966, both as amended.

This chapter begins with a discussion of cumulative impacts, impacts on cultural resources and section 106 of the National Historic Preservation Act, and impacts related to climate change. Following this is a discussion on the methods and assumptions used for each impact topic. Impact analysis discussions are organized by alternative and then by impact topic under each alternative. The existing conditions for all of the impact topics that are analyzed were identified in the “Affected Environment” chapter. All of the impact topics retained for detailed analysis are assessed for each alternative.

The analysis of the no-action alternative (continue current management) provides the environmental baseline conditions. The three action alternatives are then compared to the no-action alternative to identify the incremental changes that would occur as a result of changes in facilities, uses, and management.

Cumulative impacts are discussed under each alternative and are identified when this project is considered in conjunction with other actions occurring in the region. The discussion of cumulative impacts is followed by a conclusion statement. The key impacts of each alternative are briefly summarized at the end of the “Alternatives, Including the Preferred Alternative” chapter in table 6.

It should be noted that an environmental assessment for the *Flamingo Commercial Services Plan* evaluated the impacts of facility improvements at Flamingo (see “Flamingo Area Improvements” in “Ongoing NPS Project and Projects Planned for the Near Future” section of chapter 1). These analyses are incorporated by reference in this environmental impact statement.

CUMULATIVE IMPACTS ANALYSIS

The Council on Environmental Quality regulations for implementing National Environmental Policy Act requires assessment of cumulative impacts in the decision-making process for federal actions. A cumulative impact “is 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 nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant, actions taking place over time” (40 CFR 1508.7). Cumulative impacts are considered for all alternatives, including the no-action alternative.

To determine the potential cumulative impacts, other projects and actions within these action areas were identified through discussions with NPS staff, federal land managers, and representatives of city and county governments. Projects identified as possible contributors to cumulative impacts included planning or development activities that are being implemented or are expected to be implemented in the foreseeable future. Impacts of certain past actions were also considered in the analysis.

Actions that could have a cumulative effect in conjunction with measures that would be implemented in this management plan were identified in chapter 1 sections titled “Relationship of the General Management Plan to Other Planning Efforts” and “Ongoing NPS Projects and Projects Planned for the Near Future.” Examples include the following:

- Ecosystem restoration activities including the Modified Water Deliveries project and the *Comprehensive Everglades Restoration Plan*. These long-term projects would restore the sheet flow regime throughout the Everglades ecosystem in south Florida to a more natural

state. Each of these projects is composed of many smaller actions that would eventually remove or mitigate human-caused alterations to the natural water flow quantity, quality, and timing. Smaller actions would include attempting to restore natural topography and habitats and involves demolishing and removing nonhistoric structures, removing materials (including fill material), filling in borrow pits, and controlling and removing invasive nonnative vegetation. Implementation of these projects would result in long-term major beneficial impacts and short-term minor adverse impacts to the Everglades hydrology, soils, vegetation, wilderness, and wildlife inside and outside the park.

- **Hole-in-the-Donut restoration and other site-specific restoration projects.** The Hole-in-the-Donut restoration is an ongoing project to restore this former agricultural area to more natural conditions. It includes an ambitious invasive nonnative plant eradication effort. Other restoration efforts include those along the eastern edge of the East Everglades Addition where there are remnants of previous land uses that are being removed and the sites restored. These site-specific restoration projects would result in long-term minor to moderate beneficial impacts on native vegetation and soils.
- **Other natural resource management and associated activities in the park.** Ongoing resource management activities such as invasive nonnative plant and animal management and prescribed fires that have goals of returning park ecosystems to more natural and healthy conditions have short- and long-term beneficial effects on natural resources that, combined,

would reach a moderate level of intensity.

A narrow north-south corridor in the East Everglades Addition is owned by Florida Power & Light Company. As noted in chapter 1, an environmental impact statement is being prepared to determine if and how the lands could be acquired. Because of the uncertainty associated with the several possible alternatives for this proposed action, the effects of the proposed action are not reasonably foreseeable at this time. As a result, the cumulative impacts analysis in this chapter does not include an analysis of this possible future action.

IMPACTS ON CULTURAL RESOURCES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In this environmental impact statement, impacts on cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement the National Environmental Policy Act. These impact analyses are intended, however, to comply with the requirements of both that act and section 106 and section 110(f) of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation's regulations implementing section 106 of the National Historic Preservation Act (36 CFR 800, Protection of Historic Properties), the effects 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 National Register of Historic Places; (3) applying the criteria of adverse effect to affected, national register-eligible or listed cultural resources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under Advisory Council regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected national register-listed or -eligible cultural resources. An *adverse effect* occurs when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register of Historic Places in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, *Assessment of Adverse Effects*). 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 national register.

CEQ regulations and the NPS *Conservation Planning, Environmental Impact Analysis, and Decision-making and Handbook* (Director's Order 12) also call for a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are nonrenewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss of resource integrity that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

For the action alternatives, section 106 summaries are included in the impact analyses for archeological resources; ethnographic resources; historic structures, sites, and

districts; and cultural landscapes. The section 106 summary is an assessment of the effect of the undertaking (implementation of the alternative) on national register-eligible or listed cultural resources only, based upon the criteria of adverse effect found in the Advisory Council's regulations. Because museum collections not housed in their historic locations (as is the case at Everglades National Park) are generally not eligible for the national register, a section 106 summary has not been done for museum collections.

IMPACTS ASSOCIATED WITH CLIMATE CHANGE

The lack of qualitative information about climate change effects adds to the difficulty of predicting how these impacts will be realized in the park; for example, mangrove forests may be affected by sea level rise, and storm frequency and intensity may affect cultural

resources and visitor amenities. However, alternatives that improve natural resource conditions more, particularly in Florida Bay (e.g., preferred and alternative), would be expected to provide greater beneficial impacts than those that improve natural resource conditions to a lesser degree. The range of variability in the potential effects of climate change is large in comparison to what is known about the future under an altered climate regime in the park in particular, even if larger-scale climatic patterns have been accurately predicted for the Atlantic Coast (Loehman and Anderson 2009). Therefore, the potential effects of this dynamic climate on park resources were included in "Chapter 4: Affected Environment." However, these effects are not analyzed in detail in "Chapter 5: Environmental Consequences" under each alternative because of the uncertainty and variability of outcomes and because these impacts are not expected to differ among the alternatives.

IMPACT ANALYSIS METHODS

HYDROLOGIC RESOURCES

Guiding Regulations and Policies

NPS laws and regulations, such as the Organic Act of 1916 and *NPS Management Policies 2006*, direct parks to protect park resources, including water resources, water quality, and wetlands. The National Park Service protects these resources as part of the park's natural ecosystem that must be preserved for future generations.

Methods and Assumptions for Analyzing Impacts

Available information on surface water resources, water quality, and wetlands was evaluated and determined qualitatively based on the professional judgment of NPS staff and consultants, and consideration of park purpose and significance. Primary sources included park management and planning documents, published reports and scientific literature, and unpublished observations and insights from knowledgeable park staff. Information from these sources was gathered, reviewed, and summarized. Impacts on surface water, water quality, and wetlands were evaluated by comparing projected changes resulting from these management plan alternatives to existing conditions or the no-action alternative, as appropriate.

Everglades National Park is part of a large, interconnected freshwater system called the Kissimmee-Lake Okeechobee-Everglades Watershed (SFWMD 2008a). Terrain from north to south is nearly flat and precipitation is dominated by seasonal patterns of rainfall with a dry season from December to May and a wet season from June to November (Duever et al. 1994; Lodge 2005). Prior to major settlement, these conditions created the Everglades distinctive hydropattern—the

timing, amount, and distribution of surface water. Surface water flows were as much as 50 miles wide and 6 inches to 3 feet deep and moved about 100 feet per day during the wet season (Obeysekera et al. 1999). These conditions are also largely responsible for the mosaic of wetland and upland communities in the park.

Beginning in the late 1800s and accelerating in the 1900s, human-made modifications increasingly compartmentalized, controlled, and redirected surface flows in the south Florida ecosystem through an extensive system of roads, levees, canals, and water control structures. These changes have disrupted or eliminated the Everglades characteristic overland sheet flow and changed the distribution and timing of flows (Sklar et al. 1999; CERP 2010). Some areas are now permanently flooded where, in the past, waters would have receded during the dry season. Conversely, other areas are now permanently drained (Sklar et al. 1999; Science Coordination Team 2003).

Prior to regional urban and agricultural development, south Florida waters were low in nutrients (oligotrophic), specifically phosphorus (SFWMD 2000a). Historically, phosphorus content was approximately 10 parts per billion (Lodge 2005), 90% of which was contributed through windborne particles and rain (Davis 1994). Today, surface water entering the park drains from agricultural areas to the north and other developed areas (see “Ecosystem” map in chapter 4) and contains phosphorus levels elevated above the historic levels (SFWMD 1992, 2000a). This phosphorus enrichment (eutrophication) modifies the structure and function of the Everglades ecosystem (Noe et al. 2001).

Given these circumstances, most impacts on park water resources, water quality, and wetlands arise from projects and activities

outside the park. These impacts are discussed under the “Cumulative Impacts” sections under each alternative. The geographic area considered for cumulative effects on water resources is all of Everglades National Park, including Florida Bay.

Impact Criteria and Thresholds

The thresholds to determine impacts on surface water (e.g., timing, distribution, or amount of flows), surface water quality (e.g., chemical, physical, or biological), and wetlands are defined below. To reduce repetitiveness, impacts on specific vegetation communities in the park, many of which are wetlands, are discussed in more detail under “Vegetation.” Some aspects of water quality (e.g., turbidity) are also discussed under “Vegetation” where those aspects are closely linked to impacts on vegetation.

Negligible: An action would have no measurable or detectable effect on surface water flows, surface water quality, or wetlands.

Minor: An action would have small, but measurable, effects on surface water flows, surface water quality, or wetlands. Effects would be localized. Once the disturbance is removed, the area would recover without assistance.

Moderate: An action would have clearly detectable effects on surface water flows, surface water quality, or wetlands over a large area. Resulting changes could potentially affect hydrologic connectivity, organisms, or natural ecological processes. If the disturbance is removed, the system would likely return to a normal state with minimal intervention.

Major: An action would have substantial, regional effects on surface water flows, surface water quality, or wetlands. Resulting changes would affect hydrologic connectivity, organisms, or natural ecological processes. Key

ecological processes and community structure would be altered. The system would not return to a normal state without substantial intervention, and success is not guaranteed.

Regarding impacts on wetlands, section 404 of the federal Clean Water Act is the primary law that protects wetlands from unauthorized fill, polluted discharge, and other degradation. Executive Order 11990, “Protection of Wetlands,” provides additional guidance to federal agencies on actions to limit losses of wetland habitat. NPS policies related to these and other laws and directives are contained in Director’s Order 77-1: *Wetland Protection*, and Procedural Manual 77-1, *Wetland Protection*. Existing laws, regulations, and NPS policies require that for activities that could potentially directly or indirectly impact wetlands, NPS staff must first attempt to avoid and/or minimize those impacts. Thereafter, all unavoidable impacts must be compensated one-for-one at a minimum on a functional basis, or in the absence of such information on an acre-for-acre basis. NPS policies require that a Wetland Statement of Findings be completed for all new adverse impacts on wetlands, regardless of size, unless the action is specifically exempt by NPS policies (i.e., they are “water dependent,” such as a small boat launch).

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified, in this document the following terms are used to describe the duration of the impacts on hydrologic resources.

Short term—The impact would be temporary, lasting one year or less, such as the impacts associated with construction. Natural processes would return within the year.

Long term—The impact would last more than one year and could be permanent, such as the loss of water to an area through diversion or changes in water

quality. Many of the impacts on surface waters, water quality, and wetlands in the park have taken many years to become apparent. Therefore, each alternative is viewed from a similar perspective.

LANDSCAPE AND SOILS

Guiding Regulations and Policies

The National Park Service has a responsibility to preserve and protect landscape and soil resources as integral components of park natural systems under applicable sections of the 1916 Organic Act and the National Parks Omnibus Management Act of 1998. According to *NPS Management Policies 2006*, the National Park Service will preserve and protect landscape and soil resources as integral components of park natural systems while allowing natural processes to continue unimpeded. The National Park Service will also (1) assess the impacts of natural processes and human-related events on landscape and soil resources; (2) maintain and restore the integrity of those existing resources; and (3) integrate management of those resources into NPS operations and planning.

Methods and Assumptions for Analyzing Impacts

Available information on soils was evaluated and determined qualitatively, based on the professional judgment of NPS staff and consultants and on consideration of park fundamental resources and values. Primary sources included park management and planning documents, published reports and scientific literature, and unpublished observations and insights from knowledgeable park staff. Information from these sources was gathered, reviewed, and summarized. Impacts on soils were evaluated by comparing projected changes resulting from the alternatives to existing conditions or the no-action alternative, as appropriate.

Because of the importance of inundation in many soil processes in south Florida, chief among impacts on soils are changes in the timing, distribution, and amount of flooding. Thus, most impacts on park soils arise from activities outside the park and largely beyond the influence of park policies and operations. For instance, the natural rate of peat (soils high in organic content) accumulation in Florida is estimated to be about 3 inches per 100 years. However, when drained, peat is subject to subsidence or thinning at about 1 inch per year. Subsidence is caused by compaction (settling), burning, shrinkage due to dehydration, and, most importantly, oxidation of organic matter. Other impacts on soils include atmospheric deposition of metals (e.g., mercury) and excess nutrients (eutrophication) in marshes and estuaries because of agricultural runoff. Natural changes arise from hurricanes, drought, and fire (White 1997).

Most impacts on soils due to park activities and operations would arise from increased visitor use and changes to park facilities. Except where specifically noted, under all alternatives localized changes affecting soils would occur in high-use areas with existing facilities, such as park administrative and operational facilities, visitor centers, campgrounds, and interpretive areas. For the most part, these areas are largely landscaped and maintained, and they consist of hardened surfaces, whether sidewalks, parking lots, or boardwalks. Under these conditions, impacts on soils would be negligible. Changes in the level of visitation are not expected to substantially alter visitor impacts on soils. Between 1995 and 2010, park visits increased 34.1%; during the life of this general management plan (2010 to 2030) park visits are projected to increase 25.5%.

The geographic area considered for cumulative effects on soils includes all of Everglades National Park, including Florida Bay. Impacts to bottom sediments or soils are discussed under the hydrology impact topic as they relate to sedimentation and turbidity, and in the vegetation impact topic as they relate to

airboat use, propeller scarring, propeller dredging, and groundings.

Impact Criteria and Thresholds

The thresholds to determine impacts on surface water or surface water quality are defined below.

Negligible: The impact would be barely detectable and would not result in measurable or perceptible changes to soil character, structure, productivity, or landscape resources.

Minor: The impact would be slight but detectable over a small area and would result in small but measurable changes in soil character, structure, productivity, or landscape resources. If the disturbance is removed, the area would recover without assistance.

Moderate: The impact is readily apparent and would result in easily detectable changes to soil character, structure, productivity, or landscape resources over a larger area. Changes would alter resource functions. If the disturbance is removed, the resource would likely return to its natural state with some intervention.

Major: The impact would be severely adverse or exceptionally beneficial and result in appreciable changes to soil character, structure, productivity, or landscape resources. Critical soil and landscape characteristics would be altered or lost, and regional changes would be expected. The system would not return to a normal state without substantial intervention, and success is not guaranteed.

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified, in this document the following terms are used to

describe the duration of the impacts on landscape and soils:

Short term—Following completion of the project or action, recovery of previously disturbed or reclaimed soils would take less than two years.

Long term—The impact would last more than two years and could be permanent, such as the loss of soil because of the construction of a new facility. Although an impact may only occur for a short duration at one time, if it occurs regularly over a longer period, the impact may be considered to be long term. For instance, continued vehicle or pedestrian use of steep slopes may lead to extensive erosion. Recovery of natural soil conditions may require 10 or more years, or centuries for sensitive soils such as peat.

VEGETATION

Guiding Regulations and Policies

NPS regulations, such as the Organic Act of 1916 and *NPS Management Policies 2006*, direct parks to provide for the protection of park resources, including vegetation. The National Park Service protects plant life as part of the park's natural ecosystem that is perpetuated into the future.

Methods and Assumptions for Analyzing Impacts

Available information on vegetation was evaluated and determined qualitatively, based on the professional judgment of NPS staff and consultants and consideration of park fundamental resources and values. Primary sources included park management and planning documents, published reports and scientific literature, and unpublished observations and insights from knowledgeable park staff. Information from these sources was gathered, reviewed, and

summarized. Impacts on vegetation were evaluated by comparing projected changes resulting from the alternatives to existing conditions or the no-action alternative, as appropriate.

Primary among the reasons for the natural vegetation community structure and composition in the Everglades is the timing, distribution, and amount of flooding. Thus, most impacts on park vegetation arise from activities outside the park and are largely beyond the influence of park policies, activities, and operations.

Beginning in the 1880s, human-made modifications increasingly compartmentalized, controlled, and redirected surface flows in the south Florida ecosystem through an extensive system of roads, levees, canals, and water control structures (Sklar et al. 1999; CERP 2010). These changes have disrupted or eliminated the characteristic overland sheet flows, changed the distribution and timing of flows, and caused widespread changes in vegetation communities (Gunderson and Snyder 1997). Indirect impacts include land subsidence (Ingebritsen et al. 1999), eutrophication (Noe et al. 2001), abnormal and more destructive fire patterns (SFWMD 1999), and encroachment of invasive nonnative species (SFWMD 1999). In total, changes in surface flows and land use have eliminated about one-third of the south Florida wetland system and about half of the original Everglades (Davis et al. 1994).

Most impacts on vegetation arise from other projects and plans outside the park. These impacts are discussed under the “Cumulative Impacts” sections under each alternative. The geographic area considered for cumulative effects on vegetation is all of Everglades National Park, including Florida Bay.

Although impacts on terrestrial vegetation have not been noted as an issue of concern for the park, impacts on vegetation because of park activities and operations would arise from increased visitor use and changes to park

facilities. Visitor use can impact vegetation directly through trampling. Development and construction can impact vegetation through direct removal or loss of vegetation cover. Changes in vegetation at the population level would constitute habitat alteration, which in turn would affect wildlife. Except where specifically noted, under all alternatives changes affecting vegetation would occur in high-use areas with developed facilities, such as visitor centers, campgrounds, interpretive areas, and park administrative and operational buildings. Vegetation in these locations consists largely of a landscape of maintained lawns, shrubs, and other plantings. Under these conditions, impacts on vegetation would be negligible.

Changes in management of various areas and stream segments along the Gulf Coast are not expected to have a detectable impact on vegetation. However, one notable exception is the impact of propeller scarring and boat groundings in Florida Bay (NPS 2008c), which is discussed under each alternative.

Florida Bay. Changes in the health of Florida Bay have resulted in loss of productivity, biodiversity, and ecosystem stability (Boesch et al. 1993). Large-scale die-offs of seagrass in the bay have been noted by several authors (see Dawes et al. 2004). Between 1984 and 1994, the biomass of turtle grass declined by 28%, manatee grass by 88%, and shoal grass by 92%. Although the loss rate has slowed in recent years, “die-off and regression of seagrasses are still occurring in parts of the bay” (Dawes et al. 2004). These habitat losses have adversely impacted water birds, forage fish, juveniles of game fish species, pink shrimp, and sponges on which spiny lobsters depend. Declines in the nutrient removal function performed by seagrass beds may also be affecting the health of regional coral reefs (Dawes et al. 2004).

Seagrass coverage in the park has been relatively stable since 1995. However, local variations in salinity, water quality, and sediment properties can produce changes in seagrass populations. Environmental changes

can reduce stem density, provide respite from diseases, or allow development of robust communities (Florida Bay Science Program 2003).

Various explanations for changes in seagrass habitat have been proposed: (1) lower light levels because of increased turbidity from runoff and boat traffic, and more frequent and intense algal blooms; (2) direct impacts from propeller scarring and boat groundings; (3) declines in water quality from point and nonpoint sources and alteration of adjacent watersheds; and (4) declines in freshwater runoff (Boesch et al. 1993; USFWS 1999h). A combination of stressors has also been proposed. For instance, Dawes et al. (2004) proposed that high salinity, high or low temperatures, hypoxia, and high sediment sulfides may lower seagrass resistance to a plant parasite, *Labyrinthula sp.* High turbidity, high salinity, high temperatures, and decreased freshwater flows may also be acting together (Boesch et al. 1993).

Brewster-Wingard et al. (1999) sampled sediment cores from the bay to determine the historical distribution of seagrass and salinity. They noted that salinity in the bay has fluctuated in the past, although the amplitude of the fluctuations has increased since the 1940s, consistent with construction of the railroad to Key West (1905–12), construction of Tamiami Trail (1915–28), and changes in water management practices. The authors also noted the near-absence of seagrass in the 1800s, but a steady increase during the 1900s.

As detailed in the “Affected Environment” section, a recent study of the impact of propeller scarring of seagrass habitat in the bay indicated that the extent of scarring is “substantially more” than identified in a previous study (NPS 2008c). According to that study (2008c), seagrass recovery from propeller scarring varies depending on the species and the severity of the scarring. Estimates range from less than a year to more than seven years, but recovery depends on type of seagrass. Some areas might require 10 to 60 years for recovery (USFWS 1999; NPS

2008c). Differences in impacts on and recovery rates between species may alter the community composition and abundance of different seagrass species. Some scarred areas are maintaining the same number and length of scars (no net recovery), while in other areas the quantity and length of scars are increasing over time. In other words, scarring levels in the bay are not improving and are likely increasing (NPS 2008; Engeman et al. 2008c).

The boater education/permit program proposed in the action alternatives is intended to increase responsible boating behavior with the goal of limiting, eliminating, or reversing adverse resource impacts from boat groundings, propeller scarring, and other boating-related activities. Therefore, the assumption is that the program will have greater than negligible benefits.

Impact Criteria and Thresholds

The thresholds to determine impacts on vegetation are defined below.

Negligible: The action would result in a change in vegetation in a small area, but the change would not be measurable or would be at the lowest level of detection.

Minor: The action would result in a detectable change, but the change would be slight, such as the abundance, distribution, or composition of certain species in a local area. However, these changes would be within the natural range of variability and would not affect the viability of vegetation communities or local ecological processes. Once the disturbance is removed, the area would recover without assistance.

Moderate: The action would result in a clearly detectable change in a vegetation community and could have an appreciable effect on a fairly large area. This could include changes in the abundance, distribution, or composition of nearby vegetation communities.

However, the changes would not affect the viability of plant populations. Key ecological process and community structure may be disrupted locally but would be retained regionally. If the disturbance is removed, the system would likely return to a normal state with some intervention.

Major: The action would result in substantial changes to the vegetation community on a regional scale. The impacts would be highly noticeable and well outside the normal range of variability, including changes in the abundance, distribution, or composition of vegetation communities or plant populations. Key ecological processes and community structure would be altered, and regional changes would be expected. The system would not return to a normal state without substantial intervention, and success is not guaranteed.

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified, in this document the following terms are used to describe the duration of the impacts on vegetation.

Short term—The impact would be temporary in nature, lasting two years or less, such as the impacts associated with site clearing for construction. Natural processes would return within the two-year period.

Long term—The impact would last more than two years and could be permanent, such as the loss of vegetation in the footprint of a road or facility. Although an impact may only occur for a short duration at one time, if it occurs regularly over a longer period, the impact may be considered to be long term. For vegetation, repeated vehicle or pedestrian movement in a particular area may permanently alter the plant community.

WILDLIFE

Methods and Assumptions for Analyzing Impacts

The discussion of potential impacts on wildlife includes the habitats that wildlife occupies throughout Everglades National Park. Preliminary analysis of potential impacts on wildlife resources in the park indicates that influences could be associated with two primary activities—visitor use and development of infrastructure.

Visitor use can affect wildlife through various mechanisms. Obvious and direct impacts include disturbance to wildlife during recreational activities, for example by hiking or boating (motorized and nonmotorized) in the park. Disturbance either by noise or the presence of humans may impact one or more individuals of a species. Examples include habitat alteration or flushing of wildlife from habitat, which if repeated could cause changes in use of habitat by wildlife and thus changes in populations (such as bird colonies or rookeries). Introduction or spread of invasive species, either intentional or accidental, can also result from visitor activities. Establishment of invasive nonnative species (such as the Burmese python or the Brazilian pepper) often results in changes to both the wildlife and plant composition of an infested area.

Visitors can disturb wildlife when hiking or bicycling off established trails, with conversation or loud noises, or even through their presence or scent. Disturbance of wildlife because of noises, sights, or scents associated with human activity is referred to as sensory-based disturbance. It applies primarily to the individual response level but can lead to population level responses if the disturbance is intense, prolonged, or recurring. An example would be individual abandonment (flushing) of a nest in response to a single or multiple disturbances. If such a disturbance were to occur over a large area, during breeding activities, or for a long period, individual nest or habitat abandonment could translate to population level impacts.

Development actions proposed in the alternatives of this document, such as development of additional chickees, boat access, and other infrastructure, would be located to the extent feasible to avoid disturbance of wildlife. The most obvious impact is the disturbance or removal of vegetation that serves as wildlife habitat (i.e., habitat loss or habitat fragmentation). Consider the development of a new hiking trail or canoe launch through an undisturbed area. The vegetation removed for the new path would represent habitat loss and fragmentation. That would not, however, be the only impact on wildlife. Opening the forest or vegetation canopy where the hiking path or boat access is constructed would create an edge effect, with fragmentation of the forest or vegetation community and consequent changes in habitat. In some cases this could cascade into changes in habitat use and movement corridors. Further, new use of this path would increase sensory-based disturbance to wildlife along the new corridor. The placement of a trail or boat access is an important consideration. Developed areas established through special or unfragmented habitat tend to have greater long-term impacts compared to placing a trail close an existing road or natural habitat boundary. The more indirect impacts of infrastructure development described above are referred to as habitat degradation. Habitat loss and habitat degradation can impact a species at the individual or population level, depending on their extent.

To reduce repetitiveness, the discussions of wildlife impacts will only briefly allude to the impacts detailed in the above paragraphs through key words such as flushing, habitat alteration, invasive species, sensory-based disturbance, habitat loss, habitat fragmentation, and habitat degradation.

Information describing wildlife communities and distribution and the species that inhabit them was gathered from published scientific papers and NPS research reports, planning documents, state programs, national databases and mapping efforts, and consultation with

park specialists; this information was then reviewed and summarized. Impacts on wildlife were evaluated by comparing projected changes resulting from the action alternatives (NPS preferred alternative, alternative 2, and alternative 4) to the no-action alternative.

Impact Criteria and Thresholds

The thresholds to determine impacts on wildlife are defined below.

Negligible: Impacts are barely detectable and/or would affect a minimal area of wildlife habitat. Impacts on wildlife communities would not be detectable.

Minor: Impacts are slight but detectable, and/or would affect a small area of habitat or few members of the wildlife community. The severity and timing of changes are not expected to be outside natural variability, either spatially or temporally. Key ecosystem processes and community structure are retained at the local level.

Moderate: Impacts are readily apparent and/or would affect a large area of habitat and/or a large portion of the wildlife community. The severity and timing of changes are expected to be outside natural variability, either spatially and/or temporally; however, key ecosystem processes and community structure are retained at the landscape (regional) level.

Major: Impacts are severely adverse or exceptionally beneficial and/or would affect a substantial area of habitat and/or the majority of the inhabiting wildlife community. The severity and timing of changes are expected to be outside natural variability, both spatially and temporally. Key ecosystem processes and community structure may be disrupted. Habitat for wildlife species may be rendered nonfunctional at the landscape level.

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified in this document, the following terms are used to describe the duration of the impacts:

Short term—The impact would be temporary in nature, lasting less than a year. Natural processes would return thereafter.

Long term—The impact would last more than a year and could be permanent.

FISHERIES

Guiding Regulations and Policies

Service-wide NPS regulations such as the Organic Act of 1916 and NPS *Management Policies 2006* direct parks to provide for the protection of park resources, including fishes. The National Park Service protects fish and their habitats as part of the park's natural ecosystem that is perpetuated into the future.

Methods and Assumptions for Analyzing Impacts

Available information on fishes was evaluated based on the professional judgment of NPS staff and consultants and with consideration of the national park's purpose and significance. Primary sources included park management and planning documents, published reports and scientific literature, and unpublished observations and insights from knowledgeable park staff. Information from these sources was gathered, reviewed, and summarized. Impacts on fishes were evaluated by comparing projected changes resulting from management plan alternatives to existing conditions or the no-action alternative, as appropriate. The following assumptions were used in the analysis of the impacts of the various alternatives.

- Additional paddle access along Tamiami Trail and the improved canoe/kayak ramp and launch on the Gulf Coast would not increase visitor use enough to lead to measurable impacts on fishes or their habitats.
- Almost all freshwater fishing occurs in canals along the park boundary. Therefore, any increase in freshwater fishing within the park would have no adverse impacts.
- Proposed changes to visitor use and methods of access in the East Everglades Addition under the various alternatives are assumed to have negligible impacts. Although other projects and plans designed to change hydrologic conditions in the northeast sections of the park could affect fish habitat, these activities are not directly related to actions proposed under this management plan and are not discussed as direct effects.
- Construction of shade structures at Shark Valley is assumed to occur during dry season with the use of appropriate construction best management practices. Therefore, no adverse impacts on freshwater resources would occur. Similarly, upgrades/replacement of the Shark Valley visitor contact station and concession building would also not adversely impact nearby aquatic habitat.

Regional Changes to the Everglades Ecosystem

Primary among the reasons for the structure and composition of fish populations in the Everglades is the timing, distribution, and amount of flooding. Beginning in the 1880s, human-made modifications increasingly compartmentalized, controlled, and redirected surface flows in the south Florida ecosystem through an extensive system of roads, levees, canals, and water control

structures (Sklar et al. 1999; CERP 2010). These changes have disrupted or eliminated the characteristic overland sheet flows, changed the distribution and timing of flows, and caused widespread changes in fish habitat (Gunderson and Snyder 1997). One consequence of these changes is that about one-third of the entire south Florida wetland system has been eliminated, as have about half of the original Everglades (Davis et al. 1994). Seasonal drying of the interior of the Everglades is a controlling factor for populations and distribution of native freshwater fish, and water management activities also influence the productivity of Florida Bay (Florida Bay Science Program 2007). Thus, most impacts on fish and fish habitat arise from activities outside the park and largely beyond the influence of park policies, activities, and operations. Because of these circumstances, the impact of other plans and projects outside the park are discussed under the “Cumulative Impacts” sections under each alternative.

FISH AND FISH HABITAT

During the last 5,000 years, the south Florida ecosystem has evolved to contend with ongoing natural disturbances, including floods, droughts, and tropical storms/hurricanes (White et al. 1997). Given this context, aspects of climate change that would most likely influence fish and fish habitat would be increases in the frequency or intensity of these natural disturbances that are outside of the normal range of variability to which the ecosystem is adapted.

The U.S. Climate Change Science Program (2008) noted that extremes are a natural part of climate systems, ecosystems have adapted to the historic range of extreme events, and the consequences of those extremes have both costs and benefits depending on the species or habitat of concern. However, extremes outside this historic range may have significant impacts. How significant those impacts may be is a function of the system’s vulnerability to the type of change (e.g.,

changes in precipitation vs. changes in temperature), the system’s sensitivity to the extreme, and its ability to adapt (often referred to as resilience). The ability to adapt could also be influenced by the frequency of extreme events, which reduces the time available for recovery. Changes in precipitation and drought may also alter the susceptibility of ecosystems to invasive species.

Impact Criteria Thresholds

The thresholds to determine impacts to fish and fish habitat are defined below.

Negligible: The action might result in a change in fish abundance or fish habitat in a small area, but the change would not be measurable or would be at the lowest level of detection. Conditions would return to normal once the disturbance is removed.

Minor: The action might result in a detectable change in local fish abundance or fish habitat, but the change would be slight and within the natural range of variability. The change would not affect the viability of local fish populations or habitat or local ecological processes. Once the disturbance is removed, the area would recover without assistance.

Moderate: The action would result in a clearly detectable change in fish abundance or fish habitat and could have an appreciable effect over a fairly large area. Changes could involve alteration in the abundance, distribution, or composition of fish populations or habitats, although the viability of those populations would not be affected. Key ecological processes and community structure may be disrupted locally but would be retained regionally. If the disturbance is removed, the system would likely return to a normal state with some intervention.

Major: The action would result in substantial changes to fish abundance or fish habitat on a regional scale. The impacts would be highly noticeable and well outside the normal range of variability, including changes in the abundance, distribution, or composition of fish populations or habitats. Key ecological processes and community structure would be altered, and regional changes would be expected. The system would not return to a normal state without substantial intervention, and success is not guaranteed.

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified in this document, the following terms are used to describe the duration of the impacts:

Short term—The impact would be temporary in nature, lasting less than a year, such as increased turbidity during installation of chickees. Natural processes would return thereafter.

Long term—The impact would last more than a year and could be permanent, such as seagrass habitat degradation because of propeller scarring.

ESSENTIAL FISH HABITAT

Methods and Assumptions for Analyzing Impacts

Impact Threshold Criteria and Definitions.

As defined by the Magnuson-Stevens Fishery Conservation and Management Act, adverse effects on essential fish habitat are those that reduce the quality or quantity of this habitat by (1) altering the physical, chemical, or biological condition of the waters or substrates; or (2) resulting in the injury or loss of benthic organisms or prey species and their habitat. Adverse effects may be direct or indirect, site-specific or habitat-wide, or arise from actions occurring within or outside

essential fish habitat (50 CFR 600.910[a]). Adverse impacts are “more than minimal and not temporary in nature” based on an evaluation of the intensity, extent, and frequency of the impact and the type and function of habitat being impacted (50 CFR 600.815[a][2]). Minimal impacts “are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions.” Temporary impacts “are those that are limited in duration and that allow the particular environment to recover without measurable impact” (67 FR 2354). Determination of substantial adverse effects “should be based on project-specific considerations, such as the ecological importance or sensitivity of an area, the type and extent of essential fish habitat affected, and the type of activity. Substantial adverse effects are “effects that may pose a relatively serious threat to essential fish habitat and typically could not be alleviated through minor modifications to a proposed action” (67 FR 2367).

Based on the above, impact criteria and thresholds for essential fish habitat are described below.

No effect: The waters and substrates that define essential fish habitat would not be affected, nor would the organisms that depend on those waters and substrates.

No adverse effect: Effects on waters and substrates that define essential fish habitat would be minimal and temporary. Impacts would be beneficial or affect a relatively small portion of the affected environment, and the area would eventually recover. Consideration should be given to the importance of the habitat and its functions.

Adverse effect: Effects on waters and substrates that define essential fish habitat would be more than minimal, and impacts would permanently affect a relatively large portion of the affected environment. The habitat impacted performs relatively important functions.

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified, in this document, the following terms are used to describe the duration of the impacts on essential fish habitat.

Short term—The effect would occur only during or shortly after a specified action or treatment. Within a year, conditions would be similar to those prior to the activity.

Long term—Species would continue to be affected beyond one year's time, and conditions would not be similar to those before the activity.

FEDERAL SPECIAL STATUS SPECIES

Methods and Assumptions for Analyzing Impacts

In accordance with 50 CFR section 402(a), federal agencies are required to review all actions to determine whether an action may affect federally listed species or designated critical habitat. If such a determination is made, formal consultation is required unless the federal agency determines, with the written concurrence of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service that the proposed action will have no effect or is not likely to adversely affect any listed species or critical habitat. It is NPS policy to survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The National Park Service strives to fully meet its obligations under the National Park Service Organic Act and the Endangered Species Act to both proactively conserve listed species and prevent detrimental effects on these species. This is accomplished by cooperating with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to ensure that NPS actions comply with both the written requirements and the spirit of the Endangered

Species Act, and by cooperating with the U.S. Fish and Wildlife Service and other agencies/entities to facilitate delineation of critical habitat, development and implementation of species recovery plans and candidate conservation agreements, and proactive management for proposed and candidate species.

Through coordination with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, species of special concern that generally occur in or near the park were identified. Park staff then provided more specific information, such as the absence or presence of each species within the park boundaries. The impacts associated with visitor use and infrastructure development as described in the previous "Wildlife" section also apply to the discussions of these federally listed species. Therefore, the reader is encouraged to refer to the above descriptions of activities leading to habitat alteration, sensory-based disturbance, habitat loss, and habitat degradation. Impacts on the addressed federally listed or candidate species were evaluated by comparing projected changes resulting from the action alternatives to existing conditions. These evaluations were based on documented occurrences of the species within the park, the distribution of their preferred habitats within the park, and the occurrence and distribution of designated critical habitat. The impacts of potential visitation changes have been factored into the analysis.

For federal listed and candidate species, impact thresholds are defined based on terminology from section 7 of the Endangered Species Act using the following terminology:

No effect means there would be no effect on the species or its critical habitat, either positive or negative. A no-effect determination does not include small effects or effects that are unlikely to occur.

Not likely to adversely affect means that all effects on the species or its critical habitat are beneficial, insignificant, or discountable.

Beneficial effects have simultaneous positive effects without adverse effects on the species (for example, there cannot be “balancing” so that the benefits of the action would outweigh the adverse effects). Insignificant effects relate to the size of the impact and should not reach the scale where take occurs. Discountable effects are considered extremely unlikely to occur. Determinations of “not likely to adversely affect, due to beneficial, insignificant, or discountable effects,” typically require written concurrence from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.

Likely to adversely affect means that an adverse effect on the species or its critical habitat may occur as a direct or indirect result of an action, and the effect is not discountable, insignificant, or beneficial. In the rare event that adverse effects could not be avoided, the project would either be discontinued or NPS staff would request formal consultation with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service.

In addition, the following impact threshold definitions were used to describe the magnitude of changes to federal listed species under each alternative. Each threshold definition references the Endangered Species Act determinations described above. Separate threshold definitions are provided for adverse and beneficial impacts to provide additional details about the susceptibility and response of at-risk species to management actions.

Negligible: *Adverse impact*—There would be no observable or measurable impacts to special status species, their habitats, or the natural processes sustaining them in the proposed project area. This impact intensity would equate to a determination of “no effect” under section 7 of the Endangered Species Act.

Beneficial impact—There would be no observable or measurable impacts to federally-listed species, their habitats, or the natural processes sustaining them in a park site. For federal listed species, this

impact intensity would equate to a determination of “no effect” under section 7 of the Endangered Species Act.

Minor: *Adverse impact*—Individuals may temporarily avoid areas. Impacts would not affect critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat. This impact intensity would equate to a determination of “may affect, not likely to adversely affect” under section 7 of the Endangered Species Act. Critical habitat may be affected, but the essential physical and biological features of the critical habitat would not be affected.

Beneficial impact—Impacts would result in slight increases to viability of the species in the park as species-limiting factors (e.g., habitat loss, competition, and mortality) are kept in check. Nonessential features of critical habitat in a park site would be slightly improved. For federal listed species, this impact intensity would equate to a determination of “may affect / not likely to adversely affect” under section 7 of the Endangered Species Act.

Moderate: *Adverse impact*—Individuals may be impacted by disturbances that interfere with critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat; and the level of impact may result in physical injury or mortality of individuals, but would not be expected to affect the population’s likelihood of persistence, or lead to extirpation or declines. This impact intensity would equate to a determination of “may affect, likely to adversely affect” under section 7 of the Endangered Species Act. Critical habitat may be affected and the essential physical and biological features of the critical habitat could be minimally affected.

Beneficial impact—Impacts would result in slight increases to viability of the species in the park as species-limiting

factors (e.g., habitat loss, competition, and mortality) are reduced. Some essential features of critical habitat would be improved. For federal listed species, this impact intensity would equate to a determination of “may affect / not likely to adversely affect” under section 7 of the Endangered Species Act.

Major: *Adverse impact*—Individuals may suffer physical injury or mortality such that populations may decline, perhaps even substantially, or be extirpated from the park. Critical habitat and the essential physical and biological features may be affected, but the value of critical habitat would not be appreciably diminished. This impact intensity would equate to a determination of “may affect, likely to adversely affect” under section 7 of the Endangered Species Act.

Beneficial impact—Impacts would result in highly noticeably improvements to species viability, population structure, and species population levels in the park, as species-limiting factors (e.g., habitat loss, competition, and mortality) are eliminated. All essential features of critical habitat would be improved. For federal listed species, this impact intensity would equate to a determination of “may affect / not likely to adversely affect” under section 7 of the Endangered Species Act.

Duration. Impact duration refers to how long an impact would last. The planning horizon for this management plan is approximately 20 years. Unless otherwise specified in this document, the following terms are used to describe the duration of the impacts:

Short term—The impact would be temporary in nature, lasting less than a year. Natural processes would return thereafter.

Long term—The impact would last more than a year and could be permanent.

NATURAL SOUNDSCAPE

Guiding Regulations and Policies

NPS management goals for soundscapes are in section 4.9 of *NPS Management Policies 2006* (NPS 2006) and in NPS Director’s Order 47: *Soundscape Preservation and Noise Management* (NPS 2000).

As stated in section 8.2.3 of *NPS Management Policies 2006*, “The natural ambient sound level—that is, the environment of sound that exists in the absence of human-caused noise—is the baseline condition, and the standard against which current conditions in a soundscape will be measured and evaluated.”

NPS Management Policies 2006 require restoration of degraded soundscapes to the natural condition, whenever possible, and protection of natural soundscapes from degradation. In section 4.9, the National Park Service is directed to “take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored.”

NPS policies acknowledge that motorized equipment, which generates noise, is necessary for administrative uses within the parks to meet management objectives (NPS 2006). Policies direct that where motorized equipment is necessary and appropriate, the least impacting equipment, vehicles, and transportation systems should be used, consistent with public and employee safety.

NPS Director’s Order 47 requires, “to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources.” It also states that “the fundamental principle underlying the establishment of soundscape preservation objectives is the obligation to protect or

restore the natural soundscape to the level consistent with park purposes, taking into account other applicable laws.” Noise is generally considered appropriate if it is generated from activities consistent with park purposes and at levels consistent with those purposes.

NPS Director’s Order 47 also directs that where legislation provides for specific noise-making activities in parks, the soundscape management goal would be to reduce the noise to the level consistent with the best technology available, which would mitigate the noise impact but not adversely affect the authorized activity. Where a noise-generating activity is consistent with park purposes, “soundscape management goals are to reduce noise to minimum levels consistent with the appropriate service or activity.”

Methods and Assumptions for Analyzing Impacts

Issues related to the park soundscape identified during internal scoping included: (1) sound generated from use of motorized vehicles, including motorboats, airboats, aircraft, and cars and (2) sound generated from administrative activities in the park, e.g., repairing roads and structures and restoring disturbed areas.

Impact Criteria and Thresholds

The thresholds to determine the intensity of impacts on the natural soundscape are defined as follows:

Negligible: *Adverse*—Human-caused sounds are barely detectable, do not compete with ambient sounds present in the soundscape, and are of essentially no consequence to wildlife or visitors.

Beneficial—The benefit to the natural soundscape is barely detectable and of essentially no consequence to wildlife or visitors.

Minor: *Adverse*—Human-caused sounds are detectable above ambient sounds in the soundscape but are of little consequence to wildlife or visitors.

Beneficial—The benefit to the natural soundscape is slight but detectable and of little consequence to wildlife or visitors.

Moderate: *Adverse*—Human-caused sounds are readily detectable above the ambient sounds in the soundscape. These sounds cause physiological or behavioral responses in wildlife or visitors but do not represent a measureable risk of diminished biological function.

Beneficial—The benefit to the natural soundscape is readily apparent, and is of modest importance to wildlife or visitors.

Major: *Adverse*—Human-caused sounds overwhelm ambient sounds in the soundscape. These sounds cause physiological or behavioral responses in wildlife or visitors and may present measurable risk of diminished biological function.

Beneficial—The benefit to the natural soundscape is obvious and of substantial benefit to wildlife or visitors.

Duration. The durations for this impact topic are as follows:

Short term—Such impacts are intermittent or persisting throughout the proposed construction period.

Long term—Effects would occur beyond the proposed project implementation period.

WILDERNESS CHARACTER

Guiding Regulations and Policies

The 1964 Wilderness Act states, “it is hereby declared to be the policy of Congress to

secure for the American people of present and future generations the benefits of an enduring resource of wilderness.” One of the central mandates of this act is to preserve wilderness character. Section 2(a) states that wilderness areas shall be administered “so as to provide for the protection of these areas, the preservation of their wilderness character . . .” section 4(b) states: “Except as otherwise provided in this act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character.” Because the park has proposed wilderness in each of the action alternatives, and based on the act’s mandate to preserve wilderness character, this impact topic focuses on the extent to which a particular wilderness proposal secures for the public the benefits of an enduring (permanent) resource of wilderness, including preservation of wilderness character and the extent to which the alternatives protect and maintain the character of existing designated terrestrial and submerged wilderness.

Methods and Assumptions for Analyzing Impacts

For all but the no-action alternative, this impact assessment assumes that areas proposed for designated wilderness are ultimately designated as such by Congress. It is also assumed that all potential wilderness areas in the action alternatives will become designated wilderness. For the no-action alternative, this assessment assumes continuation of the current management direction—that is, the National Park Service continues to manage the areas to maintain their existing wilderness character until “Congress determines otherwise.”

Wilderness character is not specifically defined in the 1964 Wilderness Act, nor is its meaning discussed in the act’s legislative history. However, the Wilderness Act identifies the following qualities that unify

wilderness areas regardless of their size, location, or other features.

Untrammeled is “an area where the earth and its community of life are untrammeled by man.” This means that wilderness is essentially unhindered and free from the actions of modern human control or manipulation. Actions that intentionally manipulate or control ecological systems inside wilderness degrade the untrammeled quality of wilderness character, even though they may be taken to restore natural conditions.

Natural means “protected and managed so as to preserve its natural conditions. . . .” This means areas that are largely free from effects of modern civilization. It also refers to maintenance of natural ecological relationships and processes, continued existence of native wildlife and plants in largely natural conditions, and the absence of distractions (e.g., large groups of people; mechanization; and evidence of human manipulation, unnatural noises, signs, and other modern artifacts).

Undeveloped “an area of undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation” This refers to areas that are essentially without permanent structures, enhancements, or modern human occupation. To retain its primitive character, a wilderness ideally is managed without the use of motorized equipment or mechanical transport.

Solitude or Primitive and Unconfined Recreation “has outstanding opportunities for solitude or a primitive and unconfined type of recreation” Solitude means encountering few, if any, people and experiencing privacy and isolation. Primitive and unconfined recreation refers to freedom to explore with few restrictions and the ability to be spontaneous. It means self-sufficiency without support facilities or motorized transportation, and experiencing weather, terrain, and other aspects of the natural world

with minimal shelter or assistance from devices of modern civilization.

The impact analysis distinguishes the impacts in the main portion of the park, the submerged wilderness of Florida Bay, and the East Everglades Addition. It does so because even though much of the park is designated wilderness, the existing Florida Bay submerged wilderness varies from the rest of the wilderness areas, and most of the East Everglades Addition is not designated wilderness, but is wilderness-eligible and is being proposed for wilderness designation in varying amounts in the alternatives.

Impact Criteria and Thresholds. Impact intensity definitions for wilderness character are as follows.

Negligible: A change in the wilderness character could occur, but it would be so small that it would not be of any measurable or perceptible consequence.

Minor: A change in the wilderness character and associated values would occur, but it would be small and, if measurable, highly localized.

Moderate: A change in the wilderness character and associated values would occur. It would be measurable but localized.

Major: A noticeable change in the wilderness character and associated values would occur. It would be measurable and have a substantial or possibly permanent consequence.

Duration. The durations for this impact topic are as follows:

Short term—Effects would occur only during and shortly after a specified action or treatment.

Long term—Effects would persist well beyond the duration of a specified action

or treatment (e.g., nonnative plant removal or construction).

ARCHEOLOGICAL RESOURCES

Definitions of Intensity Levels

Negligible: Impact is at the lowest level of detection. Impacts would be measurable but with no perceptible consequences. For purposes of section 106, the determination of effect would be *no adverse effect*.

Minor: Disturbance of a site(s) results in little loss of integrity. For purposes of section 106, the determination of effect would be *no adverse effect*.

Moderate: Site(s) is disturbed with noticeable loss of integrity, but is not obliterated. For purposes of section 106, determination of effect would be *adverse effect*.

Major: Site(s) is disturbed to the extent that most or all of its informational potential is lost or obliterated. For purposes of section 106, the determination of effect would be *adverse effect*.

Duration. All impacts that diminish the potential of archeological resources to yield information important in prehistory or history would be irreversible and permanent.

HISTORIC STRUCTURES, SITES, AND DISTRICTS

Definition of Intensity Levels

Negligible: Impacts would be at the lowest levels of detection – barely perceptible and measurable. For purposes of section 106, the determination of effect would be *no adverse effect*.

Minor: Impacts would affect the character-defining features of a historic structure, site, or district but would not diminish the overall integrity of the resource. For purposes of section 106, the determination of effect would be *no adverse effect*.

Moderate: Impacts would alter a character-defining feature(s), diminishing the overall integrity of the historic structure, site, or district to the extent that its national register eligibility could be jeopardized. For purposes of section 106, the determination of effect would be *adverse effect*.

Major: Impacts would alter character-defining features, diminishing the integrity of the historic structure, site, or district to the extent the resource would no longer be eligible to be listed in the national register. For purposes of section 106, the determination of effect would be *adverse effect*.

Duration. Impacts that diminish the integrity or character-defining features of historic structures, sites, and districts would be short term if lasting less than one year, or long-term and possibly permanent if lasting one year or longer.

CULTURAL LANDSCAPES

Definitions of Intensity Levels

Negligible: Impacts would be at the lowest levels of detection—barely perceptible and measurable. For purposes of section 106, the determination of effect would be *no adverse effect*.

Minor: Impacts would affect character-defining features or patterns but would not diminish the overall integrity of the landscape. For purposes of section 106, the determination of effect would be *no adverse effect*.

Moderate: Impacts would alter character-defining features or patterns, diminishing the overall integrity of the landscape to the extent that its national register eligibility would be jeopardized. For purposes of section 106, the determination of effect would be *adverse effect*.

Major: Impacts would alter character-defining features or patterns, diminishing the overall integrity of the landscape to the extent that it would no longer be eligible to be listed in the national register. For purposes of section 106, the determination of effect would be *adverse effect*.

Duration. Impacts that diminish the integrity or character-defining features of cultural landscapes and contributing features would be short term if lasting less than one year, or long term and possibly permanent if lasting one year or longer.

ETHNOGRAPHIC RESOURCES

Definitions of Intensity Levels

Negligible: Negligible impacts would be at the lowest levels of detection and barely perceptible. Impacts would not alter resource conditions, such as traditional access or site preservation, or the relationship between the resource and the associated group's body of practices and beliefs. For purposes of section 106, the determination of effect would be *no adverse effect*.

Minor: Minor impacts would be slight but noticeable and would not appreciably alter resource conditions, such as traditional access or site preservation, or the relationship between the resource and the group's body of beliefs and practices. For purposes of section 106, the determination of effect would be *no adverse effect*.

Moderate: Moderate impacts would be apparent and would alter resource conditions or interfere with traditional access, site preservation, or the relationship between the resource and the associated group's beliefs and practices, even though the group's practices and beliefs would survive. For purposes of section 106, the determination of effect would be *adverse effect*.

Major: Major impacts would alter resource conditions. Proposed actions would block or greatly affect traditional access, site preservation, or the relationship between the resource and the group's body of beliefs and practices to the extent that the survival of a group's beliefs and/or practices would be jeopardized. For purposes of section 106, the determination of effect would be *adverse effect*.

Duration. All impacts that diminish the values ascribed to ethnographic resources by culturally associated groups, or that restrict access by associated groups to culturally important resources and places, would be long term and possibly of permanent duration.

MUSEUM COLLECTIONS

Definitions of Intensity Levels

Negligible: Impact is at the lowest levels of detection—barely measurable with no perceptible consequences, either adverse or beneficial, to museum collections.

Minor: Impact(s) would affect the integrity of few items in the museum collection but would not degrade the usefulness of the collection for future research and interpretation.

Moderate: Impact(s) would affect the integrity of many items in the museum collection and diminish the usefulness of

the collection for future research and interpretation.

Major: Impact(s) would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation.

Duration. Impacts that diminish the integrity, research values, and/or availability of museum collections would be short term if lasting less than one year, or long term and possibly permanent if lasting one year or longer.

VISITOR USE

Methods, Assumptions, and Trends for Analyzing Impacts

Visitor use at Everglades National Park has varied over time, influenced by economic conditions, energy prices, and weather (particularly tropical storms). Between 1990 and 2011, annual recreation use has ranged from a low of 820,466 (1995) to a high of 1,292,014 (1991), averaging 1,005,000 recreation visitors (not including owners, guests, and clients associated with private and commercial airboat operations in the East Everglades Addition). Long-term historical trends in visitor use at Everglades also reflect changes in patterns of leisure time pursuits, such as the dramatic increase in golfing by senior citizens and the expanded development of private recreation opportunities available to residents and visitors in south Florida. Although offering a different setting and range of opportunities than the park, these opportunities compete with the park and have likely limited increases in park recreational use in past years despite the substantial population growth in the region.

Future visitor use at Everglades will depend primarily on the following five factors:

1. residential population growth in south Florida

2. the region's seasonal population, which is tied to national population growth and demographic trends
3. international visitation to south Florida
4. the type, capacity, and location of visitor opportunities provided at the national park
5. management actions associated with the alternatives

Population gains of 1.07 million residents are projected for south Florida (Broward, Miami-Dade, Collier, Lee, and Monroe counties in this instance) between 2010 and 2035—a 20% increase from 2010. That growth would raise the region's total population to 6.3 million. Nearly 58%, half of the projected growth, is anticipated to occur on the Atlantic Coast, with 42% occurring on the Gulf Coast. A net decline of nearly 4,000 residents is projected for the Florida Keys.

Population growth of 4.0 million residents is projected for the remainder of Florida during the same period (Florida Office of Economic and Demographic Research 2012).

As described in the previous chapter, seasonal residents and tourists attracted by the area's temperate winter climate are an important component of visitor use at the Everglades. Population projections by the U.S. Census Bureau anticipate a net increase of more than 79 million residents nationally between 2010 and 2035, with the national population approaching 390 million in 2035. The age distribution of the resident population is expected to change during that period, with the number aged 65 and older expected to nearly double—from about 44 million residents in 2010 to 77.5 million residents in 2035 as the so-called “baby boom” generation ages (see table 24 below (U.S. Census Bureau 2008). That change could increase the number of seasonal migrants to south Florida.

International visitors, particularly from northern Europe, are another important component of visitation at Everglades. This component has been adversely affected by the recent recession. However, with a current

population of more than 700 million residents, northern Europe can be expected to continue to generate substantial numbers of international visitors over the life of this plan.

In addition to the demographic factors noted above, visitor use will be affected by management zoning, visitor opportunities, wilderness, and other aspects of the various alternatives. Because of uncertainties about the timing for implementing specific actions and the modest changes in capacity of developed recreation facilities proposed under the action alternatives, projecting future use is subjective and relies on professional judgment. This judgment should consider the effects of the changes in recreation opportunities, access, relationships between uses in adjacent areas of the park, and potential wilderness designations on promoting or discouraging visitor use in the park. An important change in future visitor capacity is that associated with implementation of the *Flamingo Commercial Services Plan*, which is common to all alternatives and is assumed to occur by 2025.

The demographic trends summarized above provide a basis for anticipating a long-term trend of increasing visitor use at Everglades. In essence, then, these trends describe a future that is consistent with the no-action alternative, without considering any capacity constraints or opportunities associated with changes in visitor facilities or in park management. Under the no-action alternative, an increase on the order of 200,000 recreation visitors per year to Everglades National Park could be foreseen by 2035 (table 25), just slightly above the pre-Katrina visitation levels. The resulting 1.12 million annual recreation visitors would be below the peak of 1.52 million recorded in 1972. In addition to the increase in regional and seasonal population, the completion of the new Shark Valley Visitor Center and implementation of the revised *Flamingo Concession Services Plan* will be the key drivers of visitor use under the no-action alternative. For this analysis, it is assumed that those improvements are all in place and operating by 2025.

TABLE 24. PROJECTED POPULATION OF THE U.S. BY AGE GROUP, 2010–2035 (IN MILLIONS)

Age Group	2010	2035	Change
Under 18	75,217	90,722	20.6%
18–44	113,808	133,657	17.4%
45–64	80,980	87,608	8.2%
65 and over	40,229	77,543	92.8%
Total	310,234	389,530	25.6%

Source: U.S. Census Bureau 2008

TABLE 25. PROJECTED ANNUAL VISITOR USE, NO-ACTION ALTERNATIVE, 2003/04–2035

Average of 2003/04 (Pre-Katrina)	2010	2025	2035	Change 2010–2035
1,100,000	915,000	1,055,000	1,115,000	+200,000

Over the 25-year time period covered by these projections, visitor use would vary from year to year, with periods of faster and slower growth and even periods of declines. Peak visitation, on a parkwide basis, is expected to continue to occur during the first quarter of the year (January through March). Backcountry visitor use in the Everglades City / Ten Thousand Islands area would also peak in the first quarter of each year, though overall use in the district may begin to peak in the fall.

Visitor use over the course of a year primarily reflects the influences of resource management actions; climate, both in terms of its link to visitor experience and to seasonal migration to south Florida; and the capacity of visitor facility and service areas. Long-term changes affecting these factors are expected. The timing and extent of the changes are

uncertain, although climate change is likely to occur relatively gradually, whereas management actions or changes in capacity could occur more rapidly and be associated with discrete or definable actions or events. Although the net effect on seasonal use is uncertain, the established visitation pattern would continue.

Long-term changes in visitor use are foreseen under all of the alternatives, including the no-action alternative. Therefore, changes in use that would occur in each action alternative must be considered in comparison to the change in use under the no-action alternative. The main aspects of management that would affect visitor use and *probable* long-term general effect on net visitor use include the following:

- additional backcountry chickees (Ten Thousand Islands and Florida Bay)—increased use
- amenities such as electrical hookups, showers, and concessions at Long Pine Key Campground—increased use
- completion of the Gulf Coast Visitor Center and associated improvements in parking and canoe/kayak/boating access to the Gulf / Ten Thousand Islands—increased use
- long-term adoption and expansion of the pole/troll zones in Florida Bay—increased or decreased level and distribution of use depending on the alternative
- paddle access in Long Sound—increased use
- implementation of the boater education/ permit program—decreased use
- achieving effective partnership opportunities outside the park—increased use
- public recreation access to Little Madeira and Joe bays—increased use
- authorized commercial airboat tours under concession contracts—continuing use
- ending or restricting commercial airboat operations—decreased use
- commercial airboat use as it is tied to Shark Valley use—continuing use
- alternative transportation access to Royal Palm and possibly Flamingo—increased use

In addition to the actions cited above, each of the action alternatives contains many other elements that could affect the types, amount, and distribution of use within the park without altering the overall level of use. For instance, providing additional bicycling opportunities within the park might change recreational use patterns without altering the overall level of use.

Considering all elements of each action alternative led the planning team to conclude that the NPS preferred alternative would result in higher annual use than the no-action alternative over the life of the plan. The magnitude of the increase would be expected to be relatively modest, perhaps on the order of an additional 20%, or 40,000 recreation users annually, more than the 200,000 additional visitors projected under the no-action alternative. Note that this increment does not include allowances for the visitors taking commercial airboat tours; use that currently occurs but is not reflected in park visitor use counts. Peak monthly visitation would be anticipated to increase by approximately 8,000 visitors given the anticipated increase in annual visitation and continuation of seasonal use patterns.

Alternatives 2 and 4 would also be anticipated to result in more annual visitor use than the no-action alternative, but not as much as under the NPS preferred alternative. Implementation of improvements on the Gulf Coast would be an important factor contributing to increases in both instances. Between the two, alternative 2 would promote more visitor use than alternative 4. Note that commercial airboat operations would be eliminated under alternative 4, resulting in an overall decrease in use relative to current use occurring within the park boundary.

In summary, the NPS preferred alternative would result in the highest annual visitor use over the long term, followed in descending order by alternatives 2, 4, and the no-action alternative. However, none of the alternatives seek to promote visitor use levels or provide facilities and the capacity to accommodate annual visitor use that would be substantially higher than pre-Katrina/Wilma levels.

The thresholds for this impact topic are the same used for the visitor experience and opportunities section. The thresholds used for both sections are defined under “Visitor Experience and Opportunities.”

VISITOR EXPERIENCE AND OPPORTUNITIES

Methods and Assumptions for Analyzing Impacts

This topic covers opportunities for recreation, interpretive, and educational experiences, access, and scenic resources, considering resource protection and sustainability objectives. Impacts on visitor experience and opportunities were evaluated by comparing projected impacts from the action alternatives to the no-action alternative.

Impact Criteria and Thresholds. The thresholds for this impact topic are as follows:

Negligible: Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor experience or in any defined indicators of visitor satisfaction or behavior.

Minor: Changes in visitor use and/or experience would be slight but detectable and would not appreciably diminish or enhance critical characteristics of the visitor experience. Visitor satisfaction would remain stable.

Moderate: Few critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be altered. The visitor would be aware of the effects associated with implementation of the alternative and would likely be able to express an opinion about the changes. Visitor satisfaction would begin to either decline or increase as a direct result of the effect.

Major: Multiple critical characteristics of the desired visitor experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. The visitor would be aware of the effects associated with

implementation of the alternative and would likely express a strong opinion about the change. Visitor satisfaction would markedly decline or increase.

Duration. The durations for this impact topic are as follows:

Short term—Effects on visitor enjoyment and recreational or educational opportunities typically would persist for less than one year.

Long term—Effects on visitor enjoyment and recreational or educational opportunities would extend beyond one year.

REGIONAL SOCIOECONOMIC ENVIRONMENT

Methods and Assumptions

Scoping identified potential economic and social implications of the management plan alternatives as a topic of keen public interest. Economic effects are commonly expressed in terms of the number and types of jobs supported by the park, changes in income, visitor use at the park and associated changes in visitor spending. Less well defined economic effects include the indirect effects from park operations and the effects on local government tax revenues. Examples of social impacts include effects on local and regional population growth, housing, and community facilities and services.

The analytical approach used in this analysis considers the following three main factors:

- projected future expenditures for construction rehabilitation, restoration, and maintenance of facilities and infrastructure
- changes in park staffing and federal spending to operate the park
- changes in the levels of visitor use at the park

Implementation costs of the management plan alternatives, including staffing needs, operating costs, and capital construction and maintenance expenditures, were estimated by the planning team based on current budgets and actual project costs at the park and other national park system units. Actual future outlays would reflect future NPS policies, actual on-the-ground conditions, unanticipated events and opportunities, and budgets approved by Congress for the National Park Service in general, or Everglades National Park specifically.

Expected changes in projected visitor use for the alternatives are addressed in qualitative terms (see the section on “Visitor Use”). In comparison to the no-action alternative, management guidance and zoning established under the management plan is expected to foster more visitor use in the NPS preferred alternative and alternative 2. In alternative 4, which would eliminate commercial airboat tours, visitor use would likely decrease. It is important to note that this decrease would not be accurately reflected in park visitor use statistics, as these statistics do not capture visitors entering the park via commercial airboat tours. Thus, measured visitation under alternative 4 could appear to increase in official park statistics, even as total visitation (measured and unmeasured) declines. Actual visitor use over time will exhibit temporary and multiyear variations due to factors such as severe weather events (e.g., hurricanes or tropical storms) or regional or national economic conditions (e.g., periods of economic growth or recessions).

Impact Thresholds and Characterization

Economic and social impacts associated with the management plan alternatives are assessed in terms of scale/intensity, duration, and type/character. These parameters are defined as follows.

Scale/Intensity. The scale or intensity of impacts refers to the change(s) associated with

the alternatives when compared to current and future conditions under the no-action alternative. In addition to the relative magnitude of changes, factors considered in assessing scale and intensity include the likelihood of adjacent landowners, visitors, and residents of the surrounding area being aware of the changes, the ability to measure the effects of the changes, and the number of people or size of geographic region that would be affected. The scale/ intensity thresholds for economic and social conditions for the park are defined below.

Negligible: Effects on adjacent landowners, neighbors, businesses, agencies, community infrastructure, social conditions, etc., would be nonexistent, barely detectable or observable, or detectable only through indirect means and with no discernible impact on local social or economic conditions.

Minor: Effects on adjacent landowners, neighbors, businesses, agencies, community infrastructure, social conditions, etc., would be small but detectable, geographically localized, affect few people, comparable in scale to typical year-to-year or seasonal variations, and not expected to substantially alter established social or economic structures.

Moderate: Effects on adjacent landowners, neighbors, businesses, agencies, community infrastructure, social conditions, etc., would be readily apparent or observable across a wider geographic area and affect many people and could have noticeable effects on the established economic or social structure and conditions.

Major: Effects on adjacent landowners, neighbors, businesses, agencies, community infrastructure, social conditions, etc., would be readily detectable or observable, affect a large segment of the population, extend across

much of a community or region, and have a substantial influence on the established social or economic conditions.

Duration. Social and economic changes caused by an alternative may be temporary or last for an extended time. Temporary impacts may be noticeable locally, but not result in long-term changes of underlying economic and social conditions. Long-term impacts, on the other hand, may lead to changes in the economic base, construction or closure of public facilities, real estate markets, how people and groups relate to one another, and established social and economic conditions. Many long-term effects would extend beyond the life of this management plan.

Short Term—Short-term effects are those that occur during and in direct response to planning, design, construction, and major maintenance of buildings, trails, parking lots and other facilities. These effects diminish or disappear after the activity is completed. Short-term might include the initial response(s) in social or economic conditions to fundamental changes in park management and operations and changing visitor use, that later give way to broader changes over time. Generally, short-term captures effects lasting up to five years. Distinct actions, implemented at different times, could each trigger short-term effects.

Long Term—Long-term effects are generally those lasting longer than five years, including some that may not begin until after completion of direct activities associated with the initial federal government spending or changes in management associated with an alternative. Such changes include increases in the park's base budget for operations and maintenance and effects related to changes in visitation over time.

Type/Character. Social and economic consequences may be beneficial, adverse, or indeterminate.

Beneficial—Effects that many individuals or groups would accept or recognize as improving economic or social conditions, either in general or for a specific group of people, businesses, organizations, or institutions. Examples of beneficial effects include lower unemployment, higher personal income, and economic and social diversity and sustainability.

Adverse—Effects that most individuals or groups would accept or generally recognize as diminishing economic or social welfare, either in general or for a specific group of people, businesses, organizations, or institutions. Examples of adverse effects include fewer job opportunities, increases in the cost of living without matching increases in income, or an erosion of public sector fiscal resources to fund public facilities and services.

Indeterminate—Those for which the size, timing, location, or individuals or groups that would be impacted cannot be determined, or those that include both beneficial and negative effects, in some instances affecting different communities, populations, or public entities or jurisdictions, such that the net effect is indeterminate.

PARK OPERATIONS AND MANAGEMENT

Methods and Assumptions for Analyzing Impacts

This impact topic addresses the ability of NPS staff to protect and preserve Everglades National Park resources and to provide opportunities for effective and enjoyable visitor experiences. It also addresses the effectiveness and efficiency with which NPS staff perform such tasks. Information about NPS operations was compiled from various sources, especially park managers and other NPS staff. Information gathered includes park staffing, maintenance considerations,

administrative activities, and restoration efforts. Examples of operational considerations include needs for maintenance, protection, and patrol activities, and time required for park staff to get to and from various park sites requiring attention (for example, research or monitoring sites, trailheads, or campsites).

Impact Criteria and Thresholds. The thresholds for this impact topic are as follows:

Negligible: Effects on NPS operations would be at or below the level of detection.

Minor: Effects on NPS operations would be small but detectable. The change would be noticeable to staff but probably not to the public.

Moderate: Effects on NPS operations would be readily apparent to staff and possibly to the public.

Major: Effects on NPS operations would be substantial, widespread, and apparent to staff and the public.

Duration. The durations for this impact topic are as follows:

Short term—Effects would occur only during and shortly after a specified action or treatment.

Long term—Effects would persist well beyond the duration of a specified action or treatment, or effects would not be associated with a particular action such as construction.

IMPACTS FROM IMPLEMENTING THE NO-ACTION ALTERNATIVE

HYDROLOGIC RESOURCES

No aspects of the no-action alternative would appreciably affect surface waters (timing, distribution, amount of flow, or water quality) or wetlands.

Changes in park facilities under the no-action alternative would occur within already existing developed areas. No new roads or trails would be proposed, and no new facilities would be anticipated outside developed areas. For example, upgraded facilities at Shark Valley and Key Largo would be constructed within the developed footprint. Because of this, impacts on wetlands would not be expected. Water quality impacts during construction (e.g., turbidity, sedimentation) would be short term, localized, negligible to minor, and adverse. Construction best management practices would reduce or eliminate such impacts.

Florida Bay boat access would be managed as it is now. A recent study of propeller scarring of seagrass beds in Florida Bay (NPS 2008c) found that such scarring is more extensive than previously reported, and such impacts would be expected to continue. Sediment raised into the water column by propeller disturbance and boat groundings would have short-term, minor, localized, water quality impacts, both in Florida Bay and along the Gulf Coast. The extent and duration of these effects would depend on the nature of the substrate disturbed, sea conditions, and the severity of the disturbance. However, for most scarring or grounding events, water quality would be noticeably affected for a matter of minutes or hours in the disturbed area, resulting in short-term, localized, minor, adverse effects on water quality.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects and plans that would contribute to impacts on

water resources include: (1) Everglades restoration plans that involve changes in water structures and management intended to reestablish a more natural water regime in the park, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, and (4) restoration of areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds).

As noted in the introduction, most impacts on water resources and wetlands in the park arise from changes in the amount, timing, and distribution of water and related changes in water quality (i.e., excess nutrients). Chapter 1 provides more detail regarding the intended benefits to water resources, water quality, and wetlands from Everglades restoration plans. To the extent that these plans and projects are implemented within the duration of this management plan, restoration impacts would be long term, parkwide, moderate to major, and beneficial. Impacts from implementing a pilot pole/troll zone at Snake Bight would be long term, localized, minor to moderate, and beneficial. Impacts from site-specific restoration activities would be long term, localized, minor, and beneficial.

The cumulative effect of the no-action alternative in combination with other projects and plans would be long term, parkwide, minor to major, and beneficial, and the contribution of the no-action alternative to these effects would be very small.

Conclusion. No aspects of the no-action alternative would appreciably affect surface waters (timing, distribution, amount of flow, or water quality) or wetlands. Propeller scarring and boat groundings in Florida Bay would likely continue to be relatively widespread, resulting in short-term, minor, adverse water quality impacts from increased turbidity. The cumulative effect of the no-

action alternative and other projects and plans and would be long term, parkwide, minor to major, and beneficial.

LANDSCAPE AND SOILS

Under the no-action alternative, soils would primarily be affected by visitor use (e.g., compaction) and construction of upgraded facilities (temporary disturbance or loss). Visitor effects on soils would continue to be long term, localized, negligible to minor, and adverse. Facility upgrades (such as at Shark Valley and Key Largo) would occur within the developed footprint. Impacts associated with facilities construction (e.g., erosion, removal of surface layer) would be long term, localized, negligible to minor, and adverse. Construction best management practices would help limit such impacts. Construction of developments in the Gulf Coast area would result in short-term, localized, minor, adverse impacts to soils until the soils were replaced and/or rehabilitated.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects and plans that would contribute to impacts on soils include (1) Everglades restoration plans that involve changes in water structures and management intended to reestablish a more natural water regime in the park, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) restoration activities in areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds), (4) implementing the park's fire management plan, and (5) implementation of the park's strategic management plan and resource stewardship strategy.

Chapter 1 discusses the intended benefits of Everglades restoration plans on surface water (quantity, timing, and distribution) and on water quality. To the extent that these plans and projects are implemented during the duration of this management plan, impacts on soils from such restoration efforts would be long term, regional, minor to moderate, and beneficial. Soils impacts from site-specific

restoration projects would be long term, local, minor to moderate, and beneficial. Impacts from various park management plans would be long term, parkwide, minor to moderate, and beneficial. In total, cumulative impacts on soils from this alternative and other projects and plans would be long term, parkwide, minor to moderate, and beneficial. Alternative 1 would have a very slight contribution to the cumulative effects.

Conclusion. Long-term impacts on soils (from facility upgrades and visitor use) would be localized, negligible to minor, and adverse. Impacts from other project and plans, including Everglades ecosystem restoration efforts, would be long term, regional, minor to moderate, and beneficial. The cumulative effect of the no-action alternative and other projects and plans would be long term, minor to moderate, and beneficial.

VEGETATION

Under the no-action alternative, vegetation would be affected by facility upgrades within developed areas (e.g., at Shark Valley, Everglades City, and Key Largo). Construction impacts on vegetation would be short term, localized, negligible to minor, and adverse (e.g., removal of surface layer). Construction best management practices, such as revegetation of disturbed areas, would minimize such impacts. Construction of developments in the Gulf Coast area would result in short-term, localized, minor, adverse impacts to vegetation until revegetation occurred.

Airboating can damage wetland vegetation such as sawgrass (and compact, stir up, or transport sediments, increasing water turbidity) in areas where airboats run repeatedly. However, commercial, private, and administrative airboat use would continue to occur in the East Everglades Addition under the no-action alternative; therefore, adverse impacts would also continue in areas of concentrated use, especially along the commercial airboat routes in the northern

portion of the Addition. Park staff also use airboats for maintenance, research, law enforcement, and management activities. This would be a continued, long-term, localized, minor, adverse impact.

Current management of visitor use in Florida Bay (i.e., very few restrictions on motorboat use) would continue under the no-action alternative. Damage to sea bottom vegetation such as seagrasses from propeller scarring and boat groundings is extensive and likely increasing, and many scarred areas are not recovering (NPS 2008c). Such impacts are more severe in some areas of Florida Bay than others, but they occur throughout the bay and constitute a moderate adverse impact to sea bottom vegetation. There is associated damage to sea bottom sediments as well. Ongoing (limited, small-scale) seagrass restoration efforts in Florida Bay would have long-term, localized, minor, beneficial impacts.

All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to public use as it has for the last 25 or so years. Beneficial impacts on sea bottom vegetation (and sediments) would continue to be localized and moderate because of protection from propeller scarring and boat groundings.

Overall, under this alternative, short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Impacts from continuing current management in Florida Bay would be long term, baywide, moderate, and adverse.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects and plans that would contribute to impacts on vegetation include (1) Everglades restoration plans that are intended to reestablish a more natural water regime in the park, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, (4) restoration

activities in areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds), (5) implementing the park's fire and invasive exotic plant management plans, and (6) implementing the park's strategic management plan and resource stewardship strategy.

Most of the vegetation impacts in the park arise from changes to the natural Everglades hydropattern. These changes include the amount, timing, and distribution of water; changes in nutrients; and the natural fire regime. Chapter 1 provides more detail regarding the intended benefits of Everglades restoration plans on surface waters in the park. To the extent that these plans and projects are implemented during the duration of this management plan, impacts on vegetation from these efforts would be long term, parkwide, moderate to major, and beneficial. Impacts from site-specific restoration activities would be long term, local, minor to moderate, and beneficial.

Impacts from the pilot pole/troll zone at Snake Bight in Florida Bay would be long term, localized, minor to moderate, and beneficial. Impacts from site-specific restoration activities would be long term, localized, minor to moderate, and beneficial. Impacts from implementing various park management plans would be long term, parkwide, minor, and beneficial. In total, impacts from other projects and plans would be long term, parkwide, moderate to major, and beneficial. The cumulative effect on vegetation of the no-action alternative combined with other projects and plans would be long term, regional, moderate to major, and beneficial outside Florida Bay. Within Florida Bay, the cumulative effect of the no-action alternative and other projects and plans on vegetation would be long term, baywide, minor, and beneficial. This alternative would contribute a slight amount to the overall cumulative effects outside Florida Bay, and a modest amount to cumulative effects within Florida Bay.

Conclusion. Short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Impacts from continuing current management in Florida Bay would be long term, baywide, moderate, and adverse. The cumulative effect on vegetation of the no-action alternative combined with other projects and plans would be long term, regional, moderate to major, and beneficial outside Florida Bay. Within Florida Bay, the cumulative effect would be long term, baywide, minor, and beneficial.

WILDLIFE

East Everglades Addition

Under the no-action alternative, both private airboating (by an undetermined number of eligible individuals) and commercial airboating (by four tour operators) would continue in the East Everglades Addition. The extent of airboat use would continue to be constrained primarily by water levels and terrain to roughly the northern half of the Addition. Airboat use would continue to disturb and/or displace wildlife and diminish wildlife habitat. The network of airboat trails would continue to fragment habitat and contribute to altered dispersal and foraging movements by wildlife. Impacts would continue to be long term, localized, minor to moderate, and adverse.

Park visitors would continue to access the East Everglades Addition and Shark River Slough by canoe. Camping on tree islands and in the park's designated and undesignated areas would continue to cause flushing and sensory-based disturbance to wildlife (e.g., turtles, snakes, alligators, mammals, and birds), who use tree islands for nesting, roosting, foraging etc. Such disturbance would continue to result in long-term, localized, minor to moderate, adverse impacts on wildlife.

Under the no-action alternative, Chekika would continue to be open for seasonal day use in which park visitors could access marl prairies and hike or watch wildlife. Impacts on wildlife would continue to be localized, negligible to minor, and adverse.

Headquarters / Pine Island / Royal Palm / Main Park Road

The Nike Missile Base site would remain open for visitor interpretation with no to negligible effects on wildlife. Visitors would continue to hike and bicycle on selected trails and fire roads, and impacts on wildlife from these activities would continue to be long term, localized, negligible, and adverse. There would continue to be instances of wildlife being killed or injured from collisions with vehicles traveling on the main park road, resulting in long-term, localized, minor to moderate, adverse impacts.

Florida Bay

Under the no-action alternative, wildlife habitat, including shoreline and benthic habitat in the bay, would continue to be adversely impacted from boat groundings and propeller scarring (see "Vegetation" section). Such continued habitat alteration and flushing of birds from roosting or nesting sites would result in long term, localized, minor to moderate, and adverse impacts.

Boat access in Florida Bay would continue with few restrictions. Most areas of the bay would continue to have few protection measures for wildlife or habitat, so boating activity would continue to disturb sensitive wildlife species and habitat—a moderate, long-term, adverse impact. Continued disturbance of wildlife from human activity and noise would especially be expected near the Florida Bay chickees. Noise and wave action from motorboats would continue to have long-term, localized, minor, adverse impacts on shoreline wildlife and habitat. Disturbance and damage to mangroves and

seagrass beds from boats would continue to have long-term, minor to moderate, adverse impacts. Maintaining existing idle speed, no-wake and slow-speed zones would help minimize wildlife impacts in the local vicinity, a long-term, minor, beneficial impact on wildlife and wildlife habitat.

Little Madeira and Joe bays would remain closed to public access, minimizing wildlife disturbance from human activities. This would continue to be a long term, localized, minor to moderate, beneficial impact on wildlife and wildlife habitat.

Under the no-action alternative, most keys in Florida Bay (all except North Nest, Little Rabbit, Carl Ross, and Bradley keys) would remain closed to recreation, helping to protect wildlife rookeries, nesting areas, and beach habitats from disturbance by human activities; birds and other wildlife that use these keys would have continued long-term, minor to moderate, benefits. (This would not change by alternative).

Continued unrestricted motorboat use immediately adjacent to the protected keys in Florida Bay would result in repeated disturbance of birds in these sensitive areas and would have a long-term, minor to moderate, adverse impact on wildlife. If the number of boats using Florida Bay continues to increase as it has over the past 30 years, the increased incidence of rookery and roost disturbance could raise the long-term, adverse impacts on avian populations to the level of moderate to major.

Continuation of the small-scale seagrass restoration efforts would have negligible to minor benefits for Florida Bay wildlife.

Gulf Coast / Ten Thousand Islands / Everglades City

Impacts on wildlife habitat (e.g., seagrass) from boat groundings, anchoring, and propeller scarring in this area of the park would continue. Because water tends to be

cloudy in this part of the park, it is hard to characterize the impact, but based on casual observations by park rangers and other park staff these impacts would probably continue to be minor to moderate, localized, and adverse. Continued boating access with few restrictions in the Gulf Coast area would continue to disturb wildlife, such as flushing birds from nests, roosts, and foraging habitats; resulting impacts would be long term, localized, minor, and adverse.

Existing backcountry campsites and chickees would remain and would continue to limit the capacity for overnight stays by visitors. Disturbance of wildlife from human activity and noise would continue to be more common near these sites. Impacts would be long term, localized, minor, and adverse.

Near Gopher Creek, long-term, localized, minor to moderate, adverse impacts on wildlife from motorboating and paddling would continue. Impacts on wildlife would continue to be minor in the easternmost segment, which would remain managed as idle speed, no wake.

Shark Valley / Tamiami Trail

Visitor and operational activities and facilities near Shark Valley and Tamiami Trail would continue to have some disturbance and displacement effects on sensitive wildlife. These impacts would be localized, negligible to minor, and adverse.

Overall, effects of the no-action alternative on wildlife, primarily resulting from visitor and operational activities, would be long-term, localized, moderate, beneficial impacts and long-term, moderate, adverse impacts.

Cumulative Impacts. Other past, present, and anticipated future projects with potential to contribute to impacts on wildlife include the Modified Water Deliveries project and the Tamiami Trail modification projects, which aim to restore natural hydrology by improving water volume and timing into Everglades

National Park. In addition, several individual elements of the *Comprehensive Everglades Restoration Plan* aim to reduce habitat fragmentation, reduce water seepage from the park, and enhance sheet flow in marsh habitat. All of these would benefit wildlife habitat and therefore wildlife. Several other projects and plans would have more localized impacts, including restoring previously disturbed areas and reducing invasive nonnative plants and animals. These combined actions and plans would likely have long-term, minor to moderate, beneficial impacts on wildlife through habitat restoration and enhancement.

The impacts from the other actions described above, in conjunction with the impacts of the no-action alternative, would result in long-term, minor to moderate, beneficial, cumulative impacts on wildlife. The no-action alternative would be expected to contribute a relatively small component to the cumulative impacts.

Conclusion. Effects of the no-action alternative on wildlife, primarily resulting from visitor and operational activities, would be long-term, localized, moderate, beneficial impacts and long-term, moderate, adverse impacts. Cumulative effects of the no-action alternative combined with other past, present, and reasonably foreseeable actions on wildlife would be long-term, minor to moderate, and beneficial.

FISHERIES

No aspects of the no-action alternative would appreciably affect freshwater fish habitats (timing, distribution, or amount of flows) or water quality.

In general, changes in the health of Florida Bay related to long-term water management and ongoing degradation of seagrass habitats have resulted in loss of productivity, biodiversity, and ecosystem stability (Boesch et al. 1993). Loss of seagrass habitat has adversely impacted fish that forage on seagrass, juveniles of game fish species, and

the resources they depend on (Dawes et al. 2004). Also, fishing in the bay affects fish population structure and faunal diversity in the Bay, as is evidenced by larger gray snapper within Crocodile Sanctuary and smaller gray snapper elsewhere in Florida Bay and Biscayne Bay (Faunce et al. 2002). Although fisheries management is not within the scope of this general management plan, the desired conditions and strategies described in chapter 1 provide guidance for managing a healthy fishery in the park, including more detailed resource stewardship and fisheries management planning, to ensure a sustainable park fishery—one that provides for more species distributions, densities, and age-class distributions.

A recent study of the impact of propeller scarring of seagrass habitat in the bay (NPS 2008c) indicated that the extent of scarring is “substantially more” than identified in a previous study. According to this NPS study, seagrass recovery from propeller scarring varies depending on the species and the severity of the scarring. Estimates range from less than a year to more than seven years. However, other studies estimate that recovery of scarred areas may require between 10 and 60 years (USFWS 1999; NPS 2008c). The propeller scarring study noted that “heavily used areas that are continually scarred will probably never recover under current boating pressure. Active restoration of damaged seagrass communities is technically possible, but expensive and time consuming.” Some scarred areas are maintaining the same number and length of scars (i.e., no net recovery), while in other areas the quantity and length of scars are increasing over time. In other words, scarring levels in the bay are not improving and are likely increasing (NPS 2008c; Engeman et al. 2008).

At a local scale, propeller scars have been shown to decrease the number of crabs and mollusks (which are prey for some fish species), although other studies have not shown adverse impacts on fish. At larger scales, however, no relationship between scarring density and abundance of similar

organisms has been detected (Dawes et al. 2004; NPS 2008c). Although research has not linked scarring of seagrass beds to adverse impacts of fish, the loss of seagrass habitat has defined impacts on the organisms that use seagrass habitat and on which fish depend. Therefore, the assumption is made that at some threshold of habitat degradation, fish will be adversely impacted.

There are no notable changes in overall visitor access to and operation of watercraft in estuarine and marine areas of the park under the no-action alternative. However, unlike freshwater fish and fish habitat, this lack of change may have continuing adverse consequences through continued fishing and ongoing degradation of seagrass habitat in Florida Bay. Given the current condition of seagrass habitat in the park and the time frame of the general management plan, impacts on fish are estimated to be long-term, baywide, minor, and adverse.

Overall, long-term impacts on fish and fish habitat under the no-action alternative would be localized, negligible to minor, and adverse, mostly from continued visitor use.

Cumulative Impacts. The geographic area considered for cumulative effects on fish and fish habitat is all of Everglades National Park.

Past, present, and reasonably foreseeable future projects and plans that would contribute to impacts to park fisheries include (1) Everglades restoration plans that involve changes in water structures and management intended to reestablish a more natural water regime in the park, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone for Snake Bight in Florida Bay, (4) restoration activities in areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds), (5) the park's strategic management plan and resource stewardship strategy

Most of the impacts to Everglades fish and fish habitat arise from changes to the natural

hydropattern in the Everglades—that is, the amount, timing, and distribution of water and related changes in water quality. This is true for freshwater fishes in the inland portions of the park as well as for estuarine and marine fishes along the Gulf Coast and in Florida Bay. Chapter 1 provides more detail regarding the intended benefits of Everglades restoration plans on surface waters in the park. To the extent that these plans and projects are completed during the life of this plan, impacts on fish and fish habitat from Everglades restoration plans would be long term, parkwide, moderate, and beneficial. Impacts from site-specific restoration activities would be long term, localized, minor, and beneficial.

Impacts from implementation of a pilot pole/troll zone for Snake Bight would be long term, localized, minor, and beneficial. Impacts from site-specific restoration activities would be long term, localized, minor, and beneficial. Impacts from various park management plans and strategies would be long term, parkwide, minor, and beneficial.

Fishing within the park and in nearby environs continues to have a substantial impact on fish in the park. Florida Bay shows signs of overfishing with altered fish populations and changes in species distribution (Florida Bay Science Program 2007). These changes represent long-term, baywide, moderate, adverse effects on fish.

The overall cumulative effects of the no-action alternative combined with past, present, and reasonably foreseeable actions would be long term, parkwide, minor, and adverse, with the bulk of the adverse effects related to fishing practices in the park's marine waters. The contribution of the no-action alternative to this effect would be small.

Conclusion. Long-term impacts on fish and fish habitat under the no-action alternative would be localized, negligible to minor, and adverse, mostly from continued visitor use. The cumulative effects of the no-action alternative combined with past, present, and reasonably foreseeable actions would be long

term, parkwide, minor, and adverse overall, with the bulk of the adverse effects related to fishing practices in the park's marine waters.

ESSENTIAL FISH HABITAT

In this environmental impact statement, impacts on essential fish habitat are largely synonymous with impacts on estuarine and benthic substrates (mud, sand, shell, and rock), associated biological communities, including submerged vegetation (seagrasses and algae), marshes and mangroves, and oyster shell reefs/shell banks. For the species of concern to this document—finfish and crustaceans—most of Florida Bay and the Gulf Coast are designated essential fish habitat.

Cumulative Impacts. Ongoing park efforts to remove nonnative vegetation and conduct passive and active restoration of infested mangrove habitats would improve essential fish habitat, resulting in an overall, long-term, minor to moderate benefit. Seeding, planting, and/or use of soil amendments to actively restore treated areas within the park would have negligible to minor adverse effects on essential fish habitats from the transport of sediments or nutrients that affect water quality. Nonnative vegetation treatments and large-scale restoration actions in Everglades National Park adjacent to areas of essential fish habitat could result in the transport of sediments that would temporarily degrade the water quality and the habitat. With implementation of mitigation measures, the short-term effects would be negligible to minor.

Conclusion. Implementing the no-action alternative would not change existing use or management of essential fish habitats and, therefore, would not result in any new impacts. However, there would be the continuation of long-term; minor to moderate, adverse impacts on shallow water habitats from boat groundings and propeller scarring (other sections in this chapter include more details on specific resource impacts). As

described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be a continuation of adverse effects on essential fish habitat under the no-action alternative.

FEDERAL SPECIAL STATUS SPECIES

Florida Panther

Under the no-action alternative, impacts on the Florida panther would be attributed to visitor use activities in the park. Both private and commercial airboating would continue in the East Everglades Addition. Airboats are very loud, and the noise they produce and the physical intrusion into habitat used by panthers would continue to have short-term effects. The presence of airboats and associated noise throughout many areas of the East Everglades Addition would continue to disturb panthers and reduce the quality of panther habitat in this area of the park. The network of airboat trails would also continue to alter dispersal and foraging corridors for panthers as well as deer, which are their primary prey.

Most of Everglades National Park is within wilderness, and visitors access these areas using nonmotorized methods such as hiking or paddling. Visitor use of some areas of the backcountry for camping, including tree islands, might result in discountable short-term disturbance of panthers. Panthers would be displaced from very small areas within their range while visitor activities were occurring. Panthers avoid areas of high human activity and are not commonly encountered by visitors. Visitor use of frontcountry areas for hiking and biking on existing trails and fire roads would have no detectable effects on panther populations. Under the no-action alternative, Florida panthers might continue to experience short-term disturbance from airboat noise and visitor activity in backcountry areas, which might cause them to avoid certain locales but would not result in population-level effects.

Overall, continued airboat activity and visitor use of tree islands and the backcountry of the park under this alternative would continue to result in short-term, minor, adverse effects on Florida panthers.

Cumulative Impacts. Threats to Florida panthers are their health problems and continuing loss of habitat. Health problems affecting Florida panthers are mostly related to poor habitat conditions and genetic defects. Around the Everglades, panthers have been contaminated with mercury by eating raccoons that are high in mercury content (the origin of the mercury is debatable). Because of the small size of the panther population in south Florida there has been considerable inbreeding, which has resulted in genetic depression of the species and declines in the population. In 1995, eight female panthers were introduced from Texas, and the population has since grown to nearly 100 animals. However, the panther population continues to be threatened by territorial disputes between panthers, which increase as the panther population grows, and by collisions with vehicles, which continue to be a leading cause of panther mortality. Protection efforts by the National Park Service and U.S. Fish and Wildlife Service (area wildlife refuges) and state conservation efforts have resulted in an increase in the panther population; the protection efforts are resulting in beneficial effects on the Florida panther. However, continued habitat fragmentation and loss outside these areas and increasing vehicle traffic resulting in increasing panther deaths would continue to limit these benefits. The moderate adverse effects of regional activities, in combination with the minor adverse effects of the no-action alternative, would result in overall long-term, moderate, adverse, effect on the Florida panther on a cumulative basis. The no-action alternative would contribute a small amount to the overall impacts on the species.

Conclusion. Continued airboat activity and visitor use of tree islands and the backcountry of the park would continue to result in short-term impacts on Florida panther habitat and

behavior; however, this impact would not rise to the level of a measurable effect. Cumulative effects would be long term, moderate, and adverse.

Key Largo Woodrat and Key Largo Cotton Mouse

The Key Largo woodrat and Key Largo cotton mouse are associated with tropical hardwood hammock vegetation found in Key Largo and are not found in the interior portions of the park. There is no designated critical habitat for either the woodrat or cotton mouse. There may be some minor sensory based-disturbance to individual animals (a continuing negligible adverse impact) if they are near the 20-acre Key Largo ranger station area, but no changes in the population or the distribution of the species would be likely.

Cumulative Impacts. The Key Largo woodrat and Key Largo cotton mouse would continue to be threatened throughout their known range by habitat alteration, fragmentation and destruction of habitat by humans, predation from feral cats, and competition from black rats (USFWS 1999g, 1999f. These threats have resulted in reduced populations and a restricted distribution. Creation of Everglades National Park may have created a refuge of protected habitat, reducing the long-term adverse effects to minor. The negligible adverse effects of the no-action alternative in combination with the other actions in the area would result in a minor adverse cumulative effect. The actions associated with the no-action alternative would not contribute notably to the overall cumulative effects.

Conclusion. Overall, continued current management would have discountable effects on the Key Largo woodrat and Key Largo cotton mouse as a result of human activities at the ranger station and areas surrounding Tarpon Basin. Since the Key Largo woodrat populations would be very sensitive to any loss in habitat, special attention would be paid to even small habitat losses. Cumulative effects would be adverse, but this alternative

would not have detectable contributions to these effects.

Manatee

Under current management, manatees in Florida Bay and along the park's Gulf Coast would be at risk from visitor activities in the park. According to the U.S. Fish and Wildlife *Manatee Recovery Plan* (2001a), "the most significant problem presently faced by manatees in Florida is death or serious injury from boat strikes."

From 1979 to 2004, 120 verified manatee deaths in the park resulted from boat strikes and seven from other human activities (USGS 2006). These boating activities take place in manatee designated critical habitat, which follows the park's Florida Bay and Gulf Coast shoreline. Boat access in the park's marine waters would remain generally unrestricted. Open access in Florida Bay would continue with no additional protective measures, and boating activity would occasionally harm manatees through boat strikes and habitat disturbance (propeller scarring and motorboat groundings in shallows), a continued long-term adverse effect.

Under the no-action alternative, Little Madeira Bay and Joe Bay would remain closed to the public and access would be allowed only for approved research-related activities. These conditions would result in continued, localized, long-term benefits for manatees and their habitat.

Portions of the Wilderness Waterway would continue to be idle speed, no-wake areas, largely for public safety, but with other benefits including protecting wildlife and habitat—along-term benefit.

Overall, continued motorboat activity and visitor access in the park's marine waters under this alternative would result in long-term, minor, adverse effects on manatees from boating-related impacts.

Under the no-action alternative, critical habitat for manatees would continue to experience minor to moderate adverse effects through propeller scarring of seagrass beds and benthic communities. The continued closure of Crocodile Sanctuary would result in localized continuing minor benefits to critical habitat within these areas.

Cumulative Impacts. The manatee continues to be affected by past hunting and poaching and by the present-day effects of boat strikes and propeller injuries (USFWS 2001b). Manatee are also killed and injured in water control structures across south Florida, and they are affected by habitat loss, salinity changes, and water quality changes. These threats have resulted in regional alteration of the manatee populations. The minor adverse effects of the no-action alternative in combination with the moderate adverse impacts of other actions in the area would result in moderate adverse cumulative effects on the manatee and critical habitat for manatees. The no-action alternative would continue to make a small contribution to the overall cumulative effects.

Conclusion. Motorboat activity and visitor access in the park's marine waters would result in the continuation of long-term adverse effects on manatee and critical habitat for manatees from boat and propeller strikes and habitat damage. Cumulative effects would be moderate and adverse.

Bottlenose Dolphin

Under the no-action alternative, the Florida Bay population of bottlenose dolphin would continue to access the bays and estuaries of Florida Bay and Ten Thousand Islands within Everglades National Park (Torres and Engleby 2007). The population trend of the bottlenose dolphin in Florida is unknown because there is currently no systematic observer program (NMFS 2009b). Bottlenose dolphins are not usually fearful of humans so they are susceptible to habituation to humans. Habituation could potentially lead to

behavioral alterations from human contact or from humans feeding dolphins, which could increase aggression toward humans (Cupka and Murphy 2005). Under the no-action alternative, dolphins and human contact would not be expected to increase, and thus the effects on the dolphins would be undetectable. Overall, continued unrestricted boat access in the park's marine waters would have no additional effects on bottlenose dolphins and their habitat because of existing protection measures under the Marine Mammal Protection Act.

Cumulative Impacts. Bottlenose dolphin populations are primarily threatened by commercial fishing and pollution. These threats are global in nature and represent direct injury to and mortality of dolphins and damage to their habitat from continued human presence. Between 1962 and 1973, a live-capture fishery operating in the Florida Keys permanently removed 70 bottlenose dolphins for marine parks, and since then no recorded dolphins have been removed from Florida Bay (NMFS 2009b). Within Everglades National Park, dolphins would continue to receive some protection from risks of bodily injury and other human disturbance. However, benefits to bottlenose dolphins within the park would not offset widespread loss of habitat and other threats. The negligible to minor effects of the no-action alternative, when combined with the adverse impacts of other actions that occur at the regional level and larger scales, would result in minor adverse cumulative effects on bottlenose dolphin. The no-action alternative would not contribute detectably to the overall cumulative effects.

Conclusion. Continued human and boat access in the park's marine waters would present minimal continued hazards to bottlenose dolphins in bays and estuaries in the park.

Wood Stork

There are nine known wood stork colonies in the park, with two in the East Everglades Addition, four in mangrove areas in the south near Florida Bay, and three in mangrove habitat on the western side of the park (USFWS 2010b). Under the no-action alternative, ongoing airboating would be the primary use affecting wood storks in the East Everglades Addition. There is no site-specific scientific evidence suggesting that adverse impacts on wood storks are occurring; wood storks are found in areas where airboat use occurs. Nesting wood storks are generally fairly tolerant of low-level human activity near a colony, particularly when the nests are high in trees and the activity is screened by vegetation (USFWS 1990). The occurrence of nonmotorized and low-level visitor activities in densely wooded mangrove areas, such as along the Wilderness Waterway and near Florida Bay, would likely have no detectable effects on storks. Storks forming new colonies are more tolerant of existing human activity compared to situations in which a new activity is introduced after a colony is formed (USFWS 1990). Because airboating and other visitor activities have been occurring in established locations for many years, it is likely that wood storks in existing colonies are habituated to human activity. The no-action alternative would continue the current level and distribution of boat use in Florida Bay and in the Gulf Coast area. Any minor adverse effects from continuing visitor activities (e.g., disturbance or flushing of wood storks) would likely be discountable or insignificant.

Cumulative Impacts. According to the U.S. Fish and Wildlife Service, the wood stork population is increasing and expanding its range. The wood stork appears to have adapted to some degree to changes in habitat in south Florida, and nesting has increased since its listing as an endangered species (USFWS 2007c). Statewide surveys indicate that nesting is increasing, and although individual colonies are declining in size, the overall number of colonies is increasing. As a result, the U.S. Fish and Wildlife Service is

considering changing the status of the species from endangered to threatened. Such a change in status would recognize regional and long-term, moderate benefits that have accrued for the species through protection and adaptation. Any minor adverse effects of the no-action alternative in combination with the moderate beneficial effects of other actions that occur at the regional level would result in minor to moderate beneficial effects on the wood stork and are not likely to adversely affect the wood stork. The no-action alternative would not diminish the overall cumulative benefits.

Conclusion. Any adverse effects from the no-action alternative on wood storks would be continued, long term, minor, and adverse as a result of visitor activities. Cumulative effects would be beneficial.

Piping Plover, Roseate Tern, and Red Knot

The piping plover, roseate tern, and red knot are associated with coastal beach habitats in Florida and are not found in the interior portions of the park. Within the park, Carl Ross Key and Sandy Key are included in designated critical habitat for wintering piping plovers (USFWS 2001a); no critical habitat has been proposed or designated for roseate terns or red knots. Among the greatest threats to these species are habitat alteration and destruction and predation (USFWS 2003e). Under the no-action alternative, visitor access via boat to coastal areas of the park in Florida Bay and Ten Thousand Islands would continue. There is no site-specific scientific evidence to suggest that plovers or terns are being adversely affected by ongoing boating activities. These species use the park's shorelines and keys, sometimes close to where boating and related activities occur. Any displacement of terns, plovers, or red knots from preferred areas (which could increase energy expenditure or temporarily disrupt behavior (USFWS 2003e) would likely have minor adverse effects.

Beneficial effects would continue to result from most keys in Florida Bay remaining closed to recreation, protecting habitat potentially used for foraging and roosting. All areas of Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) would remain closed to public access and only open to authorized research activities, providing localized benefits to plovers, terns, and red knots using tidal flats and other suitable shoreline habitat.

Overall, current management would continue to benefit the piping plover, roseate tern, and red knot with limited and localized, minor, adverse impacts from human activities along the park's coastline and on a limited number of keys in Florida Bay. Any adverse impacts from the no-action alternative would be minor. Ongoing minor adverse effects to designated critical habitat for piping plover would continue to occur through alteration of natural coastal processes as a result of boat wakes and damage to mud banks/seagrass from boat propellers. Minor benefits would result from limiting access and associated direct disturbance of critical habitat.

Cumulative Impacts. The piping plover, roseate tern, and red knot continue to be threatened across their ranges by coastal habitat loss and degradation from development, predation, disturbance, poor water quality, and similar factors. These threats have resulted in widespread and long-term, moderate adverse effects on populations despite the habitat protection provided by Everglades National Park. The minor adverse and beneficial effects of the no-action alternative, in combination with the moderate adverse effects of other actions that occur at the regional level, would result in a moderate adverse cumulative effect on the piping plover, roseate tern, red knot, and critical habitat for piping plover. The no-action alternative would continue to make small adverse and beneficial contributions to these effects.

Conclusion. The no-action alternative would have both beneficial and adverse continuing

effects on piping plovers, roseate terns, red knots, and critical habitat for wintering piping plovers. Any adverse impacts from the no-action alternative would be minor and insignificant. Cumulative effects would be moderate and adverse.

Everglade Snail Kite

Within the park, designated critical habitat for the Everglade Snail Kite occurs south of Tamiami Trail near the Shark Valley Visitor Center (USFWS 1999d). The greatest threats to the snail kite are the insufficient water levels that support the kite's primary food source (apple snails) and nesting and roosting habitat over open water, as well as continued degradation of marsh habitat.

Under the no-action alternative, ongoing airboating (private, commercial, and administrative/research) is the main human use with potential to affect snail kites in the East Everglades Addition. Airboat trails and recreational airboat use in the Addition have declined over the past decade or so. There is no site-specific scientific evidence suggesting that adverse impacts on snail kites in the East Everglades are occurring from these activities. Snail kites are found in areas very near where airboating occurs. Any adverse impacts from these activities would likely be minor, long term, localized, and insignificant or discountable.

Additionally, because the designated critical habitat for the Everglade snail kite lies outside of East Everglades, there are no proposed actions in the no-action alternative that will affect designated critical habitat.

Cumulative Impacts. The Everglade snail kite population continues to be threatened throughout its range by hydrologic fluctuations affecting its food sources and by widespread habitat degradation caused by natural and human-induced hydrologic changes. In addition to habitat loss, the lack of recruitment of new breeders into the population and the lack of fledging success

have negative effects on the Everglade snail kite population. These threats have resulted in widespread, moderate, adverse effects on the snail kite population despite habitat protection measures provided by Everglades National Park. The minor adverse effects of the no-action alternative, in combination with the moderate adverse effects of other actions that occur at the regional level, would result in moderate adverse cumulative effects on the snail kite. The no-action alternative would make no detectable contribution to the overall cumulative effects.

Conclusion. The no-action alternative would have a continued minor adverse effect on snail kites from airboating in the East Everglades Addition.

Eastern Indigo Snake

Under the no-action alternative, the eastern indigo snake could be disturbed by visitor activity and use of the park. The snakes are found within tree islands in the park. Continued use of tree islands in the East Everglades Addition could temporarily displace snakes or disturb their activities, resulting in short-term, minor, adverse effects.

Cumulative Impacts. The decline in eastern indigo snake populations is attributed to loss of habitat to agriculture and to collecting for the pet trade. The docile nature of this reptile has made it desirable as a pet (USFWS 1991c). The species has also suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection. The species was listed in 1978 and has no designated critical habitat. Regional effects on the snake would continue to have long-term, moderate, adverse impacts on eastern indigo snake. Within Everglades National Park, the habitat for the snake is protected to a large degree, with limited risk of disturbance and displacement, resulting in localized and short-term, minor, adverse effects. The minor adverse effects of the no-action alternative in combination with the moderate adverse effects of other actions that occur at the regional level would result in

long-term, minor, adverse cumulative effects on the eastern indigo snake. The no-action alternative would have a very slight contribution to this cumulative effect.

Conclusion. Continued visitor activities in habitat used by the eastern indigo snake under the no-action alternative would have short-term, minor, and adverse effects. Cumulative effects would be minor and adverse.

American Alligator

Under the no-action alternative, visitor and administrative use (airboating, encounters on popular trails, collisions with vehicles on park roads, etc.) and construction or facility improvements would be the primary activities with potential to affect alligators. Continued current management would benefit the American alligator by providing habitat protection and reducing the potential for individual animals to be affected by poaching or other human threats. Despite occasional collisions of airboats or boats with alligators (a long-term, minor adverse effect), this species continues to do well in the park, even in areas where the recreational and administrative uses described above occur. Any continuing minor adverse impacts would be discountable or insignificant.

Cumulative Impacts. Once on the brink of extinction, more than one million alligators are present today in the southeastern United States. Although the alligator once existed in far greater numbers in the Everglades, the alligator population has recovered nicely and this species is no longer classified as endangered—a long-term, moderate benefit. However, degradation of and development in alligator habitat outside the park continues to cause concern for the long-term well-being of the species. The long-term beneficial and adverse impacts of the no-action alternative in combination with the effects of other actions would result in a minor beneficial cumulative effect on the American alligator. The no-action alternative would contribute a modest amount to these overall benefits.

Conclusion. The park would continue to protect American alligators and their habitat, a long-term beneficial impact. However, visitor and management activities in alligator habitat under the no-action alternative would have minor, adverse effects. Cumulative effects would be minor and beneficial.

American Crocodile

The American crocodile inhabits the brackish and saltwater habitats of the park's mangrove coasts. Designated critical habitat for this species extends across the Florida Bay shoreline and estuary habitats southward to the keys. Visitor and administrative uses (airboating, encounters at high use areas like Flamingo, construction, facility upgrades, etc.) would be the primary activities with potential to affect crocodiles. The crocodile and its habitat would continue to be protected in Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) because this area would remain closed to public use. Outside this area, visitors would continue to have generally unrestricted access to the shoreline of Florida Bay, the Gulf Coast, and the Wilderness Waterway. Visitor and management activities could disturb crocodiles and have localized, short-term, minor adverse impacts. However, it is not expected that nesting or important life functions would be interrupted because the numbers and distribution of this species have been increasing in south Florida and the park (USFWS 1999h).

Cumulative Impacts. Predation, degraded hydrologic conditions, and habitat loss are the most important factors influencing the status of crocodiles in Everglades National Park and south Florida. Hatchlings have a high mortality rate and are preyed upon by other wildlife including raccoons, birds, and crabs. Alteration of salinity and water levels in Florida Bay resulting from extensive drainage systems throughout south Florida also are a factor. Crocodile nests that are too wet or too dry result in egg mortality. Suitable year-round crocodile habitat was also lost during

development of the upper Florida Keys. The American crocodile continues to be threatened by destruction of estuarine habitat, nest predation, severe weather, and vehicle strikes (USFWS 1999h) resulting in widespread adverse impacts to the American crocodile and designated critical habitat for American crocodile.

Although the worldwide population of American crocodile is federally listed as endangered, the status of the Florida population has been changed to threatened because of a recent sustained increase in numbers. The nesting population continues to slowly increase, both in abundance and nesting range, since effective protection of animals and nesting habitat was established. Within Everglades National Park, crocodiles have access to relatively undisturbed habitat, which has allowed their population to increase locally, a parkwide moderate benefit.

The effects of the no-action alternative, in combination with effects of other actions that occur at the regional level, would result in a minor adverse cumulative effect to both the American crocodile and designated critical habitat for American crocodile. The no-action alternative would have a slight beneficial contribution to the overall cumulative effects.

Conclusion. The park would continue to provide protection of American crocodiles and their habitat, although some continuing minor adverse effects from visitor and administrative uses would be expected. Cumulative effects would be minor and adverse.

Sea Turtles

Under continued current management, green, hawksbill, Kemp's Ridley, leatherback, and loggerhead sea turtles would continue to benefit from access to undeveloped shoreline and availability of seagrass habitats within Everglades National Park. However, sea turtles would potentially be at risk from visitor and management activities in the park. Their

slow-moving nature makes them susceptible to strikes by boats. Relatively unrestricted boat access in Florida Bay would continue with no additional protective measures, and boating activity would continue to adversely affect sea turtles through boat strikes and habitat disturbance (propeller scarring and motorboat groundings in shallows). Additionally, direct effects on sea turtles could include capture by recreational anglers using hook-and-line methods that could lead to injury and, in some instances, their eventual death. These impacts are expected to be long term, moderate, and adverse.

Continued boat use and recreational beach use along Cape Sable, Shark Point, and Highlands Beach would result in continued minor adverse effects to both NOAA and USFWS proposed loggerhead sea turtle critical habitat.

Cumulative Impacts. All sea turtle species are threatened by commercial fishing and habitat destruction. These threats are global in nature and result in both direct injury to and mortality of turtles and loss of nesting habitat due to shoreline development (e.g., coastal runoff, marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, and increased underwater noise and boat traffic). These combine to produce long-term, moderate to major, adverse effects on sea turtle populations. The effects of the no-action alternative, in combination with the adverse effects of other actions that occur at the regional level and larger scales, would result in moderate adverse cumulative effect on sea turtles. The contribution of the no-action alternative to these adverse overall cumulative effects would be slight.

Conclusion. The no-action alternative would benefit sea turtles and proposed loggerhead sea turtle critical habitat through habitat protection and it would also result in some continued long-term, moderate, adverse effects from human activities (primarily motorboating and recreational fishing). The no-action alternative would benefit sea turtles

through habitat protection, but it would also result in some continued long-term, moderate, adverse effects from human activities (primarily motorboating and recreational fishing). This alternative would result in moderate, adverse impacts and a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act for sea turtles. This alternative would also result in moderate, adverse impacts and a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act for NOAA and USFWS proposed critical habitat for the loggerhead sea turtle. Cumulative effects would be moderate and adverse.

Smalltooth Sawfish

Juvenile smalltooth sawfish prefer the shallow waters of inshore bars, mangrove edges, and seagrass beds. Designated critical habitat includes most of the marine waters of Everglades National Park—the park serves as the largest, most important sawfish habitat in the United States.

Visitor and administrative uses (primarily boating and in-water construction/maintenance projects) would be the primary activities with potential to affect the smalltooth sawfish under the no-action alternative. However, there is no evidence suggesting that adverse impacts from these activities are threatening recovery of the sawfish. In fact, sawfish populations in the park may be increasing slightly (NOAA 2006).

Boat access in Florida Bay would remain generally unrestricted under the no-action alternative. There would be no additional protective measures for juvenile smalltooth sawfish found throughout Ten Thousand Islands. Motorboating would continue on areas such as Hurdles Creek, where monitoring of juvenile sawfish is underway. Boating activity would continue to disturb habitat (especially seagrass) and any nearby sawfish.

Additionally, smalltooth sawfish may be adversely affected by recreational fishing activity within the park through incidental hooking or entanglement in or digestion of fishing line. Although nets associated with former commercial fisheries were largely responsible for the precipitous decline in smalltooth sawfish abundance within the United States, loss associated with recreational anglers also contributed to their decline, as anglers often removed the rostrum (saw) of these fish to retain as trophies (Caldwell 1990).

Long-term adverse impacts would be moderate to the smalltooth sawfish, and minor to its designated critical habitat.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch and habitat loss and degradation, including poor water quality and altered water delivery and salinity (NMFS 2006). These widespread threats have resulted in a reduced species distribution and reduced population levels. The beneficial and adverse effects of the no-action alternative, in combination with the moderate adverse effects of other actions that occur at the regional level, would result in moderate adverse cumulative effects on the smalltooth sawfish. The no-action alternative would not have a measurable contribution compared to large-scale threats outside the park.

Conclusion. The no-action alternative would result in localized and long-term, moderate, adverse effects on smalltooth sawfish from human activities (primarily recreational fishing) a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act. The no-action alternative would also result in localized and long-term, minor, adverse effects on designated critical habitat for the smalltooth sawfish a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. Cumulative effects would be moderate and adverse.

NATURAL SOUNDSCAPES

Noise levels across the park would be expected to remain similar to present-day levels, and natural sounds would continue to predominate. Human-generated noise in the park would stem primarily from vehicular traffic, aircraft over flights, and administrative activities that may involve airboat and/or aircraft use. Areas most affected by human-generated noise would be developed areas, popular boating areas, campgrounds, and areas near major roads.

East Everglades Addition

Airboating would continue to occur in the East Everglades Addition. Commercial airboat operations would continue to run seven days per week in the northern portion of the Addition. Airboat noise would be more heavily concentrated near the commercial airboat routes than further south in the Addition where private airboat use is more widely dispersed. Noise from private airboats is more common on weekends, when more airboats are on the water. Park staff also use airboats for maintenance, research, law enforcement, and fire/vegetation management. A study for the Florida Fish and Wildlife Conservation Commission measured airboat-generated peak instantaneous noise levels between 95 dB(A) and 110 dB(A) at 50 feet and at maximum operating conditions (Glegg et al. 2005). Because of the intensity of airboat noise, commercial and private airboat use in the East Everglades Addition has long-term, localized, moderate, adverse impacts on the natural soundscape near airboat use. Airboat use also results in long-term, regional, minor, adverse impacts on the natural soundscape of the entire East Everglades Addition, beyond the immediate vicinity of airboat use.

The East Everglades Addition would continue to be affected by helicopter noise associated with maintenance, research, law enforcement, and fire/vegetation management activities (e.g., over flights, aerial spraying). Because of

the sound intensity of helicopters (see table 11), noise from helicopters is considered a long-term, localized, moderate, adverse impact on the natural soundscape.

The Tamiami Trail borders the East Everglades Addition to the north, and the heavy traffic along the highway causes continued, long-term, localized, moderate, adverse impacts on the soundscape in areas near the road.

Headquarters / Pine Island / Royal Palm / Main Park Road

Much of the Pine Island District along the main park road is a developed area that is popular with visitors and is a focus of administrative activities by park staff. This area is generally busy, especially during the peak winter season. Therefore, the natural soundscape is impacted by a variety of noises associated with humans, including vehicle sounds (automobiles, buses, motorcycles), park operations involving machinery and heavy equipment, facility sounds such as air-conditioners and blowers, and human voices. Human-generated noise would likely continue to be higher during the day and during the peak winter season when the area receives more visitors. There would continue to be noise associated with recreational vehicle generators at the Long Pine Key campground (except during nighttime quiet hours) because the campground would continue to lack electrical hookups. The effects on the natural soundscape at Pine Island would continue to be long term, local, minor, and adverse.

Florida Bay

Florida Bay is a backcountry, marine environment that is accessible only by watercraft. The chickees at Johnson Key and Shark Point would remain, and four Florida Bay keys would remain open to recreational use—North Nest and Little Rabbit keys for day use and camping, and Bradley and Carl

Ross keys for day use only. Under the no-action alternative, these sites would continue to have intermittent, localized noise associated with camping, human activities, and motorboats (visitor and occasionally NPS boats). Because of the way visitor use is managed at these sites and the sites' isolated nature, continuing impacts to the natural soundscape would be localized, long term, minor, and adverse.

There would continue to be unrestricted motorboat access throughout most of Florida Bay, so the soundscape would continue to be affected by intermittent motorboat noise. This would be a long-term, localized, minor, adverse impact on the natural soundscape of the bay.

Little Madeira Bay, Joe Bay, and adjacent smaller water bodies would remain closed to the public, so this area would generally be free from human-generated noise. This would be a continued localized, minor, beneficial impact on the natural soundscape.

Gulf Coast / Ten Thousand Islands / Everglades City

The Gulf Coast / Ten Thousand Islands region is a remote marine environment that is primarily accessed by paddle craft and motorboats; it includes the Wilderness Waterway. Under the no-action alternative, numerous backcountry chickees would remain open to the public. There would continue to be intermittent, low-level, localized noise associated with camping, human activities, and motorboats (visitor and occasionally NPS boats) near these chickees. Impacts on the natural soundscape would be localized and long term, minor, and adverse.

Throughout the Gulf Coast region there would continue to be unrestricted motorboat access, with the exception of a few idle speed, no-wake areas, so the natural soundscape would be diminished by intermittent motorboat noise. This would continue to be a

long-term, localized, moderate, adverse impact on the natural soundscape.

Tamiami Trail / Shark Valley

Shark Valley is a popular developed visitor use area that is especially busy during the peak winter visitor season. The natural soundscape is affected by various noises associated with humans, including vehicle sounds (automobiles, buses, motorcycles, trams), park operational activities, sounds from facilities (e.g., air-conditioners), and human voices. The continuing effects on the natural soundscape at Shark Valley would be long term, localized, minor to moderate, and adverse. Human-generated noise would likely continue to be higher during the day and during the peak winter season when the area has more visitors.

Planned and funded upgrades to Shark Valley facilities would result in short-term, localized, moderate, adverse impacts from construction activities.

Overall, under this alternative there would be localized, long-term, minor to moderate, adverse impacts on the soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (such as automobiles, buses, motorboats, airboats, or aircraft).

Cumulative Impacts. The natural soundscape of Everglades National Park is relatively quiet, with most unnatural sounds occurring from localized human activity, motorboats, vehicle traffic, aircraft, and airboats. Some projects are planned or underway that would add to such noise by generating localized, short-term noise impacts from construction and restoration activities. Examples of such plans include the Modified Water Deliveries project, Comprehensive Everglades Restoration Plan, wetland and disturbed area restoration plans, the Tamiami Trail modifications, the main park road resurfacing, the replacement of the marine bulkheads at Flamingo, and improvements related to the

Flamingo Commercial Services Plan. To the extent that heavy equipment is used to accomplish these activities, effects would be short term, localized, minor to moderate, and adverse. Not all projects create adverse impacts, however. The Snake Bight pilot pole/troll zone project would slow down motorboats in this local area, thereby reducing intermittent noise from motorboat engines. This project would have long-term, localized, minor to moderate, beneficial impacts on Florida Bay's soundscape.

Helicopters and airboats are used at times for fire and invasive nonnative plant/animal management, research, and law enforcement. Such activities would continue to have long-term, occasional, adverse effects that would be moderate because of the sound intensity.

Some noise in the park comes from external sources, such as aircraft over flights from nearby Homestead and Miami International airports, traffic along Tamiami Trail, motorboats in the Intracoastal Waterway and Gulf Coast. Noise from operations and airboats of the Miccosukee Tribe is also apparent in the Shark Valley area and surrounding wilderness (pers. comm. between Fred Herling, Everglades National Park supervisory park planner, and Aaron Sidder, Parsons, August 2010). Most of the noise associated with these sources impacts the edges of the park; the vast interior remains relatively unaffected by these intrusions. Overall, these external sources have long-term, minor, adverse effects on the park.

The effects of the no-action alternative are local, long-term, minor to moderate, and adverse, depending on the location and the source; the greatest sources of noise in the park come from motorboat and airboat use in Florida Bay and the East Everglades Addition and from human activity in developed areas of the park such as Shark Valley. Overall, the effects from ongoing park plans, projects, operations, external sources, and the no-action alternative generate long-term, minor, adverse cumulative impacts on the natural soundscape of the park. This alternative

would contribute a modest amount to the overall cumulative impacts.

Conclusion. The no-action alternative would have localized, long-term, minor to moderate, adverse impacts on the soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (such as automobiles, buses, motorboats, airboats, or aircraft). Combined with other projects and park operations, the effects of the no-action alternative would represent long-term, minor, adverse cumulative effects on the overall soundscape of the park.

WILDERNESS CHARACTER

Under the no-action alternative, nearly 1.3 million acres of Everglades National Park would continue to be managed as designated wilderness, as it has been since 1978. This includes approximately 530,000 acres of submerged marine wilderness. An additional 82,000 acres would be managed as potential wilderness, as it has been since 1978. In the East Everglades Addition there would be no proposed wilderness, but the area determined wilderness eligible would continue to be managed to preserve its eligibility for future designation.

Untrammelled

Under the no-action alternative, the park would continue to manage natural resources in all areas of the park from an ecosystem perspective (e.g., wetland restoration, invasive nonnative plant/animal management, and fire management efforts). The East Everglades Addition would remain an area of specific focus. Management of natural resources in wilderness and potential wilderness areas, including the Hole-in-the-Donut area, would have a long-term, minor, adverse impact on the untrammelled quality of the park's wilderness. (See wilderness character topic under the "Methods and Assumptions"

section earlier in this chapter for definitions of the four qualities of wilderness character.)

Small-scale seagrass restoration efforts in Florida Bay for areas damaged by boat groundings and propeller scarring would continue under the no-action alternative; the restoration activities required to address these impacts would constitute localized, minor, short-term adverse impacts on the untrammeled quality of submerged wilderness.

Natural

Main Portion of the Park (All But the East Everglades Addition). Visitor use of backcountry and wilderness campsites and chickees would continue. There would be minor, adverse effects on the natural quality near such sites in terms of scenery and human activity that diminish the naturalness of a locale, particularly in relation to the natural soundscape. This would be a continued long-term, minor, adverse impact on the natural quality of wilderness.

There would continue to be obvious scarring of seagrass and the sea bottom from propeller scarring, boat grounding, and anchoring, especially in Florida Bay where the water tends to be clearer. Additionally, channel/access routes have been prop-dredged through submerged marine wilderness, and these channel/access routes would be maintained and expanded under the no-action alternative. This would have long-term, widespread, moderate to major, adverse impacts on the natural quality of the submerged wilderness. Ongoing small-scale efforts to restore areas of damaged seagrass would have a long-term, negligible to minor, localized, beneficial impact on the natural quality of the submerged marine wilderness.

East Everglades Addition. Although none of the East Everglades Addition would be proposed for wilderness designation under the no-action alternative, most of this area has been determined wilderness eligible and

would therefore continue to be managed to preserve its eligibility for future designation, per *NPS Management Policies 2006*. Any new management or visitor activities in this area would be reviewed in advance to ensure that they did not adversely affect natural conditions or processes, or otherwise foreclose the possibility of future wilderness designation. Private and commercial airboats would continue to run in the East Everglades Addition (particularly the northern half), creating and maintaining airboat trails in the sawgrass that are devoid of vegetation. There would also be impacts from NPS administrative use and use by researchers and other agencies involved in ecosystem restoration efforts. Impacts on the natural quality of wilderness in the Addition would be long term, regional, moderate, and adverse.

Undeveloped

Main Portion of the Park (All But East Everglades Addition). Existing backcountry campsites and chickees would continue to affect the undeveloped nature of land-based designated wilderness areas. This would continue to have a long-term, localized, minor, adverse effect on the undeveloped quality of wilderness.

Chickees in marine areas of the park would impact the undeveloped quality of the submerged wilderness because their pilings are embedded into the submerged (marine wilderness) bottom. The same is true of marine channel/access route markers, signposts, and navigational aids. Both situations would be a long-term, localized, and negligible to minor, adverse impact on the undeveloped quality of submerged wilderness.

East Everglades Addition. Most of the wilderness-eligible portion of the Addition lacks human developments. However, a small number of hunting cabins, airboat docks, road traces, and canals would remain, diminishing the undeveloped quality of wilderness. This would be a long-term, minor to moderate, localized adverse impact. In accordance with

NPS policy, no new permanent structures would be allowed on wilderness-eligible land except as required for resource protection or visitor safety. This would be a long-term, minor, beneficial impact on the wilderness quality of the East Everglades Addition.

Under this alternative private airboats would continue to travel through this area, affecting the undeveloped sense, resulting in a moderate to major, long-term, adverse impact to this quality.

Opportunities for Solitude or Primitive and Unconfined Recreation

Main Portion of the Park (All But East Everglades Addition). The feeling of solitude for visitors in the wilderness area would be affected primarily by motorized craft. These effects may take the form of “spillover” motorboat noise from nearby marine waters (e.g., into beach areas used by visitors), spillover noise from nearby roads, and noise/sightings of aircraft. There are relatively few areas where motorboat spillover noise is audible, so this would be a continuing long-term, local, minor, adverse impact on the opportunity for solitude in wilderness areas. Aircraft noise and sightings would not change by alternative, and thus are not considered in this analysis. (For more information on the Everglades soundscape, see the “Natural Soundscapes” section.)

East Everglades Addition. In wilderness-eligible portions of the Addition, opportunities for solitude or primitive and unconfined recreation would be affected primarily by the sight and sounds of airboats (private or commercial). These sights and sounds would continue to be a long-term, minor to moderate, adverse impact on opportunities for solitude or primitive and unconfined recreation.

Considering all four qualities of wilderness character, management actions would continue to have a variety of impacts on wilderness character under the no-action

alternative. Overall, for the existing designated wilderness under the no-action alternative, most impacts would be minor, long-term, and adverse primarily due to continuing motorboat use, the presence and use of existing backcountry campsites and chickees, and continuing resource management activities. But in the Florida Bay submerged wilderness, adverse impacts to wilderness character would be moderate to major due to continuing scarring of seagrass and the sea bottom. In the East Everglades Addition eligible wilderness under the no-action alternative, there would be moderate, adverse, long-term impacts primarily due to the sights and sounds of airboats, the continuing presence of a few structures, and continuing resource management/research activities.

Cumulative Impacts. Other past, present, and reasonably foreseeable future projects that would affect the wilderness character of the park include various ecosystem restoration projects and implementation of vegetation and wildlife management plans. These include the Modified Waters Deliveries project, the Tamiami Trail modifications project, the *Comprehensive Everglades Restoration Plan*, the Hole-in-the-Donut restoration project and other restoration efforts, and the Snake Bight (Florida Bay) pole/troll zone pilot project. These projects are designed to restore natural conditions to the park. During the restoration period, which could last many years, the construction work associated with these projects would include the use of motorized and mechanical equipment, including airboats and helicopters. These restoration activities would be expected to result in minor to moderate, adverse impacts on the untrammeled, undeveloped, and solitude qualities of the main Everglades Wilderness and East Everglades Addition eligible wilderness. But in the long term, these projects would improve the natural and undeveloped qualities of the wilderness and eligible wilderness. Overall, these projects would have long-term, moderate, beneficial impacts on the wilderness character of the terrestrial portion of the main wilderness and East Everglades Addition eligible wilderness

primarily due to restoration of the natural quality. There also would be a minor to moderate, localized, long-term, beneficial impact on the existing Florida Bay submerged wilderness due to an improvement in natural conditions in the Snake Bight. The no-action alternative, combined with other past, present, and reasonably foreseeable future projects and activities, would have a moderate, long-term, beneficial, cumulative impact on the terrestrial portion of the main wilderness and East Everglades Addition, and a moderate to major, long-term, adverse impact on the submerged wilderness. This alternative would continue a modest contribution to these overall cumulative impacts on terrestrial wilderness in the park; however, the no-action alternative would contribute the greatest portion of the overall cumulative adverse impact on submerged wilderness in Florida Bay.

Conclusion. Management actions and visitor use would have a variety of impacts on wilderness character under the no-action alternative. For both the main portion of the wilderness and the East Everglades Addition eligible wilderness, the alternative would have a long-term, minor, adverse impact primarily due to continuing motorboat and airboat use, and resource management / research activities in the areas. In the Florida Bay submerged wilderness, adverse impacts to wilderness character would be moderate to major, and long-term due to continuing scarring of the water bottom. When past, present, and likely future actions are added to the effects of the no-action alternative, there would be a moderate, long-term, beneficial, cumulative effect on the terrestrial portion of the main wilderness area and East Everglades Addition eligible wilderness, and a moderate to major, long-term, adverse, cumulative impact on the Florida Bay submerged wilderness. The no-action alternative would add a very small increment to the overall cumulative impact for most of these areas, with the exception of Florida Bay where the alternative would be responsible for most of the overall adverse cumulative impact.

ARCHEOLOGICAL RESOURCES

Under the no-action alternative, there would be no new construction other than planned facility upgrades, and no substantial changes in visitor use activities would occur. Consequently, other than routine maintenance activities and construction projects that have already been approved or undertaken (e.g., improvements at Flamingo as outlined in the *Flamingo Concession Services Plan*), there would be little potential for impacts on archeological resources as a result of ground-disturbing construction. As staffing and funding priorities permit, NPS archeologists would monitor the condition of known archeological sites and undertake appropriate protection and stabilization measures to reduce or avoid possible site impacts from erosion, visitor use, or other factors. Ongoing archeological investigations would continue, such as the long-term study of prehistoric shell works sites in the Ten Thousand Islands area. Although test excavations conducted as part of these investigations would have minor adverse impacts on portions of identified sites, the investigations would expand and contribute to the park's archeological database having a beneficial effect. Continuation of archeological resource management actions would have permanent, negligible to minor, adverse impacts on archeological resources. Because of a lack of cultural resource management staffing, archeological investigations would continue to be limited to compliance projects and a few funded projects rather than an ongoing archeological resource management program.

Cumulative Impacts. The park's archeological resources are subject to a variety of disturbances, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; invasive nonnative plants such as Brazilian pepper whose deep roots can disturb buried sites; ground-disturbing construction and rehabilitation activities; inadvertent visitor use impacts; and artifact looting. These factors could contribute to

permanent, minor to moderate adverse impacts on archeological resources as sites face risks from storm damage, erosion, and possible human-caused disturbance.

Some foreseeable projects, such as the restoration of disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and invasive nonnative vegetation) could adversely affect archeological resources because of ground disturbance. In consultation with the state historic preservation office, associated tribes, and others, archeological assessments and investigations would be completed for all proposed project areas to ensure that significant sites would be avoided or that adverse impacts would be adequately mitigated before these construction activities are undertaken. Any adverse impacts on archeological resources would be permanent and of minor to moderate intensity.

The above disturbances could have minor to moderate, permanent, adverse impacts on the integrity of archeological resources because the potential of impacted sites to yield important prehistoric or historic information could be diminished. However, ongoing and future archeological research and investigations that contribute to the understanding of regional prehistory and history would have long-term beneficial impacts.

The impacts associated with implementation of the no-action alternative would have permanent negligible to minor, adverse impacts on the park's archeological resources. The adverse impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a permanent, minor to moderate, adverse cumulative impact. The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impacts.

Conclusion. Implementation of the no-action alternative would have permanent, negligible to minor, adverse impacts on the park's prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places. In conjunction with the impacts of other past, present, or reasonably foreseeable actions, there would also be permanent, minor to moderate, adverse cumulative impacts on archeological resources from implementation of the no-action alternative.

Historic Structures, Sites, and Districts

Under the no-action alternative, the park's historic structures, sites, and districts would be protected, stabilized, and preserved to the extent allowable under current funding and staffing levels. Appropriate preservation treatments would be carried out in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. The park would continue to adaptively use selected historic buildings, such as those associated with the Nike Missile Base site (HM-69), for administrative and other purposes. Seasonal guided tours of the Nike site would continue. Adaptive use in accordance with *The Secretary's Standards* for rehabilitation would assist the park in preserving buildings and structures listed in or determined eligible for listing in the National Register of Historic Places. The Duck Camp (former hunting camp in the East Everglades Addition) may meet the criteria of national register eligibility; if determined eligible, it would be stabilized and possibly rehabilitated for interpretive purposes. No other hunting camps in the area would be preserved.

Implementation of these preservation undertakings would have long-term, beneficial impacts on the park's historic buildings and structures, helping ensure their continued contribution to park interpretation, research, and preservation of cultural heritage. However, ongoing efforts to preserve and rehabilitate historic buildings

could entail the repair and/or replacement of deteriorated historic fabric, and the introduction of modern structural elements or systems to make them safe and functional for adaptive use. These measures, conducted in accordance with the *Secretary's Standards*, would have long-term or permanent, negligible to minor, adverse impacts on historic structures, sites, and districts.

Cumulative Impacts. Historic structures and buildings in the park are often damaged by exposure to severe storms, hurricanes and humid climatic conditions. Several of the NPS Mission 66 buildings at Flamingo (e.g., marina store, maintenance buildings, and lodge) were substantially damaged by recent hurricanes and were subsequently determined ineligible for the national register because of lost or diminished historical integrity. Several of these damaged buildings were demolished and removed. The damage and loss of buildings from hurricanes has resulted in a permanent, moderate to major, adverse impact on resources contributing to the historical integrity of the Flamingo Mission 66 developed area. All new construction at Flamingo to rehabilitate or replace facilities as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 buildings and cultural landscape elements. The visitor center would be rehabilitated. Undertakings to preserve Flamingo's surviving buildings and site features would have overall long-term beneficial impacts. Long-term or permanent, negligible to minor adverse impacts would also result from the repair and/or replacement of deteriorated historic building materials and fabric, and the introduction of modern structural elements to effect rehabilitation treatments.

Other foreseeable projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect historic structures. The Old Ingraham Highway and associated canals are eligible for listing in the National Register as a historic district, although the integrity of these

structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the road's overall integrity because the road would continue to retain its existing configuration and character. Such construction would also contribute to the park's conservation efforts. Adverse impacts would be long term or permanent and minor.

The impacts from storms and other natural processes, together with ongoing or foreseeable construction activities, could adversely affect the integrity of historic structures. This would result from the loss or damage of character-defining features and architectural elements. The impacts associated with implementation of the no-action alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's historic structures, sites, and districts. The impacts of this alternative, in combination with the beneficial and minor to major adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of the no-action alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. In conjunction with the impacts of other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on historic structures from implementing the no-action alternative.

Cultural Landscapes

Under the no-action alternative, the park's cultural landscapes would continue to be protected, stabilized and preserved to the extent allowable under current funding and staffing levels. Appropriate preservation treatments would be carried out in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties (with Guidelines for the Treatment of Cultural Landscapes)*. Actions conducted to stabilize contributing buildings and structures and preserve and maintain historic vegetation, circulation patterns, and other character-defining features would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on cultural landscapes.

The park would continue to conduct cultural landscape inventories and reports (as necessary) for selected historic properties (e.g., the Nike Missile Base site (HM-69); the Ingraham Highway historic district; and remnants of the former Royal Palm State Park, including elements constructed by the Civilian Conservation Corps during the 1930s). However, under the no-action alternative, efforts would potentially be limited in scope based on available funding and other project priorities. Information acquired from cultural landscape inventories would expand the park's knowledge of important character-defining landscape features, and provide the basis for appropriate management and preservation treatment of significant landscapes. These investigations would have long-term beneficial impacts on cultural landscapes.

Cumulative Impacts. Cultural landscapes in the park are often at risk from damage by severe storms and hurricanes. Storm winds and surges can uproot ornamental vegetation planted as part of designed landscapes (such as that planted at Flamingo during the 1950s), and they can severely erode or obliterate other elements such as trails, roads, and small-scale features, resulting in long-term or permanent, moderate to major adverse impacts. All new

construction at Flamingo to rehabilitate or replace facilities, as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 cultural landscape elements. Undertakings to preserve the integrity of Flamingo's surviving cultural landscape features would have overall long-term beneficial impacts. Proposed actions to preserve and rehabilitate cultural landscape features would also result in long-term or permanent, negligible to minor, adverse impacts.

Other foreseeable construction projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect cultural landscape features associated with historic structures. The Old Ingraham Highway and its associated canals are eligible for listing in the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the overall integrity of cultural landscape features because the road would continue to retain its existing configuration and character. Also, these actions would contribute to the park's conservation efforts. Adverse impacts would be long term and minor.

The impacts from storms and other natural processes, together with the ongoing or foreseeable construction activities mentioned above, could adversely affect the integrity of the park's cultural landscapes. This would result from the loss or damage of character-defining features such as contributing buildings and structures, vegetation, patterns of circulation, and small scale features. Implementation of the no-action alternative would have long-term beneficial impacts and negligible to minor adverse impacts on the park's cultural landscapes. The impacts of this alternative, in combination with the beneficial and minor to major adverse impacts of other

past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse cumulative impact(s). The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impact(s).

Conclusion. Implementation of the no-action alternative would have long-term beneficial and negligible to minor adverse impacts on the park's cultural landscapes. In conjunction with the impacts of other past, present, or reasonably foreseeable actions, there would also be long-term, minor to moderate, adverse cumulative impacts on cultural landscapes from implementation of the no-action alternative.

Ethnographic Resources

Under the no-action alternative, there would be no new construction other than planned facility upgrades, and no substantial changes in visitor use activities would occur. Consequently, other than routine maintenance activities and other foreseeable construction projects that have already been approved, there would be little potential for impacts on ethnographic resources as a result of ground-disturbing construction. The park's culturally associated tribes (the Miccosukee Tribe of Indians of Florida, the Seminole Tribe of Florida, and the Seminole Nation of Oklahoma), as well as other American Indian groups such as the Council of the Original Miccosukee Simanolee Nation Aboriginal People, regard many of the prehistoric and historic archeological sites (e.g., middens, village mound sites, burial locations) as having cultural and/or sacred importance to their respective tribes, and they have indicated that these sites should be protected and left undisturbed. Sites in the East Everglades Addition and other areas of the park may also hold particular ethnographic importance for individuals associated with the modern and historic Gladesmen culture. The Duck Camp in the East Everglades Addition (having possible Gladesmen associations) might be

stabilized and interpreted. Private airboating would continue in this area, allowing access to camps and places important to the Gladesmen culture. However, sites important to the park's associated tribes might continue to be at risk from visitor use impacts associated in part with airboat access to the tree islands. Because of the limited nature of park construction and management actions under the no-action alternative, there would be long-term or permanent, negligible to minor, adverse impacts on ethnographic resources.

In consultation with associated tribes, the state historic preservation office, Gladesmen representatives, and other interested parties, NPS personnel would continue to monitor the condition of known sites and undertake appropriate protection and stabilization measures to reduce or avoid possible site impacts from erosion, visitor use, or other factors. Ongoing investigations would continue (such as the long-term study of prehistoric shell works sites in the Ten Thousand Islands area), and ethnographic overviews and studies have been approved for the park. Information acquired from these investigations and studies would expand the park's knowledge of important ethnographic resources, and provide the basis for appropriate resource management and preservation treatments. This information would result in a long-term beneficial impact.

Cumulative Impacts. A variety of factors can disturb the park's ethnographic resources and disrupt the cultural connections between resources and associated groups, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; ground-disturbing construction activities; inadvertent visitor use impacts; and site looting. These factors could contribute to adverse impacts on ethnographic resources as sites face risks from storm damage, erosion, and possible human-caused disturbances. Adverse impacts would be minor to moderate and long term or permanent.

Actions entailing ground disturbance would be limited under the no-action alternative. However, foreseeable projects such as restoration of disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and invasive nonnative vegetation) could adversely affect ethnographic resources as a result of ground disturbance. In accordance with section 106 procedures and consultation requirements, ethnographic assessments and investigations would be completed for all proposed project areas to ensure that ethnographic resources are avoided or that adverse impacts are adequately mitigated before construction activities. Resulting adverse impacts would be long term and minor.

The impacts associated with implementation of the no-action alternative would have long-term or permanent, negligible to minor, adverse and beneficial impacts on the park's ethnographic resources. The adverse and beneficial impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of the no-action alternative would have long-term or permanent, negligible to minor, adverse and beneficial impacts on the park's ethnographic resources. In conjunction with the impacts of other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on ethnographic resources from implementing the no-action alternative.

Museum Collections

Under the no-action alternative, the South Florida Collections Management Center would remain in the Daniel Beard Center and the Robertson Building (both facilities are in the park's Pine Island District). This center would continue to store collection items from Everglades, Biscayne, and Dry Tortugas national parks; Big Cypress National Preserve; and De Soto National Memorial. The NPS Southeast Archeological Center in Tallahassee, Florida, would remain the primary repository for archeological artifacts and materials collected from the various regional park units.

Specialized environmental control systems and equipment are required to ensure the long-term preservation of the SFCMC collections in the hot and humid environment of South Florida. The former heating, ventilation, and air conditioning system did not adequately control humidity levels or prevent wide humidity fluctuations. The system deficiencies contributed to mold growth and other damaging conditions for collection items and archival materials. Some of the collections have also been damaged by pest infestations. The National Park Service has undertaken measures to correct most of the pressing environmental control problems. However, the current facilities do not meet the full range of NPS professional standards for the storage of museum collections. A fire suppression system has not been installed, placing the collections at risk of catastrophic loss. Although staffing has increased to assist comprehensive curatorial management of the facility, inadequate work space for staff and researchers continues to make it difficult to manage and access the collections. There is insufficient space to properly store the collections or accommodate new acquisitions. Continuation of the South Florida Collections Management Center in the current facilities with the deficiencies noted above would result in long-term or permanent, minor to moderate, adverse impacts on the museum collections.

Cumulative Impacts. The fragile nature of many collection items and archival materials require that they be stored in carefully controlled conditions to ensure their long-term survival. These requirements are particularly acute for museum facilities in south Florida and in other similar environments in the region where hot and humid conditions pose curatorial challenges for the proper maintenance of humidity levels and other environmental conditions. Museum collections are also occasionally at risk of damage by improper or frequent handling, and inadequate security and protection systems. Damage or loss of collection items resulting in the diminished value of these materials for research, artistic, or other purposes would have long-term or permanent, minor to moderate, adverse impacts on museum collections.

The impacts associated with implementation of the no-action alternative would have long-term or permanent, minor to moderate, adverse impacts on museum collections. The adverse impacts of this alternative, in combination with the predominantly moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of the no-action alternative would constitute a substantial component of the adverse cumulative impact.

Conclusion. Implementation of the no-action alternative would have long-term or permanent, minor to moderate, adverse impacts on museum collections. In conjunction with the impacts of other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate adverse cumulative impacts on museum collections from implementation of the no-action alternative. The adverse effects of the no-action alternative would constitute a substantial component of the adverse cumulative impact.

VISITOR USE

Visitor opportunities under the no-action alternative would remain essentially unchanged compared to the current situation. Consequently, visitor use at Everglades National Park under the no-action alternative would be expected to increase to about 1.43 million recreation visitors per year over the life of this plan—primarily in response to regional population growth, including the seasonal “snowbird” migration and the continued exclusion of clients of the commercial airboating operations in the East Everglades Addition. Increased use would likely occur at all major visitor use areas of the park, although the most additional use would likely be in the Everglades City / Ten Thousand Islands, Shark Valley, and Flamingo areas. Year-to-year changes in visitor use would vary over time, with periods of faster or slower growth and even periods of short-term declines. However, the long-term trend would be for increased visitor use.

Peak recreation visitation would likely continue to occur in February and March; although some areas might see higher relative increases in other periods (such as early fall in the Everglades City area). Future use under the no-action alternative would have long-term, minor to moderate effects that might be concurrently seen as beneficial or adverse—depending on visitor expectations and preferences related to the visitation levels and the activities in which individual visitors participate. The effects might be more noticeable during peak visitation periods and could differ in different locations in the park.

Overall, maintaining the current access; scenic resources; range of visitor opportunities; and recreation-oriented facilities, including those associated with improvements at Flamingo, would have a long-term, minor to moderate impact in promoting increased visitor use, although construction activities would have short-term, limited, adverse impacts. To the extent that increased use could be accommodated while achieving the park’s other environmental, ecological and cultural

resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact on visitor use.

Cumulative Impacts. Other past, present, and reasonably foreseeable projects that could result in cumulative effects on visitor use are described in chapter 1. Past actions include the development of the administration, maintenance, and visitor service facilities; roads; parking areas; exhibits; and other resources that support and host current visitor use at Everglades. The present and reasonably foreseeable projects with the highest potential to affect use include Flamingo improvements (the impacts on visitor use are recognized under the no-action alternative) and construction projects such as replacing the marine bulkheads at Flamingo and resurfacing the main park road. Effects on visitor use from Flamingo improvements would be long-term, beneficial, and moderate because of improved day and overnight visitor opportunities. The other projects would primarily result in short-term inconveniences to visitors—for example travel delays during construction on the main park road. Typically, the park staff would attempt to schedule such work during off-peak periods to minimize disruptions. Once the projects are completed, visitors would be unaffected by the actions. Combined with the actions proposed under the no-action alternative, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial cumulative effects. Impacts of the no-action alternative would comprise a relatively small portion of the overall effect.

Conclusion. Maintaining the current access; scenic resources; range of visitor opportunities; and recreation-oriented facilities, including those associated with Flamingo improvements, would have a long-term, minor to moderate impact in promoting increased visitor use, although construction activities would have short-term, limited, adverse impacts. To the extent that increased use could be accommodated while achieving the park's other environmental, ecological

and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact on visitor use. Combined with the actions proposed under the no-action alternative, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial cumulative effects. Impacts of the no-action alternative would comprise a relatively small portion of the overall effect.

VISITOR EXPERIENCE AND OPPORTUNITIES

Visitors to Everglades National Park would continue to have access to a variety of information, interpretation, and recreational and educational opportunities at locations throughout the park. Access to the park would continue on the existing roads and trails and at boat access points. The visitor experience at the park is currently adequate but not excellent, and under the no-action alternative the visitor experience would remain largely unchanged.

East Everglades Addition

Under the no-action alternative, private airboating and commercial airboating would continue within the East Everglades Addition with little to no change in management. Airboating would continue to be a popular and substantial experience for visitors, a long-term, moderate benefit for visitors who take advantage of these opportunities. However, because commercial airboat operations would not be under a concessions contract with the National Park Service, there would be no guarantee that accurate or pertinent information about Everglades National Park would be provided during commercial airboat tours. There is little opportunity for safe nonmotorized use in the Addition because of potential safety concerns in areas where airboats and paddlers share unmanaged trails/routes.

Chekika, staffed with volunteers, would remain open seasonally (in the winter) for day use only, a continued long-term, minor, beneficial impact on the visitor experience.

Headquarters / Pine Island / Royal Palm / Main Park Road

The Ernest F. Coe Visitor Center would continue to provide general interpretation and orientation to visitors. Royal Palm would continue to serve as a major interpretive area for the Everglades ecosystem. Royal Palm / Long Pine Key would continue to provide camping and day use opportunities. The Nike Missile Base site, with interpretive opportunities, would continue to be open seasonally. Interpretive sites and turnouts along the main park road would continue to provide self-directed interpretation and exhibits. Under the no-action alternative, these sites would all continue to provide a long-term, minor to moderate, benefit to visitors.

The South Florida Collections Management Center would continue to remain unavailable to the general public. This would be a continuing long-term, negligible to minor, adverse impact on visitors in that the collections would remain inaccessible to visitors.

There would continue to be a lack of alternative transportation to the park. This would be a continued long-term, minor to moderate, adverse impact on the visitor experience because it limits the number and types of visitors who can use the park.

Hiking would continue on the existing trails and fire road network, and bike travel would be on park roads open to vehicles and designated trails. For cyclists and hikers, this would continue to have long-term, minor to moderate, adverse impacts on their experience because of the limited opportunities available to them and because cyclists would still compete with vehicles on roads. Motorists would also continue to

experience long-term, minor, adverse impacts from the inconvenience and conflicts related to cyclists on park roads.

Florida Bay

This alternative would continue to allow relatively unrestricted motorboat access throughout most of Florida Bay. For visitors who value unrestricted motorboat access within Florida Bay, this would have long-term, moderate, beneficial impacts on their experience. For visitors seeking solitude and/or wilderness-type experiences in Florida Bay, relatively unrestricted motorboat access would continue to have long-term, minor, adverse impacts.

The no-action alternative would continue the current visitor recreational and educational opportunities in Florida Bay. Water access to Florida Bay would be from Flamingo, and public access would be permitted on the four keys and the chickees that are currently available for recreational use. A wide range of recreational opportunities would continue to be available, especially fishing and boating. Numerous tour opportunities would remain available. Overall, maintaining current visitor opportunities in Florida Bay would have a long-term, regional (Florida Bay), moderate, beneficial impact on visitor experience.

The no-action alternative would implement planned and funded improvements to the Key Largo ranger station and the Florida Bay Interagency Science Center. These improvements would provide a long-term, minor, beneficial impact on visitors.

Current camping options in Florida Bay would remain somewhat limited; visitors traveling by paddled craft would have a very long way to paddle between some campsites or chickees. This would create a minor, adverse effect for experienced visitors in calm conditions; however, for inexperienced visitors traveling in difficult conditions, the impacts would be moderate and adverse. This would result in continued, long-term, minor

to moderate, adverse impacts on visitors in Florida Bay.

Gulf Coast / Ten Thousand Islands / Everglades City

The no-action alternative would retain existing Gulf Coast visitor facilities. The center provides little enticement or appeal for visitors and creates challenges in terms of meeting their information, orientation, and comfort needs (i.e., inadequate restrooms, space to interact with rangers, space for parking, etc.). This would have continuing long-term, minor to moderate, adverse impacts on the visitor experience.

Visitor opportunities under the no-action alternative would continue to include boat, interpretive, fishing, and paddling tours based out of Everglades City. These options would continue to have a long-term, minor, beneficial effect on visitor experience.

Space for NPS and concessions tour boating operations at the Gulf Coast Visitor Center would remain limited, resulting in congestion and inconvenience, which would continue to be a long-term, negligible, adverse impact on visitors. The canoe launch at the Gulf Coast Visitor Center, which is in poor condition, would continue to be a minor adverse impact on the visitor experience.

Backcountry opportunities would remain the same under the no-action alternative. Chickees would remain widely dispersed. The network of backcountry opportunities is somewhat limited, with motorboaters and paddlers sharing the only designated boating route (the Wilderness Waterway). Continuation of the current opportunities for motorboaters and paddlers would constitute a long-term, minor, beneficial impact on the visitor experience.

Tamiami Trail / Shark Valley

Visitor opportunities along Tamiami Trail would continue to be limited except for Shark Valley, which would continue as a focal area for visitor opportunities. This would continue to have a long-term, minor, beneficial impact on the visitor experience.

Planned and funded improvements to visitor contact and concession facilities at Shark Valley would have a long-term, local, minor, beneficial impact on the visitor experience at Shark Valley.

Vehicular congestion and waiting lines would continue to be a common part of the Shark Valley visitor experience during midday at the peak visitor season, a localized long-term, minor to moderate, adverse impact.

Overall, this alternative would result in the continuation of long-term, minor to moderate, adverse impacts as well as long-term, minor to moderate, beneficial impacts.

Cumulative Impacts. Numerous past, present, and reasonably foreseeable Everglades and NPS plans and projects would affect visitor experience at the park. Actions that would directly affect visitor experience include the park's long-range interpretive plan, Flamingo improvements, resurfacing the main park road, and the Snake Bight pilot pole/troll zone project. Ecosystem restoration projects would indirectly impact the visitor experience by creating a more enjoyable environment and better wildlife viewing opportunities. Collectively, these projects would have a long-term, minor to moderate, beneficial impact on the overall visitor experience at Everglades National Park.

Visitors to Everglades National Park would continue to have access to information, interpretation, and recreational and educational opportunities throughout the park. Access to the park would continue on the existing roads, trails, and boat access points. Although a couple of visitor service facilities in the park would be upgraded

through planned improvements, some visitor and operational facilities would still have serious drawbacks. The visitor experience at the park would continue to be adequate, but with some noticeable shortcomings related to inadequate facilities and limited facilities to support backcountry opportunities.

Combined with the actions of other park plans and projects, the no-action alternative would have a long-term, minor, beneficial cumulative effect on the visitor experience at Everglades National Park. The contribution of the no-action alternative to this overall cumulative effect would be fairly substantial.

Conclusions. The no-action alternative would result in the continuation of long-term, minor to moderate, adverse impacts as well as long-term, minor to moderate, beneficial impacts. The other plans and projects in and around the park collectively would have a long-term, minor to moderate, beneficial impact on the visitor experience at the park. The no-action alternative, in combination with the other plans and projects in and around the park, would have long-term, minor, beneficial cumulative impacts on visitor experiences and opportunities. The contribution of the no-action alternative to this overall cumulative effect would be fairly substantial.

REGIONAL SOCIOECONOMIC ENVIRONMENT

Implementing the no-action alternative would occur against a backdrop of other economic, demographic, and social changes in the region. Economic projections for south Florida (here meaning Broward, Miami-Dade, Collier, Lee, and Monroe counties) anticipate population growth of approximately 20% through 2035, a net gain of 1.07 million year-round residents (Florida Office of Economic and Demographic Research 2012). In terms of magnitude, comparable increases in resident population are expected on the Gulf Coast and Atlantic Coast sides of the park. Recent population losses in the keys following hurricanes Katrina and Wilma are projected to continue but moderate in degree, resulting

in a net decrease of about 4,000 residents (55%) by 2035. Seasonal population influxes to south Florida are expected to grow as the baby boom population increases the number of individuals aged 65 and over to more than 77 million by 2035. The influx of new residents will affect the economic and social dynamics in the region. Economic expansion, including for example the number of jobs in retail trade and services and engaged in residential construction, will accompany the population growth projected to occur on the mainland, while the keys face a more challenging economic future.

Visitor-related Economic Impacts

Annual visitor use at Everglades National Park under the no-action alternative would be expected to increase to about 1.12 million annual visitors over the life of this plan—returning to levels comparable to those in the years preceding hurricanes Katrina and Wilma, but still substantially below the peak visitor use of 1.52 million in 1972 (see “Impacts of the No-Action Alternative—Visitor Use” section in this chapter).

Higher visitor spending at local stores, motels and hotels, and other tourism-related businesses and attractions would accompany the rising visitation. A substantial portion of the increased spending would occur at Flamingo following the completion of redevelopment under the Commercial Services Plan. Annual visitor spending would climb by \$25 to \$30 million over the life of this plan. Visitor spending associated with the commercial airboat tours would be in addition to that total. Future visitor use and spending would fluctuate with the seasons, with peak visitor use in the first quarter of the year. Future visitor spending would include increases in park entry and camping fees; lodging, food, beverage, and merchandise sales at Flamingo; and lodging revenues and sales of merchandise through the Everglades Association’s operations at the Ernest F. Coe Visitor Center.

The economic contributions associated with commercial airboating and associated business ventures, including the direct and secondary employment and income support, would continue. So too would property, sales, and other taxes and fees accruing to local and state governments generated on the real and business property, and from ongoing operations.

Projected spin-offs from additional visitor spending include 340 to 390 jobs and as much as \$15 million in increased personal income in the surrounding region. The visitor-related economic impacts would be long-term benefits, but negligible to minor relative to the 1.66 million jobs and \$114 billion in personal income in the three-county region in 2010.

Visitor spending under the no-action alternative would continue to be dispersed, accruing to retail merchants, recreation outfitters, restaurants, hotels and motels, and many other business establishments in the region. Establishments in Everglades City and nearby Naples and Marco Island would benefit from visitor use in the Everglades City / Ten Thousand Islands area. Economic benefits accruing to establishments in Homestead, Florida City, and elsewhere in the Miami metropolitan area would be more closely tied to visitor use in the East Everglades Addition and Royal Palm / Flamingo areas. Economic benefits accruing to businesses in the keys would be tied primarily to sport fishing and boating activity in Florida Bay. Market opportunities created by the spending would help sustain the retail trade and service establishments in the region. The economic stimulus associated with visitor spending would remain highly seasonal.

The state and local governments would collect additional sales taxes and other revenues from the increased visitor spending.

At a regional level, the visitor-related economic impacts would be beneficial, and negligible to minor in the short and long term due to the scale of increased visitation over time. However, the revenues associated with

park visitors could be critical to individual businesses, particularly those relying more heavily on seasonal sales.

Economic Impacts Related to Implementation and NPS Operations

Implementing the no-action alternative would provide a sustained economic infusion to the region over the life of this plan. The infusion would result from ongoing park operating expenditures, including payroll, one-time capital costs, and environmental research and restoration projects. Annual operating costs necessary to implement this alternative would remain comparable to current funding levels, although concessioner staffing and operating costs would be higher than current levels. One-time capital costs for Flamingo improvements would be \$13.3 million and construction of improvements and other rehabilitation and renovation projects associated with that plan would support short-term jobs and incomes in the region. Additional one-time outlays on projects that are not part of this plan are anticipated.

Continuation of commercial airboating in the East Everglades without management oversight by the National Park Service or a contractual relationship between airboat companies and the National Park Service would continue to have short- and long-term adverse effects on park budgets and operations, while continuing to provide commercial airboat operators with short- and long-term beneficial impacts.

NPS maintenance staff would perform much of the work to address deferred maintenance and preservation, restoration, and rehabilitation activities. Future outlays by the park for materials and equipment to support construction and major maintenance would create short-term economic impacts in the region. Local merchants, equipment suppliers, specialty contractors, and related industries would capture a substantial portion of those outlays. The timing and amount of these expenditures are uncertain, depending on the

budgetary approvals by Congress; budget allocations within the National Park Service; and future collections of entry, camping, and concession fees at the park that can be used to support projects. Annual NPS payroll and operations and maintenance expenditures would result in long-term effects on employment, taxes, business sales, and income.

Establishment of the national park helped sustain the critical role of the Everglades in providing important ecosystem services in south Florida; among these services are enhancing water quality, groundwater replenishment, and flood control. The economic value of these services to the regional economy, although difficult to quantify, is substantial. The park would continue to provide ecosystem services under the no-action alternative, potentially increasing over time in response to the *Comprehensive Everglades Restoration Plan*. These services would be long term and beneficial.

No major changes in budgeted resources to fund NPS operations would be anticipated under the no-action alternative. Supportable staffing needs under the no-action alternative are estimated to remain at about 180 staff positions, and the park would continue to benefit from substantial volunteer efforts. Park operations would continue to indirectly support approximately 100 additional jobs. These jobs would have a total personal income of about \$4.2 million annually elsewhere in the regional economy. Available resources would include annual base budget appropriations; a portion of entry, camping, and concession fees; and various nonrecurring funding for other projects, such as the *Flamingo Commercial Services Plan*.

Establishment of the national park and subsequent land acquisition removed lands and improvements from the local tax rolls. Some adverse effects on local businesses might also have resulted. These effects on tax revenue were offset, in part, by PILT (payments in lieu of taxes) payments, the

likely boost in area property values due to the proximity to the national park, sales tax revenues associated with park visitors, and the economic infusions from NPS operations and staff.

Research, education, and other activities sponsored by the park's partner organizations would continue to provide additional sources of economic stimulus. The timing, magnitude, and indirect economic consequences of those activities are not known.

Economic effects associated with park operations would be beneficial and negligible to minor in the short and long term.

Effects on Regional Population Growth

The park would not be a major catalyst for future population growth under the no-action alternative. Staffing levels would remain about the same, and the economic expansion associated with long-term increases in visitor use would be minor in comparison to other drivers of population growth in south Florida.

The park, its natural resources, and its recreation opportunities would continue to be a potential amenity for many residents and for people considering relocation to the region. Thus the park would contribute indirectly to population growth. However, implementation of the no-action alternative would not dramatically enhance the region's multifaceted lifestyle, climate and other reasons that visitors come to south Florida, and outdoor recreation opportunities that contribute to its seasonal tourism economy.

The effects on regional population growth under the no-action alternative would likely be negligible, both in the short and long terms.

Community Services

Little change in park-related demands on community services and facilities across south

Florida would result from implementing the no-action alternative. Local water and wastewater systems would be marginally affected by more people traveling through the area and staying locally in second homes or lodging accommodations. However, the incremental demands, dispersed over time and location, are unlikely to require additional capacity or staffing. Tax revenues generated by visitor spending would help provide resources to meet future needs.

Effects on community services under this alternative would likely be negligible over the short and long terms.

Attitudes and Lifestyles

The park's influence on community attitudes and lifestyles would not alter dramatically under the no-action alternative. Continuing NPS operation within the current management framework would not substantially affect current visitor use opportunities or use patterns. Maintaining current land and water access plus management of lands to preserve their wilderness characteristics would encourage continued low use in many areas of the park. Such management would enjoy support from some members of the public.

For some members of the community, continued management under the no-action alternative would not be satisfactory because they might see it as lacking clear current management direction for the park. People and groups, who promote a positive commitment to specific recreation opportunities, or enhanced restoration and protection of natural resources, might not view the management direction in this alternative favorably. At the same time, some might see benefits with the no-action alternative because it avoids situations or impacts that they would find less desirable.

The net effects of the no-action alternative on community attitudes and lifestyles are indeterminate.

Overall, under this alternative the economic and social effects include minor, short- and long-term economic benefits and negligible effects on population growth and demands on community services and facilities. Long-term consequences on attitudes and lifestyle are more likely to be adverse than beneficial. The no-action alternative would have short- and long-term, negligible to minor, beneficial and adverse social and economic effects.

Cumulative Impacts. Social and economic impacts from the no-action alternative are of the same type as those associated with past, present, and future actions in and near the park, the establishment of the park, and those associated with the no-action alternative. From the economic and social perspectives, one cannot readily isolate the park from past, present, and future development in the surrounding areas. Past human activity and development actions in the park and elsewhere in the Everglades are largely responsible for existing land use and ownership patterns. Those uses are also tied to the cultural and historical landscapes. If not for establishment of the park, the affected lands would undoubtedly provide far fewer opportunities for public use and natural resource protection.

Social and economic effects of the above actions include minor short- and long-term increases in traffic on local roads, short-term minor demands on local construction trades and services, short- and long-term minor demands on community services, and changes in the seasonal resident and visitor population. Social and economic effects of ongoing or planned improvements / restoration / management at the park would result in beneficial, long-term, minor economic effects on visitor-related businesses due to changes in visitor use levels and distribution. Combined with these effects, the no-action alternative would result in short- and long-term, minor beneficial and adverse cumulative effects. The no-action alternative would comprise a small portion of these overall cumulative impacts.

Conclusions. The economic and social effects of the no-action alternative include minor, short- and long-term economic benefits and negligible indeterminate effects on population growth and demands on community services and facilities. Long-term consequences on attitudes and lifestyle are indeterminate, but in general more likely to be adverse than beneficial. The no-action alternative would have short- and long-term, negligible to minor, beneficial and adverse cumulative social and economic effects. Combined with the effects of other past, present, and foreseeable actions, the no-action alternative would result in short- and long-term, minor, beneficial and adverse cumulative effects. The no-action alternative would comprise a small portion of these overall cumulative impacts.

PARK OPERATIONS

Under the no-action alternative, current management trends, strategies, and park operations would continue, characterized by (1) maintenance of existing facilities and assets (e.g., visitor contact stations, operational facilities, roads, parking and picnic areas, campgrounds, trails, boat launches, marinas); (2) visitor-related operational demands (e.g., interpretive services, law enforcement services, and campground maintenance); (3) ongoing ecosystem restoration and research; and (4) current resource management activities, including fire and invasive nonnative plant and animal management. Wilderness minimum requirement analysis would continue for the nearly 1.3 million acres of designated wilderness, the additional 85,300 acres of potential wilderness, and wilderness-eligible areas of the East Everglades Addition (most of the Addition). Park operations are complicated by the size and complexity of the park (land, water, submerged land) and dispersed facilities.

While the park continues to operate effectively, current funding leaves the park understaffed, which has long-term, adverse impacts on park operations.

East Everglades Addition

Under the no-action alternative, commercial airboat operators and operators of private airboats would continue to use airboats on undesignated trails and routes in the East Everglades Addition. The current airboating situation requires patrolling and monitoring (of both commercial and private airboats) by park law enforcement rangers. This operational burden would remain a long-term, adverse impact on park operations.

East Everglades administrative and operational activities (e.g., ranger, fire, maintenance, etc.) would continue to operate out of adapted former residences within the East Everglades Addition. These structures are not well suited to park operational uses, due to size, layout, and age, which leads to operational inefficiencies. They also lie within the Shark River Slough restoration area, where additional water flow is anticipated, possibly affecting the structures. This situation would be a continued, long-term, adverse impact on park operations.

Florida Bay

Florida Bay would continue to be managed under current practices. Marine law enforcement rangers would continue to patrol a vast area that would not be protected by or organized into management zones. This means that enforcing laws and regulations for safety and resource protection (e.g., sea bottom, wading birds, fish, etc.) purposes would remain a monumental operational challenge. Boat groundings on Florida Bay banks, which often require ranger assistance, would continue to be a common occurrence. This situation would be a continuing long-term, adverse impact on park operations.

Tamiami Trail / Shark Valley

Vehicular congestion and long lines at Shark Valley would continue to be a problem during peak visitor periods, demanding substantial

time and attention from park rangers to manage the situation. Also, the Tamiami Trail ranger station complex, which is old, in poor condition, and not centrally located, would continue to be the base for NPS operations along Tamiami Trail. This situation results in a maintenance burden and poses operational challenges that would be a continued, long-term adverse impact on park operations.

SUMMARY

Overall, the no-action alternative would have a continuing, long-term minor adverse impact on NPS operations at the park.

Cumulative Impacts. Many other projects that impact park operations have recently occurred, are occurring, or will occur in the near future. These projects can be loosely grouped into the following categories—visitor services, Flamingo improvements, ecosystem restoration, vegetation and wildlife management, infrastructure improvements, and resource management activities. Implementation of these other plans and projects, including repairs and other improvements made to park infrastructure, would improve staff efficiency and reduce deferred maintenance. The no-action alternative, combined with other plans and projects, would have a long-term, minor, adverse, cumulative impact on park operations.

Conclusions. The park continues to operate well, however continuation of the no-action alternative would have beneficial and adverse effects on park operations. Overall, the no-action alternative would have long-term, minor adverse impacts on NPS operations. Other projects and park operations, combined with the no-action alternative, would result in long-term, minor, adverse cumulative impacts on the operations and management of the park.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are those environmental consequences of an action that cannot be fully mitigated or avoided. Under the no-action alternative, some unavoidable adverse impacts to water resources, soils, wildlife, vegetation, natural sounds, and wilderness character would result from unrestricted boat access throughout most of Florida Bay; from recreation access to tree islands and certain keys; and from continuation of private and commercial airboating within the East Everglades.

Irreversible and Irretrievable Commitments of Resources

With the exception of consumption of fuels and raw materials for maintenance and construction activities, no actions in this alternative would result in consumption of nonrenewable natural resources or use of renewable resources that would preclude other uses for a period of time.

Relationship of Short-Term Uses and Long-Term Productivity

The park would continue to be used by the public, and most areas would be protected in a natural state. The National Park Service would do its best, within current management direction, to maintain ecological processes and native biological communities and to provide appropriate recreational opportunities consistent with the preservation of cultural and natural resources. Actions would be taken with care to minimize effects to productivity of biotic communities; however, nearly unrestricted motorboating within Florida Bay would continue to affect seagrasses to a degree that could adversely affect long-term productivity.

IMPACTS FROM IMPLEMENTING THE NPS PREFERRED ALTERNATIVE

HYDROLOGIC RESOURCES

Some elements of the NPS preferred alternative that would benefit hydrologic resources include (1) restoration of more natural water flow under the south portion of Anhinga Trail by installation of culverts or a bridge, (2) establishment of pole/troll and pole/troll/idle zones in Florida Bay, and (3) the mandatory boater education and permitting program. The Anhinga Trail improvements would reestablish more natural surface water flow. The NPS preferred alternative proposes substantial changes in how motorboats access various portions of Florida Bay. Most of the recommendations made by the recent propeller scarring study (NPS 2008c) are incorporated in this alternative. Establishment of substantial pole/troll and pole/troll/idle zones and the boater education and permit program would result in fewer boat groundings and fewer incursions into the shallowest areas, with fewer disturbances to bottom sediments from motorboat propellers; this would decrease turbidity in Florida Bay. Impacts would be long term, localized, minor to moderate, and beneficial.

Upgraded facilities and two new shade structures at Shark Valley, upgraded NPS facilities at Key Largo, and development of visitor turnouts along Tamiami Trail would be constructed within the footprint of development or disturbed areas. Impacts on wetlands are not expected. Water quality impacts during construction (e.g., turbidity, sedimentation) would be short term, localized, negligible to minor, and adverse because construction best management practices would be employed to reduce or eliminate such impacts.

Impacts on water resources, water quality, and wetlands from new and upgraded facilities might result from development of (1) a new

administrative/operations center outside the East Everglades Addition; (2) additional carry-in boat access to Florida Bay along the main park road and along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) three new chickees in Florida Bay, (5) a new canoe/kayak ramp and launch at Gulf Coast, and (6) a replacement visitor center (see appendix F, Floodplain Statement of Findings that addresses 6). As in the no-action alternative, impacts on water quality during construction would be short term. Long-term, adverse impacts on wetlands would depend on project design, location, and size, the specifics of which are unknown at this time. More detailed analysis for these projects would occur in project-specific environmental impact analyses done before each project is being implemented.

Under this alternative, the park would implement an adaptive management approach to resource conservation. Under adaptive management, if monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. Examples of adaptive management could include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on water resources could be short or long term and range from negligible to minor, depending on the actions taken.

The construction of the replacement visitor center and associated development would occur in a previously disturbed area. In addition, it would use floodplain and wetland mitigation design, so there would be no new impacts expected on wetlands.

Overall, the impacts on hydrologic resources under this alternative would be short term, localized, negligible to minor, and adverse

(e.g., turbidity, sedimentation) during construction projects.

Cumulative Impacts. As noted in the introduction, most impacts on water resources and wetlands in the park arise from changes in the amount, timing, and distribution of water and related changes in water quality (i.e., excess nutrients). As described under the no-action alternative, impacts from other projects and plans—such as (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, and (4) restoration of areas disturbed by prior land uses—would be long term, parkwide, moderate to major, and beneficial. The cumulative effect of the beneficial and adverse impacts of the NPS preferred alternative, combined with impacts of other projects and plans, would be long term, parkwide, moderate to major, and beneficial. The NPS preferred alternative would contribute a modest amount to the total cumulative effects.

Conclusion. The impacts of the NPS preferred alternative on water resources would be long term, localized, minor to moderate, and beneficial (e.g., decreased turbidity) in Florida Bay, and short term, localized, negligible to minor, and adverse (e.g., turbidity, sedimentation) during construction projects. The cumulative effect of other projects and plans combined with the NPS preferred alternative would be long term, parkwide, moderate to major, and beneficial.

LANDSCAPE AND SOILS

Under the NPS preferred alternative, soils would continue to be affected by visitor use (e.g., compaction). Visitor effects on soil would continue to be long-term, localized, negligible to minor, and adverse. Certain tree islands or areas that were open to visitor use could be closed seasonally or year-round (e.g., for wildlife protection, water or the protection of cultural resources. Although such closures

would help protect soils in these areas from visitor use impacts, overall effects on soils from visitor use would remain long term, localized, negligible to minor, and adverse.

Some facility upgrades (such as at Shark Valley and Key Largo) would occur within the developed or disturbed footprint. Impacts on soils from construction activities would be long-term, localized, negligible to minor, and adverse (e.g., erosion, removal of surface layer). Construction best management practices would be in place to limit such impacts.

Impacts on soils (disturbance or loss) from new and upgraded facilities would be associated with (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along U.S. 1 near Long Sound, (4) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (5) three new chickees in Florida Bay, (6) Gulf Coast site improvements, (7) two to three campsites on tree islands within the East Everglades Addition, and (8) a new collections management facility in the headquarters/Pine Island area. Each of these actions would affect from 0.25 to 10.0 acres of soil. Best management practices during construction would help limit construction-related impacts. Impacts on soils from all these projects would be long term, localized, minor, and adverse (e.g., disturbance of surface layer, erosion).

Overall, impacts on soils under the NPS preferred alternative would be long term localized, minor, and adverse. These impacts would result from visitor use and construction.

Cumulative Impacts. The effects of other projects and plans on park soils would be as described for the no-action alternative: long term, parkwide, and minor to moderate, and beneficial. Such projects include (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) restoration activities in areas disturbed by prior land uses,

(4) implementing the park's fire management plan, and (5) implementation of the park's strategic management plan and resource stewardship strategy. In combination with the long-term, localized, minor, adverse effects of the NPS preferred alternative, overall cumulative effects would be long term, parkwide, minor to moderate, and beneficial. The NPS preferred alternative would have a slight contribution to the cumulative effects.

Conclusion. Impacts on soils under the NPS preferred alternative would be long-term localized, minor, and adverse. These impacts would result from visitor use and construction. The cumulative effect of the NPS preferred alternative, when combined with other projects and plans, would be long term, parkwide, minor to moderate, and beneficial.

VEGETATION

Airboating can damage wetland vegetation such as sawgrass (and compact, stir up, or transport sediments, increasing water turbidity) in areas where airboats run repeatedly. Commercial, private, and administrative airboat use would continue in the East Everglades Addition, so adverse impacts would also continue, particularly in the frontcountry zone where airboat use is concentrated (e.g., the northern portion of the Addition). Because that area is smaller than under the no-action alternative and because airboats would be required to stay on designated routes to minimize resource impacts, this alternative would result in a long-term, localized, minor, beneficial impact.

Under the NPS preferred alternative, certain islands or areas within the East Everglades Addition could be closed to visitor use seasonally or year-round for natural resource reasons (such as wildlife protection or water level management) or cultural resource reasons. Such closures would help reduce vegetation impacts (e.g., from airboat landings or foot traffic) compared to the no-action

alternative; such impacts would be short-term, localized, negligible to minor, and adverse.

Installation of culverts or a bridge to improve water flow under the southern portion of Anhinga Trail would provide long-term, localized, minor benefits. During construction, impacts on vegetation would be short term, localized, minor, and adverse (e.g., disturbance of surface layer). Construction best management practices, such as revegetation of disturbed areas, would reduce or eliminate short-term and long-term impacts.

Comprehensive seagrass restoration efforts in Florida Bay and infilling of Chekika borrow pits would restore vegetation cover and have long-term, localized, minor to moderate, beneficial impacts. The mandatory boater education and permit program would help visitors understand how to avoid damage to seagrass beds, a long-term, localized, minor to moderate, beneficial impact on seagrass more so for Florida Bay than for other areas of the park.

Under the NPS preferred alternative, vegetation would be affected by facility upgrades within developed areas (e.g., at Shark Valley and Key Largo). Construction impacts on vegetation would be short term, localized, negligible to minor, and adverse (e.g., removal of surface layer). Construction best management practices, such as revegetation of disturbed areas, would be used to minimize such impacts.

Impacts on vegetation from new and expanded facilities would result from (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along the main park road and along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) three new chickees in Florida Bay, (5) Gulf Coast site improvements, (6) two to three campsites on tree islands within the East Everglades Addition, and (7) turnouts along Tamiami Trail. Each of these actions would affect from

0.25 acre to 10.0 acres. Impacts on vegetation would result from loss of or damage to vegetation on the construction site during and after construction. These impacts would be short term and long term, adverse, localized, and minor to moderate depending on size of the development footprint. Although the chickees would be elevated to limit shading of sea bottom vegetation, installation and new visitor use would probably cause long-term, localized, and negligible to minor impacts.

The NPS preferred alternative proposes substantial changes in how motorboats access various portions of Florida Bay. Most of the recommendations made by the recent propeller scarring study (NPS 2008d) are incorporated in this alternative. Pole/troll and pole/troll/idle zones would be established on about 127,400 acres throughout the bay (see “NPS Preferred Alternative” maps).

Establishment of substantial pole/troll and pole/troll/idle zones would result in fewer boat groundings and fewer incursions into the shallowest areas, with fewer disturbances to seagrasses, other sea bottom vegetation, and sea bottom sediments. Long Sound would be managed as the boat access no-wake/idle-speed zone, which would reduce damage to seagrasses and shoreline vegetation from boat wakes. The proposed mandatory boater education and permit program would support and accelerate adjustment to these changes in boat access and management. Overall, these changes represent long-term, moderate to major, beneficial impacts on vegetation as degraded habitat recovers and new seagrass damage is greatly reduced.

Much of the north shore of Florida Bay would be designated as idle speed, no-wake, a long-term, localized, minor to moderate benefit on shoreline vegetation from reduced wake-caused erosion.

Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Joe Bay includes the smaller area to the east known as Snag Bay, and the two areas make up roughly 48% of Crocodile Sanctuary. For

simplicity in this plan, the two bays will be referred to collectively as Joe Bay.

Little Madeira Bay and adjacent smaller water bodies would continue to be managed as a special protection zone and serve as a baseline area for long-term ecological monitoring and restoration efforts. This means they would remain closed to public use, so impacts from protection to seagrass and sea bottom sediments from propeller scarring and boat groundings would remain localized, moderate, and beneficial.

Under this alternative, the park would implement an adaptive management approach to resource conservation. Under adaptive management, if monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. Examples include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on vegetation could be short or long term and range from minor to moderate depending on the actions taken.

Overall, short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse, due to revegetation measures. Construction of new and expanded facilities would result in long-term, localized, and negligible to minor, adverse impacts. New programs and changes in motorboat access in Florida Bay would result in long-term, baywide, moderate to major, beneficial impacts.

Cumulative Impacts. As described for the no-action alternative, impacts from other projects and plans would be long term, parkwide, moderate to major, and beneficial. Such projects include (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, (4) restoration activities in areas disturbed by prior land uses, (5) implementing the park’s

fire and invasive nonnative vegetation management plans, and (6) implementing the park's strategic management plan and resource stewardship strategy. The cumulative effect of the NPS preferred alternative combined with other projects and plans outside Florida Bay would be long-term, regional, moderate to major, and beneficial. This alternative would contribute substantially to the total cumulative effects, representing the majority of the beneficial cumulative impacts (in Florida Bay at least).

Conclusion. Short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Construction of new and expanded facilities would result in long-term, localized, and negligible to minor, adverse impacts. New programs and changes in motorboat access in Florida Bay would result in long-term, baywide, moderate, beneficial impacts. Impacts from other projects and plans would be long term, regional, major, and beneficial, particularly plans involving improvements to water quality and restoration of surface water quantities, distribution, and timing. The cumulative effect of the NPS preferred alternative and other projects and plans would be regional, moderate to major, and beneficial.

WILDLIFE

East Everglades Addition

Additional recreational opportunities (e.g., hiking, paddling, and wildlife viewing) for park visitors in the undeveloped areas of the park, such as the East Everglades Addition, would likely increase human presence and activity and sensory-based disruption to wildlife. Animals could flush from human presence or noise, interrupting foraging, mating, or nesting activities, resulting in long-term, negligible, adverse impacts. If alternative transportation for park visitors were achieved, reduced visitor traffic would be anticipated, along with reduced collisions with wildlife on Tamiami Trail and park roads. This action

would result in long-term, minor, beneficial impacts for wildlife in the park.

Commercial airboating would continue to occur within a designated (northern) portion of the frontcountry zone (see "NPS Preferred Alternative" map) in the East Everglades Addition. Private airboating (by eligible individuals) would continue but would be confined to the frontcountry zone on designated routes. Airboat use would continue to disturb or displace wildlife and diminish wildlife habitat, but the area of impact would be reduced by the requirement to stay within the frontcountry zone and the requirement to stay on designated routes within that zone. Impacts on vegetation would be mitigated under low water conditions in the East Everglades Addition to reduce impacts on wildlife habitat. The impacts would be continued, minor and adverse.

Closing certain tree islands to visitor use seasonally or year-round to protect wildlife and/or wildlife habitat would have long-term, local, minor, beneficial impacts on wildlife. Designation of two or three campsites on tree islands could locally increase impacts on wildlife (from increased human activity), but locations of such campsites would be carefully chosen to minimize impacts. Impacts would be localized, long-term, minor, and adverse on birds and other wildlife that use tree islands for forage or reproduction.

Moving NPS operational facilities to a consolidated center outside the Addition would allow restoration of wildlife habitat at the current site. Also, increased ranger patrols in the Addition would improve visitor awareness of the fragility of the Everglades ecosystem, including wildlife, and possibly reduce the incidence of any wildlife harassment, poaching, or other illegal interactions with wildlife. Impacts on wildlife would be long term, local, minor, and beneficial.

Chekika would continue to be open for seasonal day use in which park visitors could access marl prairies and hike or watch wildlife.

Impacts on wildlife (from sensory based disturbance, flushing, etc.) would continue to be localized, negligible to minor, and adverse. Filling and restoring the Chekika ponds would lead to short-term, local, minor, adverse impacts on wildlife directly using the ponds or those in the surrounding area during restoration activities. Alligators, herons, raccoons, etc. would be forced to relocate to suitable habitat when filling of the ponds started, and other species that could not relocate might be lost. Competition among and between species seeking habitat and resources in the surrounding the area might lead to increased predation and loss of habitat for some animals. These short-term, adverse impacts would be negated as vegetation and wildlife reestablish in the area of the backfilled ponds, leading to long-term, local, minor, beneficial impacts on wildlife and habitat.

Headquarters / Pine Island / Royal Palm / Main Park Road

Improved water flow under the Anhinga Trail near Royal Palm would enhance water and habitat availability for fish and other wildlife by restoring more natural hydrology, reducing fragmentation of habitat, and possibly enhancing growth of vegetation. Benefits would be localized, long term, and minor.

The Nike Missile Base site would remain open for visitor interpretation with no to negligible effects on wildlife. Visitors would continue to hike and bicycle on selected trails and fire roads, and impacts on wildlife from these activities would continue to be long term, localized, negligible, and adverse. There would be localized, long-term, minor, beneficial impacts on wildlife if alternative transportation were successfully implemented to the Flamingo area. Depending on the number of visitors using such options, vehicle volume could be reduced, resulting in fewer wildlife / vehicle collisions.

Florida Bay

Preparation and implementation of a detailed boating safety and resource protection plan (to be prepared after the general management plan is approved) would have baywide, long-term, moderate, beneficial impacts on wildlife and wildlife habitat. Increased boater knowledge of designated channels / access routes could reduce widespread noise and habitat disturbance, both above and below the waterline. The mandatory boater education and increased law enforcement presence would also increase boater awareness and compliance, reducing impacts on seagrass habitat and other wildlife resources in the bay. This would have long-term, local, moderate, beneficial impacts on wildlife and habitat throughout the bay.

Under the NPS preferred alternative, establishment of substantial pole/troll and pole/troll/idle zones in Florida Bay would reduce motorboat noise and boat speed in those areas. Establishment of a 300-foot idle speed, no-wake area along the northern shoreline of Florida Bay would help protect estuary habitat and mangroves from noise and motorboat wakes. The slower speeds and lower noise levels associated with these actions would reduce sensory-based disruption of wildlife nesting, roosting, and foraging activities compared to the no-action alternative, a long-term, minor to moderate, beneficial impact.

Under the NPS preferred alternative, a seagrass restoration program would work to restore damage from boat groundings and propeller scarring. Seagrass habitat and associated wildlife (such as sea turtles and crustaceans) would be expected to experience long-term, minor, localized benefits.

Developing a boat launch for carry-in boats along the 18-mile stretch of U.S. 1 would probably lead to increased levels of use in nearby areas (e.g., Long Sound). This action would lead to additional human-wildlife interactions, a long-term, localized, and negligible to minor, adverse impact on

wildlife. However, managing Long Sound as a boat access zone, with no-wake/idle-speeds enforced along shorelines would minimize noise and wake from boats, with long-term, moderate, localized beneficial impacts on wildlife and wildlife habitat. The new trail in the hammock near the Key Largo ranger station or at the Tarpon Basin property would result in localized habitat fragmentation, a localized, negligible, adverse impact. A new canoe launch at Key Largo or Tarpon Basin would probably have negligible, if any, wildlife impacts because there is already human activity associated at these sites.

Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). The impacts on wildlife from managing Little Madeira Bay and adjacent smaller water bodies as a special protection zone (no public access), would continue to have a long-term, localized, minor to moderate, beneficial impact on wildlife and wildlife habitat. Managing Joe Bay as a backcountry (nonmotorized) zone would have localized, long-term, minor, adverse impacts (flushing, sensory-based disturbance, etc.) on wildlife and habitat.

Under the NPS preferred alternative, three new chickees would be constructed in Florida Bay and would be used by boaters and paddlers. Human activity in these local areas would increase—a long-term, localized, minor, adverse impact on wildlife because of sensory-based disruption of wildlife from human presence and activities.

Gulf Coast / Ten Thousand Islands / Everglades City

The implementation of a boater education / permit requirement and increased ranger patrols would increase boaters' knowledge and understanding of park resources. The increased understanding and compliance would result in long-term benefits to wildlife through the public, causing reduced sensory-based disturbance associated with boating,

harassing wildlife, and disturbing shoreline and bottom land habitat used by wildlife.

An upgraded canoe launch and other developments at the Gulf Coast Visitor Center would result in long-term, minor, adverse impacts on wildlife, mostly associated with an increase in human presence and sensory-based impacts on wildlife. Eight chickees in the backcountry areas of the park would result in short-term, local, minor, adverse impacts associated with construction-related noise in undeveloped areas of the Gulf Coast. Additionally, there would be localized, long-term, minor, adverse impacts from the increased presence and activity of humans in the backcountry areas.

Establishing the Everglades Paddling Trail would have long-term, local, minor, beneficial impacts on wildlife in the few segments zoned backcountry (paddle only) because motorboat-related noise, wakes, and other habitat disturbance would be greatly reduced. Near Gopher Creek, long-term, localized, minor to moderate, adverse impacts on wildlife from motorboating and paddling would continue. Impacts on wildlife would continue to be minor in the easternmost segment, which would remain managed as idle speed, no wake.

Tamiami Trail / Shark Valley

If achieved, seasonal alternative transportation from Miami to national park destinations along Tamiami Trail, such as Shark Valley, could reduce visitor-related traffic and lead to reduced wildlife-vehicle collisions, which would have long-term, minor, beneficial impacts on wildlife crossing roads. The expanded evening activities at Shark Valley might increase the presence of and noise generated by park visitors in the evening hours, which might disturb wildlife activities at night in the areas near the Shark Valley visitor contact station. Impacts on wildlife from increased evening activities would be expected to be long term, local, negligible to minor, and adverse.

Relocating and centralizing operational activities to a new (previously disturbed) location such as Gator Park would allow restoration of wildlife habitat at the current operational sites but increase the level of activity at the new site. Impacts associated with construction would be short term and minor. Over the longer term, the increased human presence at the new (disturbed) site would have minor adverse impacts on wildlife.

Under this alternative, increased ranger patrols near Shark Valley and Tamiami Trail would increase visitor awareness of the fragility of the Everglades ecosystem. The presence of officers would presumably lead to reduced illegal wildlife feedings, harassment, and other direct human interactions with wildlife. The impacts on wildlife would be long term, negligible to minor, and beneficial.

Adaptive Management. Under this alternative, the park would implement an adaptive management approach to resource conservation. If monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. These actions could include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on wildlife could be short or long term and range from negligible to minor, depending on the actions taken. If necessary, such actions would be subject to additional NEPA planning and compliance.

Overall, implementing the NPS preferred alternative would have impacts that are short and long term, moderate, and adverse and impacts that are short and long term, minor, and beneficial.

Cumulative Impacts. The impacts of other past, present, and anticipated projects on wildlife and habitats, through habitat restoration and enhancement, would be as described for the no-action alternative: long term, minor to moderate, and beneficial. Such projects/plans include the Modified Water

Deliveries project and the Tamiami Trail modification projects, several individual elements of the *Comprehensive Everglades Restoration Plan*, restoration of previously disturbed areas, and reduction of invasive nonnative plants and animals. The impacts from the NPS preferred alternative would be short and long term, negligible to moderate, and adverse due to sensory-based disturbance and other effects of visitors use, and short and long term, minor to moderate, and beneficial due to improved management of visitor use throughout the park. The cumulative impacts of other actions combined with the impacts of the NPS preferred alternative would be long term, minor to moderate, and beneficial. This alternative would have a small contribution to the total cumulative impacts.

Conclusion. The NPS preferred alternative would have short- and long-term, moderate, adverse impacts, and short- and long-term, minor to moderate, beneficial impacts. The cumulative impacts of the NPS preferred alternative, combined with other past, present, and reasonably foreseeable actions, would be long term, minor to moderate, and beneficial.

FISHERIES

Freshwater Fishes

Adverse impacts to freshwater fishes under the NPS preferred alternative would be short-term, localized, and negligible. These impacts result from projects that may disrupt local aquatic habitat or local water quality during construction (e.g., those that would create turbidity). An example of these projects would be the addition of visitor turnouts along Tamiami Trail. There would be no notable changes in overall visitor access to and operation of watercraft in freshwater areas. The process of filling in existing borrow pits at Chekika would have short-term, localized, minor, and adverse impacts because fish would either be directly killed or would be consumed by other predators. These adverse impacts would be offset by creation of more natural habitat and elimination of habitat used

by invasive nonnative species. Installation of additional culverts under the Anhinga trail would have long-term, localized, negligible impacts on freshwater fish because of improved hydrologic connectivity and water flow.

Estuarine and Marine Fishes

As described in the following paragraphs, impacts on estuarine and marine fishes would arise from construction projects, and changes in visitor use of motorboats and changes in access to marine waters.

Under the NPS preferred alternative, construction projects include installation of three additional backcountry camping chickees in Florida Bay and eight additional chickees along the Wilderness Waterway on the Gulf Coast. Disturbance during installation would be short term, localized, minor, and adverse. Increased use of the areas of the new chickees would result in long-term, localized, and negligible to minor, adverse impacts.

Additional access for carry-in boats would be provided by a new boat access point at Long Sound (along the 18-mile stretch of U.S. 1) in Florida Bay. Impacts from increased visitor access in the area would be long term, localized, negligible to minor, and adverse. Impacts at Long Sound would be offset by its management as a boat access zone, with no-wake/idle-speed enforced along shorelines. This enforcement would represent consistent resource protection, a long-term, localized, and minor benefit. Joe Bay and adjacent smaller water bodies would be managed as a backcountry zone (paddle only) with catch and release only fishing allowed. This would be a change from the no-action alternative, with both areas closed to public access. Therefore, this change would create some fishing pressure where there has been none for more than 20 years. Impacts would be long term, localized, minor to moderate, and adverse.

The new Gulf Coast Visitor Center would slightly increase visitor use of that area. Those impacts would be assumed to be long term, localized, negligible to minor, and adverse. Impacts during construction would be short term, localized, minor, and adverse. An Everglades Paddling Trail would be established under this alternative, and a few segments would be zoned seasonally as backcountry (paddle only). Impacts from decreased fishing pressure in these segments would be long term, localized, negligible to minor, and beneficial.

The NPS preferred alternative proposes changes in management of boats within Florida Bay. Most of the recommendations of the recent propeller scarring study (NPS 2008c) are incorporated into the NPS preferred alternative. Substantial pole/troll and pole/troll/idle zones would be established in Florida Bay, and much of the north shore of Florida Bay would be designated as idle speed, no-wake. The impacts of these changes are judged to be long term, baywide, and beneficial because of improved habitat. However, the intensity of these effects is not known at this time. The impact of these changes in boater access on fishing pressure would also be uncertain.

The proposed education/permit requirement for boaters would support and perhaps accelerate adjustment to the new Florida Bay operating environment. In the long run, the program would also likely decrease accidental groundings and inappropriate uses by boaters less familiar with the bay. As degraded seagrass habitat begins to recover because of less intensive use (e.g., pole/troll propulsion compared to full use of gasoline powered engines), impacts to fish would be long term, moderate, and beneficial. The comprehensive seagrass restoration program would help seagrass beds recover from past impacts.

Adaptive Management. Under the NPS preferred alternative, the park would implement an adaptive management approach to resource conservation. Under adaptive management, if monitoring reveals that

desired resource conditions are not being achieved, corrective actions would be implemented. These actions could include increased visitor education, access restrictions, area closure to allow for natural recovery, or area closure with active restoration. The potential benefits of these actions on fish and fish habitat could be short or long term and range from negligible to minor, depending on the actions taken. If necessary, such actions would be subject to additional NEPA planning and compliance.

Overall, under the NPS preferred alternative, most adverse impacts on fish and fish habitat would be short and long term, localized, and negligible to minor, mostly from continued visitor activities and during construction.

Cumulative Impacts. As described under the no-action alternative, impacts from past, present, and reasonably foreseeable actions would be long-term, parkwide, minor, and adverse overall, with the bulk of adverse effects resulting from ongoing fishing. In addition to the negligible to minor adverse effects from construction activities, the NPS preferred alternative would also have long-term, minor to moderate beneficial effects on the fisheries. Overall cumulative effects would be long term, parkwide, minor, and beneficial. The contribution of the NPS preferred alternative to this cumulative effect would constitute a substantial portion of these beneficial impacts.

Conclusion. Under the NPS preferred alternative, most adverse impacts on fish and fish habitat would be short and long term, localized, and negligible to minor, mostly from continued visitor activities and during construction. Additionally, there would be long-term, moderate beneficial impacts on the fisheries because of increased refuge (reduced fishing pressure), more informed/responsible behavior by boaters, and recovery and restoration of damaged seagrass beds resulting from the establishment of pole/troll and pole/troll/idle zones. Impacts from past, present, and reasonably foreseeable actions would be long term, parkwide, minor, and

adverse overall, with the bulk of adverse effects resulting from ongoing fishing. The overall cumulative impacts of the NPS preferred alternative, combined with other past, present, and reasonably foreseeable actions by others, would be long term, parkwide, minor, and beneficial.

Essential Fish Habitat

Under the NPS preferred alternative, implementation of pole/troll and pole/troll/idle zones, the boater education/permit program, extensive idle and slow-speed corridors, and seagrass restoration projects would result in substantial improvements to the health and functioning of benthic habitat. Existing adverse impacts on essential fish habitat in estuarine and benthic substrates (mud, sand, shell, and rock), associated biological communities (including submerged vegetation such as seagrasses and algae, marshes and mangroves, and oyster shell reefs/banks) from boat groundings and propeller scarring would be reduced by protection of shallow water areas. Implementing the NPS preferred alternative would result in long-term, moderate, beneficial impacts on shallow-water habitats.

Cumulative Impacts. Ongoing park efforts to remove invasive nonnative vegetation and conduct passive and active restoration of infested mangrove habitats would improve essential fish habitat, resulting in an overall, long-term, and minor to moderate, benefit. Seeding, planting, and/or use of soil amendments to actively restore treated areas within the park would have short-term, negligible to minor; adverse effects on essential fish habitats from the transport of sediments or nutrients that affect water quality. Nonnative vegetation treatments and large-scale restoration actions in Everglades National Park that occur adjacent to areas of essential fish habitat could result in the transport of sediments that would temporarily degrade the water quality and the habitat. With implementation of mitigation measures, the short-term effects would be negligible to

minor. Overall cumulative effects would be short- and long-term, minor, adverse and beneficial impacts to essential fish habitat. The NPS preferred alternative would constitute the majority of the beneficial cumulative impacts.

Conclusion. Implementing the NPS preferred alternative would result in long-term, moderate, beneficial impacts on shallow-water habitats. Other sections in this chapter include more details on specific effects on resources. As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be no adverse effects on essential fish habitat under the NPS preferred alternative.

FEDERAL SPECIAL STATUS SPECIES

Florida Panther

The NPS preferred alternative would constrain private airboat use to designated routes in the frontcountry zone within the East Everglades Addition. Commercial airboat touring would continue on limited, designated routes. Thus, over the long term, Florida panthers and their habitat in this area would be less disturbed by airboat activity than under the no-action alternative (current management). This would have benefits for Florida panthers in the park. Visitor access to tree islands for camping and other recreational purposes would continue to locally diminish the attractiveness of habitat to panthers; however, seasonal or year-round closures of certain tree islands or areas for resource protection reasons would provide short- or long-term, localized benefits on panther habitat. Increased visitor use of frontcountry areas would have no detectable effects on panther populations compared to the no-action alternative because panthers would likely continue to avoid areas where high levels of human activities were occurring. Actions under the NPS preferred alternative would constitute a *may affect, not likely to*

adversely affect finding under section 7 of the Endangered Species Act.

Overall, impacts on panthers from implementing the NPS preferred alternative would be short and long term, minor, and beneficial and adverse.

Cumulative Impacts. Regional impacts on Florida panther populations would be the same as described under the no-action alternative—threats to Florida panthers are their health problems, mostly related to poor habitat conditions, genetic defects from inbreeding, and continuing loss of habitat. Protection efforts by the National Park Service and U.S. Fish and Wildlife Service (area wildlife refuges) and state conservation efforts have resulted in an increase in the panther population, which provides long-term benefits to the panther's population. However, continued habitat fragmentation and loss outside these areas and increasing vehicle traffic resulting in increasing panther deaths (collisions with vehicles continue to be a leading cause of panther mortality) would continue to limit these benefits. Impacts on panthers from implementing the NPS preferred alternative would be short and long term, minor, and beneficial and adverse. When combined with the adverse and beneficial effects of other actions, the overall cumulative effects on Florida panthers would be moderate and adverse. The NPS preferred alternative's contribution to this cumulative effect would be small.

Conclusion. The NPS preferred alternative would have long-term, minor benefits on panthers, primarily as a result of constraining private airboat use to designated routes within the frontcountry zone in the East Everglades Addition. Continued visitor activities in habitat used by panthers have discountable short-term effects on panther habitat and foraging behavior; however, this impact would not rise to the level of a measurable effect. Activities implemented under the NPS preferred alternative would constitute a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species

Act. Cumulative effects would be moderate and adverse.

Key Largo Woodrat and Key Largo Cotton Mouse

Under the NPS preferred alternative, a paddle launch and interpretive trail would be developed for park visitors to access Florida Bay and Tarpon Basin. The new trail in the hardwood hammocks near the Key Largo ranger station or at the Tarpon Basin property would disturb at most a very small area of hardwood hammock habitat. The number of visitors in the area is not expected to greatly increase, and because foliage in the hardwood hammock is dense, park visitors would not be expected to disturb habitat away from the trail. Since Key Largo woodrat populations would be sensitive to any loss in habitat, special attention would be paid to even small habitat losses. Conservation measures would be implemented as appropriate, and impacts on the woodrat, cotton mice, or their habitats from the paddle launch, trail, and related visitor activity would be negligible and insignificant or discountable, resulting in a *may affect, not likely to adversely affect* finding.

Cumulative Impacts. Widespread effects on the woodrat and cotton mouse would be as described in the no-action alternative. These species would continue to be threatened by habitat degradation caused by development, pollution, and human intrusion in the hardwood hammock habitat throughout Key Largo. The negligible effects of the NPS preferred alternative actions, combined with the adverse effects of other actions that occur at the regional level, would result in moderate adverse cumulative effects on the Key Largo woodrat and Key Largo cotton mouse. The NPS preferred alternative would contribute very slightly to the overall cumulative effects.

Conclusion. Overall, the NPS preferred alternative would have negligible adverse effects on the woodrat and cotton mouse. This would result in a *may affect, not likely to adversely affect* finding for the woodrat and

cotton mouse under section 7 of the Endangered Species Act. Cumulative effects would be moderate and adverse.

Manatee

The manatee would benefit from the NPS preferred alternative through implementation of large pole/troll and pole/troll/idle zones in Florida Bay, the parkwide boater education/permit system, implementation of a detailed boating safety and resource protection plan that would include measures to help protect manatees, and increased law enforcement patrols. Active seagrass restoration would improve forage areas damaged by propeller scarring and boat groundings. Slower speeds and designated routes in the bay would likely reduce boat impacts with manatees, reduce the incidence of injury and death, decrease underwater noise generated by motorboats, and improve conditions in designated critical habitat. Considering the area involved and manatee habitat, these changes would have moderate benefits to manatees and critical habitat for manatees and critical habitat for manatees.

Managing Long Sound as a boat access zone, with no-wake and idle-speed enforced along the shorelines would mitigate motorboat traffic effects and benefit manatee critical habitat. Joe Bay would be reopened for paddling use only (and managed as a backcountry zone). Little Madeira Bay would be a special protection zone and would only be open for research-related activities. The conditions in the special protection zone and backcountry zone would have localized, long-term benefits for manatee critical habitat.

Designating a few segments of the newly established Everglades Paddling Trail as seasonal backcountry (nonmotorized) zones would reduce the risk of injury or death to manatees.

Additional put-in locations for nonmotorized boats in Long Sound, Gulf Coast, and possibly in other locations (assuming this can be

accomplished), and the installation of new chickees could lead to increased use, particularly in certain areas. Actions taken under the NPS preferred alternative would reduce the potential for manatees to experience boat strikes and other human disturbances in most areas of the park waters but might increase those risks in other areas. Considering these changes, manatees would still be at risk from direct boat strikes and habitat degradation.

Overall, the NPS preferred alternative would have long-term moderate benefits and continuing minor adverse effects on the manatee and its critical habitat. This would result in a *may affect, not likely to adversely affect* finding for both the manatee and critical habitat for manatees under section 7 of the Endangered Species Act.

Cumulative Impacts. Regional impacts on the manatee from past hunting and poaching, from injuries from boats and their propellers, from injuries in water control structures, from habitat loss, from salinity changes, and from water quality changes would be the same as described under the no-action alternative—widespread and long-term adverse impacts. The minor adverse effects and the beneficial effects of the NPS preferred alternative actions, combined with the adverse effects of other actions that occur at the regional level, would result in moderate adverse effects on the manatee on a cumulative basis. The NPS preferred alternative would make a modest beneficial contribution to these cumulative effects.

Conclusion. Motorboat activity and visitor access in the park's marine waters would result in continued, long-term, minor, adverse effects on the manatee and manatee critical habitat from boat and propeller strikes and habitat degradation. Changes to the management of recreational boating in Florida Bay (more pole/troll and pole/troll/idle zones, restricted motorboat access in places, etc.), combined with a boater safety and resource protection plan, improved boater education, increased on-the-water law enforcement, and

seagrass restoration, would result in reduced boat strikes, decreased underwater noise from motorboats, improved habitat, and moderate benefits to both the manatee population and designated critical habitat. This would constitute a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for the manatee and critical habitat for manatee. Cumulative effects would be widespread and long term, moderate, and adverse.

Bottlenose Dolphin

Under the NPS preferred alternative, bottlenose dolphins would benefit from the establishment of pole/troll and pole/troll/idle zones in Florida Bay, the parkwide boater education and permit system, implementation of a detailed boating safety and resource protection plan, and increased law enforcement. Reduced boater speeds and designated routes in the bay would reduce human interactions with dolphins and improve conditions for seagrass habitat, which would benefit the dolphins and their food sources in the bay, particularly in the central Florida Bay (Torres et al. 2007). These actions would also decrease underwater noise generated by motorboats. These changes would result in long-term benefits to dolphins using Florida Bay and Ten Thousand Islands.

Managing Long Sound as a boat access zone, with idle and slow-speed enforced along shorelines, would mitigate motorboat traffic and benefit dolphins by reducing underwater noise and impacts on their food source. Joe Bay would be reopened for paddling use only (and managed as a backcountry zone). Little Madeira Bay would be a special protection zone and would only be open to research-related activities. These conditions would result in localized long-term benefits.

Additional put-in locations for nonmotorized boats in Long Sound, Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees would increase boater traffic and

visitation near these locations. Damage to seagrass habitat and mud flats would be reduced from the pole/troll pole/troll/idle zones and idle and slow-speed corridors in the bay.

Overall, actions taken under the NPS preferred alternative would reduce the potential for adverse effects on bottlenose dolphins, providing long-term benefits. This would result in a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act.

Cumulative Impacts. Widespread cumulative impacts on bottlenose dolphins would be as described for the no-action alternative. The population of the bottlenose dolphins is considered depleted and continues to be threatened by commercial fishing, incidental injury and mortality from fishing gear, and habitat destruction. These threats are global in nature and represent both direct injury to and mortality of bottlenose dolphins. Overall, the cumulative effects of all actions would be minor to moderate and adverse. The contribution of the NPS preferred alternative to these effects would be modest and beneficial.

Conclusion. The NPS preferred alternative would reduce impacts on the bottlenose dolphin, their food sources, and their habitats, producing long-term, minor beneficial impacts—a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. Cumulative effects would be moderate and adverse.

Wood Stork

Within the East Everglades Addition, reduced disturbance from constraining airboats to designated routes within the frontcountry zone would provide a long-term benefit to wood storks and might support expansion of the wood stork colonies. Any adverse effects from continued motorized and nonmotorized boat access and visitor activities in densely wooded mangrove areas, such as along the

Wilderness Waterway and near Florida Bay, would be minor. The 300-foot idle speed, no-wake area on the northern shoreline of Florida Bay and pole/troll and pole/troll/idle zones would reduce noise and boat wake disturbance to foraging storks in the area, resulting in localized, long-term benefits. The eight additional chickees in the Gulf Coast / Ten Thousand Islands area would be located to avoid known nesting or foraging areas. Restoration of water flow under the Anhinga Trail near Royal Palm would enhance water and habitat availability for fish and would increase foraging habitat for the wood stork. Although wood stork activity in this area is very limited, enhancing habitat and foraging conditions might attract additional wood stork use.

Actions taken under the NPS preferred alternative would result in localized, long-term, minor benefits to wood storks and would constitute a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act.

Cumulative Impacts. The regional benefits on wood stork populations would be the same as described for the no-action alternative—long term, moderate, and beneficial. According to the U.S. Fish and Wildlife Service, the wood stork is increasing and expanding its range and appears to have adapted to some degree to changes in habitat in south Florida; nesting has increased since its listing as an endangered species (USFWS 2007c). Although colonies are declining in size, the overall number of colonies is increasing, and the U.S. Fish and Wildlife Service is considering changing the status of the species from endangered to threatened to recognize regional benefits that have accrued for the species through protection and adaptation. The minor benefits of the NPS preferred alternative would support and contribute to the other beneficial actions resulting in a moderate beneficial cumulative effect.

Conclusion. The NPS preferred alternative would have localized, long-term, minor beneficial effects on wood storks from

reduced potential for human disturbance. This would constitute a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. The cumulative effect would be moderate and beneficial.

Piping Plover, Roseate Tern, and Red Knot

Under the NPS preferred alternative, piping plovers, roseate terns, and red knots would benefit from establishment of pole/troll and pole/troll/idle zones and idle and slow-speed corridors that would be implemented along the shoreline of Florida Bay and near the Florida Bay keys. Long Sound would be in the boat access zone, with idle and slow-speed enforced along shorelines. Any disturbance to these species from noise and human activity in estuary habitats and keys would be reduced as a result of these actions. This reduced disturbance would be localized, moderate, and beneficial. The impacts on piping plover, roseate terns, and red knots in Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) from management as a special protection zone (Madeira Bay) and backcountry zone (Joe Bay) would be localized, minor, and beneficial. The no-wake, pole/troll, and pole/troll/idle zones in the NPS preferred alternative would also have moderate beneficial effects to designated piping plover critical habitat through reduced impacts to natural processes that affect shoreline development such as boat wakes and propeller damage to mud banks and seagrass beds and reduced human disturbance.

Overall, this alternative would result in localized minor to moderate benefits to these species and would constitute a *may affect, not likely to adversely affect* finding for the piping plover and roseate tern under section 7 of the Endangered Species Act, and a *may affect, not likely to adversely affect* determination for piping plover critical habitat.

Cumulative Impacts. The piping plover, roseate tern, and red knot continue to be

threatened across their ranges by coastal habitat loss from development, predation, poor water quality, and unnatural water delivery and salinity. These threats have resulted in widespread and long-term, moderate, adverse effects on populations despite the habitat protection provided by Everglades National Park. The minor to moderate beneficial effects of the NPS preferred alternative actions, combined with the moderate adverse effects of other actions that occur at the regional level, would result in moderate adverse cumulative impacts on the piping plover, roseate tern, red knot, and piping plover wintering critical habitat. The NPS preferred alternative would make a slight beneficial contribution to these cumulative effects.

Conclusion. Overall, the NPS preferred alternative would benefit the piping plover, roseate tern, red knot, and piping plover critical habitat with limited, localized, minor to moderate benefits compared to continued current management. This would result in a *may affect, not likely to adversely affect* finding for the piping plover, roseate tern, red knot, and piping plover critical habitat under section 7 of the Endangered Species Act. Cumulative effects would be moderate and adverse.

Everglade Snail Kite

Under NPS preferred alternative, ongoing airboating (private, commercial, and administrative/research) is the main human use with potential to affect snail kites in the East Everglades Addition. Under the NPS preferred alternative, the Everglade snail kite would likely benefit from the reduced area within which private and commercial airboats would run (designated routes in the frontcountry zone) in the East Everglades Addition. These measures would reduce noise and activity, providing localized, long-term benefits for the snail kite in the park. Designating certain tree islands for recreation and establishing campsites in the East Everglades Addition would probably not

adversely affect snail kites because known snail kite habitat would be avoided. Ground-disturbing activities, such as those along the Anhinga Trail and around the Gulf Coast Visitor Center, would not be in the snail kite's preferred habitat and therefore no effects would be likely. In addition to habitat loss, the lack of recruitment of new breeders into the population and the lack of fledging success have negative effects on the Everglade snail kite population. Overall, the NPS preferred alternative would be expected to have long-term, minor, adverse and beneficial impacts that are insignificant or discountable. This would lead to a *may affect, but not likely to adversely affect* determination for the Everglade snail kite under section 7 of the Endangered Species Act.

Additionally, because designated critical habitat for the Everglade snail kite lies outside East Everglades, there are no proposed actions in the NPS preferred alternative that will affect designated critical habitat. This would be a *no effect* determination for the Everglade snail kite under section 7 of the Endangered Species Act.

Cumulative Impacts. The decline in the Everglade snail kite populations is linked to alterations in hydrology that affect snail kite habitat and its primary food source. These regional impacts on the snail kite would continue to have long-term, moderate, adverse impacts on its population. The NPS preferred alternative overall would have localized, minor, adverse and beneficial impacts on the snail kite as a result of changes in recreational use (especially airboat use) in the East Everglades Addition. Overall, cumulative effects would be moderate and adverse, with no detectable contribution from the NPS preferred alternative.

Conclusion. Overall, the NPS preferred alternative would have minor adverse and beneficial impacts on the Everglade snail kite, but the adverse impacts would not rise to the level of a measurable impact. This would result in a *may affect, not likely to adversely affect* finding for the Everglade snail kite

under section 7 of the Endangered Species Act. Cumulative effects would be moderate and adverse.

Eastern Indigo Snake

Within the East Everglades Addition, reduced disturbance from constraining private airboats to designated routes within the frontcountry zone would increase habitat protection for the eastern indigo snake by reducing the exposure of snakes to motorized visitor activities. This would provide localized long-term benefits. Continued intermittent use of tree islands in the East Everglades Addition could temporarily displace snakes or disturb their activities, resulting in short-term effects. Ground-disturbing activities, such as those that would occur along the Anhinga Trail and around the Gulf Coast Visitor Center, would not be in the snake's preferred habitat, and therefore would have discountable effects on the eastern indigo snake. Designation of campsites on tree islands in the East Everglades Addition could disturb burrowing snakes if small-scale excavation is required. However, the park would implement their standard eastern indigo snake protection and education plan for all construction personnel to follow in compliance with the park's conservation and protection plan for the snake. With implementation of conservation measures, these activities under the NPS preferred alternative *may affect, but are not likely to adversely affect*, the eastern indigo snake.

Overall, the NPS preferred alternative would have localized, long-term, minor beneficial effects on eastern indigo snake populations primarily as a result of changes in private airboat use in the East Everglades Addition. Continued visitor activities in habitat used by the eastern indigo snake and proposed construction activities would have negligible, short-term, minor, adverse effects.

Cumulative Impacts. Widespread cumulative impacts on eastern indigo snake populations would be the same as described for the no-

action alternative—long-term, major, and adverse. The decline in eastern indigo snake populations is attributed to loss of habitat to agriculture and to collecting for the pet trade. The species has also suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection. These regional effects on the snake would continue to have long-term, major, adverse impacts on eastern indigo snakes. The NPS preferred alternative overall would provide a localized and long-term minor benefit for snake populations, primarily as a result of changes in private airboat use in the East Everglades Addition. The benefits to the snake by implementing the NPS preferred alternative, combined with the long-term, major, adverse effects of past, present, and reasonably foreseeable actions by others, would have widespread, long-term, and moderate adverse cumulative impacts on the eastern indigo snake population. The NPS preferred alternative would contribute a modest beneficial and a small adverse increment to these cumulative effects on this species.

Conclusion. The NPS preferred alternative would have long-term, minor, beneficial effects on the eastern indigo snake populations, primarily as a result of changes in private airboat use in the East Everglades Addition. Continued visitor activities in habitat used by the eastern indigo snake and proposed construction activities would have short-term, minor, adverse effects. Activities implemented under the NPS preferred alternative would constitute a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. Cumulative impacts would be moderate and adverse.

American Alligator

Within the East Everglades Addition, constraining private airboats to designated routes within the frontcountry zone would result in localized long-term benefits from reducing noise and activity in some areas. Facility upgrades and new shade structures at Shark Valley would occur within the existing

developed footprint. New ground-disturbing activities would include modifications to Anhinga Trail to improve water flow and construction of a new administrative facility outside the park near the East Everglades Addition. Resident alligators would likely leave the vicinity during construction at each of these sites, but they would otherwise not be harmed and would return once construction is completed. No additional impacts would be anticipated from establishment of the Everglades Paddling Trail and installation of eight additional chickees in the Gulf Coast / Ten Thousand Islands area.

Under the NPS preferred alternative, individual American alligators would be better protected as a result of improved habitat protection and increased ranger patrols (a long-term minor benefit), but would continue to be at some risk from human activities, a long-term minor adverse effect. Any adverse effects would be insignificant, resulting in a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act.

Cumulative Impacts. Although the alligator once existed in far greater numbers in the Everglades, the alligator population has recovered nicely (a long-term benefit), and it is no longer classified as an endangered species. However, degradation of and development in alligator habitat outside the park continues to cause concern for the long-term well-being of the species. Impacts of the NPS preferred alternative, combined with the long-term adverse and beneficial effects of past, present, and reasonably foreseeable actions by others, would have minor adverse and beneficial cumulative impacts on American alligators. The NPS preferred alternative would contribute a small measurable amount to the recovery of this species by protecting habitat from development and degradation, and a small adverse increment to the cumulative impacts.

Conclusion. Overall, the NPS preferred alternative actions would improve protection of American alligators and their habitat.

Visitor and management activities in alligator habitat under the NPS preferred alternative would have short- and long-term minor adverse effects that would constitute a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. There would be minor adverse and beneficial cumulative impacts on American alligators.

American Crocodile

The American crocodile would potentially benefit from the NPS preferred alternative through implementation of pole/troll and pole/troll/idle zones and the 300-foot shoreline idle speed, no-wake designation in Florida Bay, the parkwide boater education/permit requirement, and increased law enforcement. Slower speeds in estuaries and along the coastline would reduce disturbance in designated critical habitat and possibly boat strikes with crocodiles. These changes could result in long-term minor benefits.

Managing Long Sound as a boat access zone, with idle and slow-speed enforced along shorelines, would mitigate motorboat traffic and potentially benefit American crocodiles. Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Little Madeira Bay would be a special protection zone and would be open only to permitted research-related activities, continuing to provide a long-term benefit to this species and habitat. Crocodiles inhabiting Joe Bay would likely experience some disturbance from boating activity, but any impacts would probably be negligible to minor because the boats (paddle craft) would be traveling at slow speeds.

Additional put-in locations for nonmotorized boats in Long Sound, Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees would distribute visitor use and increase boat use in some areas. This would likely result in a minimal increase in human

presence in crocodile habitat and cause a long-term, negligible, adverse effect.

Actions taken under the NPS preferred alternative could increase human use slightly in some areas, but would also reduce the potential for impacts on crocodiles and their designated critical habitat. Any adverse impacts would be insignificant, resulting in a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for both the American crocodile and designated critical habitat for American crocodile.

Cumulative Impacts. Predation, degraded hydrologic conditions, and habitat loss are the most important factors influencing the status of crocodiles in the park and south Florida. Hatchlings have a high mortality rate and are preyed upon by other wildlife including raccoons, birds, and crabs. Alteration of salinity and water levels in Florida Bay resulting from extensive engineering of drainage systems throughout south Florida also are a factor. Crocodile nests that are too wet or too dry result in egg mortality. Suitable year-round crocodile habitat was also lost during development of the upper Florida Keys.

Although the worldwide population of American crocodile is federally listed as endangered, the status of the Florida population has been changed to threatened because of a recent sustained increase in numbers. The nesting population continues to slowly increase since effective protection of wildlife and nesting habitat was established. Within Everglades National Park, crocodiles have access to relatively undisturbed habitat, which has allowed their population to increase locally, a parkwide moderate benefit.

The effects of the NPS preferred alternative, combined with the effects of other actions that occur at the regional level would result in a minor beneficial cumulative effect on American crocodiles and designated critical habitat for the American crocodile. The NPS preferred alternative would make a small

positive contribution to the beneficial cumulative effects.

Conclusion. Under the NPS preferred alternative the park would continue to protect American crocodiles and their habitat and would reduce the likelihood of human-related disturbance in crocodile habitat. Any adverse minor impacts would be insignificant, resulting in a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for the American crocodile and designated critical habitat for the American crocodile. Cumulative effects would be minor and beneficial.

Sea Turtles

Sea turtles would benefit from the NPS preferred alternative through establishment of pole/troll and pole/troll/idle zones in Florida Bay, the parkwide boater education and permit system, implementation of a detailed boating safety and resource protection plan, and increased ranger patrols. Slower speeds and use of designated routes in the bay would reduce the risk of boat strikes and improve conditions in seagrass habitat; in addition, active seagrass restoration would be implemented. These changes would result in long-term benefits to sea turtles using Florida Bay.

Managing Long Sound as a boat access zone, with idle and slow-speed enforced along shorelines, would mitigate motorboat traffic and benefit sea turtles. Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). Little Madeira Bay would be managed as a special protection zone and would remain closed to public use. These conditions would result in localized, long-term benefits.

Additional put-in locations for nonmotorized boats in Long Sound, Gulf Coast, and possibly in other locations (assuming this can be accomplished) along with installation of new chickees would increase boat access and

visitation to near these locations, but any effects on sea turtles would be discountable.

However, direct effects on sea turtles could include incidental catches by recreational anglers using hook-and-line methods that could lead to injury and, in some instances, eventual death. These impacts are expected to be long term, adverse, and moderate.

Other potential adverse impacts include the temporary inability of the species to use areas for forage and shelter that are undergoing construction activities due to avoidance of related noise and physical exclusion from areas blocked by turbidity curtains. However, through consultation with the National Marine Fisheries Service and U.S. Fish and Wildlife Service, it was determined these effects would be insignificant because of the small footprint, short construction times, and turbidity controls of the proposed projects. Additionally, the noise associated with pile-driving were also determined by the NMFS to have an insignificant effect on sea turtles.

Overall, through consultations with the National Marine Fisheries Service, it was jointly determined that actions taken under the NPS preferred alternative would reduce the potential for adverse effects on sea turtles, but could still result in incidental take. These impacts would be long term, moderate, and adverse, resulting in a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act. However, with implementation of the agreed-upon mitigation measures, this impact would be minimized to the extent possible, and the National Marine Fisheries Service determined that the National Park Service preferred alternative was not likely to jeopardize the continued existence of sea turtles.

Many of the ongoing minor adverse effects to proposed loggerhead sea turtle critical habitat resulting from boating and recreational use would continue. The proposed no-wake zone along lower Cape Sable would provide beneficial effects to the portion of the proposed critical habitat on Cape Sable south

of Middle Cape. In addition, a boater education program and boating resource protection planning would result in minor beneficial effects throughout both NOAA and USFWS proposed loggerhead critical habitat.

Cumulative Impacts. Sea turtles are threatened by commercial fishing and habitat destruction. These threats are global in nature and result in both direct injury to and mortality of turtles and loss of nesting habitat due to shoreline development (e.g., coastal runoff, marina and dock construction, dredging, aqua culture, oil and gas exploration and extraction, increased underwater noise, and boat traffic). These activities combine to produce long-term, moderate to major, adverse effects on sea turtle populations. The moderate, adverse and moderate, beneficial impacts of the NPS preferred alternative, combined with the impacts of other actions, would result in moderate, adverse, cumulative effects on sea turtles and their habitat. However, both beneficial and adverse impacts under the NPS preferred alternative would be a modest contribution to these larger cumulative effects.

Conclusion. The NPS preferred alternative would reduce impacts to sea turtles and their habitats, resulting in long-term, minor benefits, as well as continued moderate adverse impacts through the potential for incidental take, resulting from hook-and-line fishing. It was determined through consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that these impacts represent a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act. This alternative would reduce impacts to proposed loggerhead sea turtle critical habitat, resulting in minor benefits and a *may affect, not likely to adversely affect* determination for proposed critical habitat. Overall, cumulative effects would be adverse and moderate.

Smalltooth Sawfish

Implementing the boater education/permit system, the boating safety and resource protection plan, and increased ranger patrols would add to boater knowledge and understanding of park resources, including sawfish and sawfish habitat. The NPS preferred alternative would also implement pole/troll and pole/troll/idle zones and additional idle speed, no-wake designations in Florida Bay, slowing motorboats and further reducing the risk of injury to sawfish.

However, smalltooth sawfish may be adversely affected by recreational fishing activity within the park through incidental hooking, entanglement, or digestion of actively fished or discarded fishing line.

Other potential adverse impacts include the temporary inability of the species to use areas for forage and shelter habitat that are undergoing construction activities due to avoidance of construction-related noise, and physical exclusion from areas blocked by turbidity curtains. However, through consultation with the National Marine Fisheries Service and U.S. Fish and Wildlife Service, it was determined these effects would be insignificant, given the small footprint, short construction times, and turbidity controls of the proposed projects. Additionally, the noise associated with pile-driving was determined by the National Marine Fisheries Service to have an insignificant effect on smalltooth sawfish.

Overall, through consultation with the National Marine Fisheries Service, it was jointly determined that the actions taken under the NPS preferred alternative would result in both long-term, minor, beneficial and long-term, moderate adverse impacts to the smalltooth sawfish. However, with implementation of the agreed upon mitigation measures, this impact would be minimized to the extent possible, and the National Marine Fisheries Service determined that the NPS preferred alternative was not likely to

jeopardize the continued existence of smalltooth sawfish.

The actions described in the NPS preferred alternative would result in minor, beneficial impacts for designated critical habitat for the smalltooth sawfish.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch and habitat loss and degradation, including poor water quality and altered water delivery and salinity (NMFS 2006). These widespread threats have resulted in a reduced species distribution and reduced population levels. The beneficial and adverse effects of the NPS preferred alternative, combined with the adverse impacts of other actions that occur at the regional level, would result in moderate adverse cumulative impacts on the smalltooth sawfish.

Conclusion. The NPS preferred alternative would result in both long-term, minor, beneficial and long-term, moderate, adverse effects to the smalltooth sawfish—a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act for the smalltooth sawfish. The actions described in the NPS preferred alternative would result in minor, beneficial impacts and a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for designated critical habitat for the smalltooth sawfish.

NATURAL SOUNDSCAPES

Noise levels across the park would be expected to remain relatively similar to present-day levels, and natural sounds would continue to predominate. Human-generated noise in the park would continue to stem primarily from vehicular traffic, aircraft overflights, and administrative activities involving airboat and/or aircraft use. Areas most affected by human-generated noise would be developed areas, popular boating (and airboating) areas, campgrounds, and areas near major roads. Some areas of the park

would have reduced noise from motorboats or airboats because of changes related to management zoning. If alternative transportation to various park areas is successfully implemented, noise levels could be locally decreased by the reduction in numbers of individual passenger vehicles.

East Everglades Addition

Airboating would continue in the East Everglades Addition within the frontcountry zone. Commercial airboat operators, running seven days per week, would be confined to the northern portion of the frontcountry zone (see “NPS Preferred Alternative” map). Noise from private airboats is more common on weekends when more airboats are on the water. Park staff also use airboats for maintenance, research, law enforcement, and fire/vegetation management. As described in the no-action alternative, airboat-generated peak instantaneous noise levels measured between 95 dB(A) and 110 dB(A) at 50 feet and at maximum operating conditions (Glegg et al. 2005). Because of the intensity of airboat noise, commercial and private airboat use in the East Everglades Addition would continue to have long-term, moderate, adverse impacts on the natural soundscape near areas of airboat use. Private airboating (by eligible individuals) in the East Everglades would be confined to the frontcountry zone on designated routes, a long-term, localized, negligible to minor, beneficial impact compared to the no-action alternative. Under the NPS preferred alternative, commercial airboat operations would be placed under concessions contracts with the park, which would restrict commercial airboating to designated routes and implement resource protection measures. This would result in long-term, minor, beneficial impacts on the soundscape compared to the no-action alternative. Overall, restrictions on both private and commercial airboating would have a long-term, regional, minor, beneficial impact on the soundscape of the East Everglades Addition.

Natural soundscapes of the Addition would continue to be affected by administrative use of helicopters and airboats under the NPS preferred alternative. The East Everglades Addition wilderness proposal in this alternative would have little effect on the natural soundscape because the National Park Service already uses the wilderness minimum requirement process (which is designed to protect wilderness values such as natural quiet) in this wilderness-eligible area. Thus, impacts on the natural soundscape would remain long-term, localized, moderate, and adverse.

The Tamiami Trail borders the East Everglades Addition to the north and the heavy traffic along the highway would continue to cause long-term, localized, moderate, adverse impacts on the soundscape in areas near the road.

Headquarters / Pine Island / Royal Palm / Main Park Road

Under the NPS preferred alternative the main park road and various developed and frontcountry areas in the Pine Island District would remain a focus of visitor and administrative activities. The main difference compared to the no-action alternative would be reduced noise from recreational vehicle generators at the Long Pine Key campground due to installation of electrical hookups. Generator use would continue to be prohibited during nighttime quiet hours, as under the no-action alternative, so this would be a negligible to minor beneficial impact. Long-term, local, minor, adverse impacts on natural soundscapes from human activity and park operations would continue in the Pine Island District under the NPS preferred alternative.

Florida Bay

The NPS preferred alternative would allow recreational access to the same sites in Florida Bay as the no-action alternative. However, this

alternative would add three additional chickees in Florida Bay, which would be additional localized areas of increased human activity. These new recreational and camping sites in Florida Bay would have localized, long-term, minor, adverse effects on the natural soundscape.

The NPS preferred alternative would establish substantial pole/troll and pole/troll/idle zones in Florida Bay, where operating gasoline-powered motorboat engines would not be permitted. This would result in long-term, moderate beneficial impacts on the natural soundscape. Additionally, a 300-foot-wide, idle speed, no-wake area would be established along the northern shoreline of Florida Bay (see “NPS Preferred Alternative” maps). This would slow motorboats operating in this area and reduce motorboat noise, a long-term, localized, moderate, beneficial impact on the natural soundscape.

Little Madeira Bay and adjacent smaller water bodies would be managed as a special protection zone and would remain closed to the public. As under the no-action alternative, this area would generally be free from human-generated noise, and localized, minor, beneficial impacts on the natural soundscape would continue. Joe Bay would be managed as backcountry (paddle only). Long Sound would be managed as a boat access zone, with idle and slow-speed enforced along shorelines. These changes would have a long-term, moderate, localized beneficial impact on natural soundscapes because of elimination of noise from motorboats.

Gulf Coast / Ten Thousand Islands / Everglades City

The NPS preferred alternative would add eight backcountry chickees to the Gulf Coast / Ten Thousand Islands area of the park, and these would be additional localized areas of increased human activity. Impacts on the natural soundscape would be long term, minor, and adverse. Construction of developments to the Gulf Coast area would

result in short-term, localized, minor, adverse impacts to the soundscape.

The new Everglades Paddling Trail would probably have little impact on natural soundscapes, except along the few segments zoned as seasonal backcountry (paddle only) zone. Impacts would be localized, long-term, minor, and beneficial.

Gopher Creek would continue to be managed as an idle speed, no-wake area. This would continue to have a long-term, localized, moderate, adverse impact on the natural soundscape.

Tamiami Trail / Shark Valley

At Shark Valley, the impacts of the NPS preferred alternative would be the same as for the no-action alternative—long term, local, minor to moderate, and adverse from various noises associated with vehicle sounds, park operational activities, facilities (e.g., air-conditioners), and human voices, with short-term, localized, moderate, adverse impacts from construction activities associated with new and upgraded facilities.

The NPS preferred alternative would have long-term, local, minor to moderate, adverse, as well as minor to moderate beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, aircraft).

Cumulative Impacts. The impacts of other plans and projects on the natural soundscape would be the same as those discussed for the no-action alternative—local, long-term, minor to moderate, and adverse, depending on the location and the source. Most unnatural sounds would continue to be from localized human activity, motorboats, vehicle traffic, aircraft, and airboats. Some projects are planned or underway that would add to such noise by generating localized, short-term noise impacts from construction and

restoration activities. Examples of such plans include the Modified Water Deliveries project, *Comprehensive Everglades Restoration Plan*, wetland and disturbed area restoration plans, the Tamiami Trail modifications, the main park road resurfacing, replacing the replacement of the marine bulkheads at Flamingo, and Flamingo improvements. External sources would continue to affect the natural soundscape of the park, similar to the no-action alternative, with long-term, minor, adverse effects on the park. The effects of the NPS preferred alternative would be long term, local, minor to moderate, and adverse as well as minor to moderate and beneficial, depending on the location and the source; the greatest sources of noise would be motorboat use in marine areas, airboat use in the East Everglades, and human activity in developed areas of the park, such as Shark Valley. Under the NPS preferred alternative, impacts on the natural soundscape would continue to be mostly confined to developed areas, popular boating areas, campgrounds, and along major roads. The effects from other park plans, projects, operations, and external sources, combined with the NPS preferred alternative on natural soundscapes would be long-term, negligible to minor, adverse, cumulative impacts. The NPS preferred alternative would contribute a substantial beneficial increment to the total cumulative impacts, constituting a majority of the beneficial impacts of the cumulative impacts.

Conclusion. The NPS preferred alternative would have long-term, local, minor to moderate, adverse, as well as minor to moderate beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, aircraft). The effects of the NPS preferred alternative actions combined with other ongoing park plans, projects, operations, and external sources would have long-term, negligible to minor, adverse, cumulative effects on the overall soundscape of the park.

WILDERNESS CHARACTER

Nearly 1.3 million acres of Everglades National Park would continue to be managed as designated wilderness, as it has been since 1978. This includes approximately 530,000 acres of submerged marine wilderness. An additional 82,000 acres would continue to be managed as potential wilderness, as it has been since 1978. The NPS preferred alternative would expand the park's wilderness. About 42,200 acres within the East Everglades Addition would be proposed for wilderness designation, and about 43,100 acres would be proposed as potential wilderness. Potential wilderness would be converted to designated wilderness once nonconforming uses (primarily private airboat use and motorized activities associated with ongoing ecosystem restoration work) ended.

Untrammelled

Under the NPS preferred alternative, the park would continue to manage natural resources in all areas of the park from an ecosystem perspective (e.g., wetland restoration, invasive nonnative plant / wildlife management, and fire management efforts), which would have a long-term, minor, adverse impact on the untrammelled quality of the park's wilderness. The East Everglades Addition would remain an area of specific focus for these activities.

The NPS preferred alternative would establish a comprehensive seagrass restoration plan in Florida Bay for submerged marine wilderness that would allow the park and partners to efficiently implement actions to address damage to submerged marine and wilderness resources from boat groundings and propeller scarring. These efforts would have short-term, localized, minor to moderate, adverse impacts on the untrammelled quality of submerged wilderness areas that undergo restoration efforts.

Natural

Main Portion of the Park (all but East Everglades Addition). The NPS preferred alternative would establish a comprehensive seagrass restoration plan that would allow the park and partners to efficiently implement actions to address damage to submerged marine and wilderness resources from boat groundings and propeller scarring. This would have a long-term, local, minor to moderate, beneficial impact on the natural quality of the submerged wilderness.

This alternative would establish several new zones including pole/troll and pole/troll/idle zones and designate some idle and slow-speed corridors in Florida Bay. Additionally, the NPS preferred alternative would establish a boater education program/permit system requiring that all operators of motorboats and nonmotorized boats obtain a permit to operate vessels within the park. These restrictions and the boater program would help protect the natural resources of the park. The pole/troll/idle zones would be in deeper water and would not affect the submerged wilderness. The pole/troll zones and the mandatory boater education program / permit system would help scarred areas recover over time and help reduce new boat groundings and propeller scarring, a long-term, regional, moderate to major beneficial impact on the natural quality of submerged marine wilderness.

Under the NPS preferred alternative, the park would continue to manage the network of backcountry and wilderness campsites and chickees while adding chickees (three in Florida Bay and eight in the Gulf Coast / Ten Thousand Islands area). Such facilities diminish the naturalness of a locale, both in terms of scenery and in relation to the natural soundscape. This would locally reduce naturalness, a long-term, minor, adverse effect. The proposed Everglades Paddling Trail would be minimally marked to preserve scenery and minimize maintenance requirements, so it would have a negligible adverse effect on naturalness.

East Everglades Addition. The proposed designation of 42,200 acres as wilderness, and the eventual designation of another 43,100 acres of potential wilderness, would ensure that most of the area would be permanently protected and managed to preserve its natural quality from an ecosystem perspective. Because of the large area that eventually would be designated as wilderness in perpetuity, this would have a major, long-term, beneficial impact on the area's natural quality.

Within the East Everglades Addition, the NPS preferred alternative would limit private airboating to designated routes in the frontcountry zone and commercial airboats to a subarea in the northern portion of the frontcountry zone. The eventual elimination of private airboats from the proposed designated wilderness would end the creation of new airboat trails (which are apparent because they damage or destroy vegetation) and allow airboat trails outside the frontcountry zone to recover to natural conditions over time. This increase in naturalness would have a long-term, regional, moderate beneficial impact on the natural quality of wilderness.

Undeveloped

Main Portion of the Park (all but East Everglades Addition). Under the NPS preferred alternative, the park would continue to manage the network of backcountry and wilderness campsites and chickees and would add eight chickees in the Gulf Coast / Ten Thousand Islands area. These actions would have a long-term, localized, minor, adverse effect on the undeveloped quality of land-based wilderness. The proposed Everglades Paddling Trail would be minimally marked to preserve scenery and minimize maintenance requirements, so it would have a long-term, negligible, adverse effect on the undeveloped quality of the area.

In Florida Bay, three new chickees would impact the undeveloped quality of the

submerged wilderness because their pilings are embedded into the submerged (marine wilderness) bottom. This would be true as well of aids to navigation, including channel/access route, boundary, and regulatory markers (all improved in the NPS preferred alternative to better protect resources and improve visitor safety, but the minimum number necessary to provide direction). There would be relatively few posts for marking pole/troll and pole/troll/idle zones as well, because these zones would be minimally marked to preserve scenery and minimize maintenance requirements. There would be long-term, negligible to minor, adverse impacts on the undeveloped quality of submerged wilderness where new pilings or posts for marking are driven into the submerged bottom.

East Everglades Addition. Most of the wilderness-eligible portion of the East Everglades Addition lacks human developments. The NPS preferred alternative would propose 42,200 acres in the Addition for wilderness designation and an additional 43,100 acres as potential wilderness. With wilderness designation, the area would be permanently protected from future development, except as required for resource protection or visitor safety per NPS management policies. Unless they are determined to be historic, structures such as hunting cabins, airboat docks, road traces, and canals within these areas would eventually be removed, and the areas would be restored to natural conditions. With the designation of wilderness and removal of nonhistoric developments, impacts on the undeveloped quality of wilderness within the East Everglades Addition would be long term (in perpetuity), regional, minor to moderate, and beneficial.

The designation of wilderness would also affect the undeveloped quality by eventually eliminating the use of private airboats and limiting administrative use of airboats in this area. This would give the perception that this is an undeveloped area compared to the no-

action alternative, and would be a major, long-term, beneficial effect on this quality.

Opportunities for Solitude or Primitive and Unconfined Recreation

Main Portion of the Park (all but East Everglades Addition). The sense of solitude for visitors in wilderness areas would be affected primarily by motorized craft. These effects might take the form of “spillover” motorboat noise from nearby marine waters (e.g., into beach areas used by visitors), spillover noise from nearby roads, and noise/sightings of airplanes and helicopters. Establishment of pole/troll zones in Florida Bay, the idle speed, no-wake area along the northern Florida Bay shoreline and at Long Sound, and segments of the Everglades Paddling Trail zoned backcountry (seasonally nonmotorized) would reduce motorboat noise spilling into adjacent wilderness compared to the no-action alternative. However, there are relatively few areas of visitor use within wilderness where this effect would be detected (e.g., at beaches and campsites along the coast and on the few Florida Bay keys open for visitor use). The beneficial effect on the solitude quality of wilderness would be long term, localized, and minor.

The pole/troll and pole/troll/idle zones and required education program/permit system would adversely affect the sense of a primitive, unconfined experience for the Florida Bay submerged wilderness. This would reduce visitor’s options to go where they want without restriction, and would be a moderate, long-term, adverse impact on this quality.

East Everglades Addition. The 42,200 acres of proposed designated wilderness and about 43,100 acres of proposed potential wilderness areas in the East Everglades would permanently protect opportunities for solitude and primitive and unconfined recreation. Private airboats would be confined to areas zoned frontcountry. Thus, in most of the Addition, visitors would be assured of

outstanding opportunities for solitude. The solitude benefits would not be fully realized in the 43,100 acres of proposed potential wilderness until private airboat use (a life-long right for eligible individuals) and motorized/mechanical activities associated with ecological restoration end. Given the extent of new wilderness and potential wilderness proposed under this alternative for the East Everglades Addition, impacts on opportunities for solitude and primitive, unconfined recreation would be long term (in perpetuity), regional, major, and beneficial compared to no-action conditions.

Considering all four qualities of wilderness character, management actions and the wilderness proposal for the East Everglades Addition in the preferred alternative would have a variety of impacts on wilderness character. Compared to the no-action alternative, for the existing designated wilderness under the NPS preferred alternative, there would be a minor, long-term, adverse impact due to development and use of several new chickees. But in the Florida Bay submerged wilderness, there would be a moderate, long-term, beneficial impact to wilderness character due to the reduction in spillover motorboat noise and bottom scarring due to the pole/troll and pole/troll/idle zones and the mandatory boat education program / permit system. (This impact level considers both the beneficial impact on the natural quality and the adverse effect on the primitive, unconfined recreation quality). In the East Everglades Addition the proposed wilderness designation would have a major, long-term (in perpetuity), beneficial impact on wilderness character, primarily due to the designation of a large area as wilderness and eventually eliminating private airboats in the area— benefiting the qualities of naturalness, undeveloped, and solitude of wilderness character over a large area.

Cumulative Impacts. Impacts from other plans, projects, and activities would be the same as described in the no-action alternative. During the period of ecological restoration work in the main wilderness and East

Everglades Addition, which would include the use of motorized and mechanical equipment, there would be minor to moderate adverse impacts in various areas on the undeveloped, untrammled, and solitude qualities of wilderness character. But in the long term there would be moderate, beneficial impacts on the wilderness character of the terrestrial portion of the main wilderness, a long-term, minor to moderate, localized, beneficial, cumulative impact on the existing Florida Bay submerged wilderness, and a major, long-term, beneficial, cumulative impact on the wilderness character of the East Everglades Addition. Sources of these long-term beneficial impacts would include various ecosystem restoration projects (the Modified Waters Deliveries project, the Tamiami Trail modifications project, the *Comprehensive Everglades Restoration Plan*, the Hole-in-the-Donut restoration project, and the Snake Bight pole/troll zone pilot project), and implementation of vegetation and wildlife management plans, and the activity of the Miccosukees along Tamiami Trail.

Impacts of the NPS preferred alternative, combined with the impacts of other past, present, and reasonably foreseeable future projects and activities, would have a long-term, moderate, beneficial, cumulative impact on wilderness character in the terrestrial portion of the main wilderness, a long-term, major, beneficial, cumulative impact on the East Everglades Addition and a moderate, long-term, beneficial, cumulative impact on the wilderness character of the Florida Bay submerged wilderness. The contribution of this alternative to the overall cumulative impacts would be modest for the main terrestrial portion of the existing wilderness area, but the alternative would be responsible for most of the overall beneficial cumulative impacts for both the East Everglades Addition and the Florida Bay submerged wilderness area.

Conclusion. Management actions and the wilderness proposal for East Everglades Addition in the NPS preferred alternative would have a variety of impacts on wilderness

character. For the main portion of the existing wilderness, excluding Florida Bay, the alternative would have a minor, long-term, adverse impact due to development and the use of several chickees. In the Florida Bay submerged wilderness, the preferred alternative would have a moderate, long-term, beneficial impact to wilderness character due to the pole/troll zones and the mandatory boat education program/permit system. In the East Everglades Addition, the NPS preferred alternative would have a major, long-term (in perpetuity), beneficial impact on wilderness character, primarily due to designating wilderness and potential wilderness over a large area and eventually eliminating private airboats in the area. When the actions in the preferred alternative are combined with other past, present, and reasonably foreseeable future projects and activities, there would be a moderate, long-term beneficial, cumulative impact on wilderness character in the terrestrial portion of the main wilderness, a moderate, long-term, beneficial, cumulative impact on the Florida Bay submerged wilderness, and a major, long-term, beneficial, cumulative impact on the wilderness character of the East Everglades Addition. The preferred alternative would add a small increment to the overall beneficial cumulative impact for the main terrestrial portion of the existing wilderness area, but the alternative would contribute the greatest portion of the overall beneficial cumulative impacts for both the East Everglades Addition and Florida Bay submerged wilderness areas.

ARCHEOLOGICAL RESOURCES

New construction is proposed at various park locations under the NPS preferred alternative, including Gulf Coast site improvements at Everglades City, the South Florida Collections Management Center (built near the Daniel Beard Center), improvements to NPS facilities at Key Largo, and primitive campsites on East Everglades Addition tree islands. As appropriate, archeological surveys and/or monitoring would precede and accompany any ground-disturbing activity. Because

previously disturbed areas would be selected where feasible for new construction, and archeological sites would be avoided to the extent possible, few if any adverse impacts would be expected as a result of such construction. Any adverse impacts would be of negligible to minor intensity and permanent.

The park would establish a comprehensive cultural resource management program to improve and expand efforts to inventory, document, and protect all cultural resources. As part of the program, archeological sites would be regularly monitored to assess resource conditions and inform treatment strategies. In comparison with the no-action alternative, sites would be more actively protected and stabilized as necessary to reduce or avoid possible impacts from erosion, visitor use, or other factors. Some tree islands could be closed to public use to protect sensitive archeological sites, and a site stewardship program would be implemented to provide further site protection. Implementing the comprehensive cultural resource management program would have a long-term beneficial impact on the park's archeological resources.

Archeological sites adjacent to or easily accessible in visitor use areas would continue to be vulnerable to inadvertent damage and vandalism, although the frequency and intensity of these impacts would likely remain limited. Under the NPS preferred alternative, additional acreage in the East Everglades Addition would be designated wilderness (42,200 acres) and potential wilderness (43,100 acres). As private airboat use is eventually eliminated in wilderness areas and the numbers of visitors accessing tree islands by airboats declines, potential adverse impacts to archeological resources resulting from visitor use activities should be reduced in that area. In addition, continued ranger patrol and visitor education about the significance and fragility of such resources and how visitors can reduce their impacts to them would discourage inadvertent impacts and vandalism. Adverse impacts to archeological

resources resulting from visitor activities would be negligible to minor and permanent.

Ongoing archeological investigations would continue, such as the long-term study of prehistoric shell works sites in the Ten Thousand Islands area. Although test excavations conducted as part of these investigations would have permanent, minor adverse impacts on portions of identified sites, the investigations would expand and contribute to the park's archeological database.

Cumulative Impacts. The park's archeological resources are subject to a variety of disturbances, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites, invasive nonnative plants such as Brazilian pepper whose deep roots can disturb buried sites, ground-disturbing construction activities, inadvertent visitor use impacts, and artifact looting. These factors could contribute to minor to moderate, long-term or permanent, adverse impacts on archeological resources as sites face risks from storm damage, erosion, and possible human-caused disturbance.

Foreseeable projects such as increased efforts to restore disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and invasive nonnative vegetation) could have permanent, minor to moderate, adverse impacts on archeological resources because of ground disturbance. The above disturbances could adversely affect the integrity of archeological resources because the potential of impacted sites to yield important prehistoric or historic information could be diminished. However, ongoing and future archeological research and investigations that contribute to the understanding of regional prehistory and history would have long term beneficial impacts.

The impacts associated with implementation of the NPS preferred alternative would have

long-term beneficial impacts and permanent, negligible to minor, adverse impacts on the park's archeological resources. The impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a permanent, minor to moderate, adverse cumulative impact. The adverse effects of the NPS preferred alternative, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed by the NPS preferred alternative would have long-term beneficial impacts and permanent, negligible to minor, adverse impacts on the park's prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places. In conjunction with impacts from other past, present, or reasonably foreseeable actions, there would also be permanent, minor to moderate, adverse cumulative impacts on archeological resources from implementing the NPS preferred alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing the NPS preferred alternative would result in *no adverse effect* on archeological resources.

Historic Structures, Sites, and Districts

Under the NPS preferred alternative the park staff would implement a comprehensive cultural resource management program, to promote, in part, the ongoing inventory, documentation, and historic preservation planning of historic sites, structures, and districts. The surveys and research to be undertaken would be a prerequisite for understanding a resource's significance and provide the basis for informed planning and decision making regarding how the resource should be managed. Such surveys and

research would result in a long-term, beneficial impact to historic structures.

The park would continue to rehabilitate and adaptively use selected historic buildings, such as those associated with Nike Missile Base site (HM-69), for administrative and other purposes. Interpretation of the Nike Missile Base site would be increased, and site improvements would include improved vehicle access, parking, and restrooms. These improvements would be placed in unobtrusive areas or concealed by vegetation screening to minimize visual intrusions on the historic setting. In addition, structures at the Duck Camp (a former hunting camp in the East Everglades Addition) would be stabilized and possibly rehabilitated for interpretive purposes if determined eligible for listing in the national register. The rehabilitation of historic buildings and structures would be undertaken in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. Materials removed during rehabilitation efforts would be evaluated to determine their value to the park's museum collections and/or for their comparative use in future preservation work. Because the repair and replacement of historic fabric associated with the rehabilitation of historic buildings and structures would be under-taken in accordance with the Secretary of the Interior's Standards, any adverse impacts would be permanent and of negligible to minor intensity. Implementation of proposed preservation undertakings would have overall long-term, beneficial impacts on the park's historic buildings and structures.

Historic structures could suffer wear and tear from increased visitation, but monitoring the user capacity of historic structures could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to inadvertent impacts and vandalism. However, visitor education regarding the significance of such resources and how visitors can reduce their

impacts to them would help discourage inadvertent impacts and vandalism. Adverse impacts would be negligible to minor in intensity and long term or permanent.

Cumulative Impacts. Historic structures and buildings in the park are often damaged by exposure to severe storms, hurricanes, and humid climatic conditions. Several of the NPS Mission 66 buildings at Flamingo (e.g., marina store, maintenance buildings, and lodge) were substantially damaged by recent hurricanes and were subsequently determined ineligible for the national register because of lost or diminished historical integrity. Several of these damaged buildings were demolished and removed. The damage and loss of buildings from hurricanes has resulted in a permanent moderate to major adverse impact on resources contributing to the historical integrity of the Flamingo Mission 66 developed area. All new construction at Flamingo to rehabilitate or replace facilities as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 buildings and cultural landscape elements. The visitor center would be rehabilitated. Undertakings to preserve Flamingo's surviving buildings and site features would have overall long-term beneficial impacts. Long-term or permanent, negligible to minor, adverse impacts would also result from the repair and/or replacement of deteriorated historic building materials and fabric, and the introduction of modern structural elements to effect rehabilitation treatments.

Other foreseeable projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect historic structures. The Old Ingraham Highway and associated canals are eligible for listing in the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to

substantially diminish the road's overall integrity because the road would continue to retain its existing configuration and character. Such construction would also contribute to the park's conservation efforts. Adverse impacts would be long term or permanent and minor.

The impacts from storms and other natural processes together with ongoing or foreseeable construction activities could adversely affect the integrity of historic structures. This would result from the loss or damage of character-defining features and architectural elements. The impacts associated with implementation of the NPS preferred alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's historic structures, sites, and districts. The impacts of this alternative, in combination with the beneficial and minor to major adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse cumulative impact. The adverse effects of the NPS preferred alternative, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed by the NPS preferred alternative would result in long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on historic structures from implementing the NPS preferred alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing the NPS preferred alternative would result in *no*

adverse effect on historic structures, sites, and districts.

Cultural Landscapes

Under the NPS preferred alternative, the park would implement a comprehensive cultural resource management program to promote, in part, the ongoing inventory and documentation of cultural landscapes. The surveys and research to be undertaken are a prerequisite for understanding a landscape's significance, as well as provide the basis for informed decision making regarding how the features and patterns of the landscape should be managed. Such surveys and research would result in a long-term beneficial impact on cultural landscapes.

Significant cultural landscapes, such as those associated with the Nike Missile Base site and the Ingraham Highway historic district, would be preserved and possibly rehabilitated in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties (with Guidelines for the Treatment of Cultural Landscapes)*. If a cultural landscape is rehabilitated, the significant landscape patterns and features (e.g., spatial organization, land use patterns, circulation systems, topography, vegetation, buildings and structures, cluster arrangements, small-scale features, views and vistas, and archeological sites) would be protected and maintained. Alterations or additions to the landscape could occur, and existing historic fabric that has become damaged or deteriorated would be repaired or replaced. Because the rehabilitation of cultural landscapes would be undertaken in accordance with the Secretary of Interior's Standards, any adverse impacts would be of negligible to minor intensity and long term or permanent.

Interpretation of the Nike Missile Base site would be increased under the NPS preferred alternative, and site improvements would include improved vehicle access, parking, and restrooms. Careful design would ensure that

the improved vehicle access and addition of parking areas and restrooms would minimally affect the scale and visual relationships among landscape features. Such improvements would also be placed in unobtrusive areas or concealed by vegetation screening to minimize visual intrusions on the setting. In addition, the topography and land use patterns of the landscape would remain largely unaltered. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

Construction that occurs in significant cultural landscapes would introduce visual, audible, and atmospheric intrusions into the landscape's setting. Although the effects of such intrusions would be adverse, the impacts would be construction-related only, i.e., short term, localized, and of negligible to minor intensity.

Cumulative Impacts. Cultural landscapes in the park are often at risk from damage by severe storms and hurricanes. Storm winds and surges can uproot ornamental vegetation planted as part of designed landscapes (such as that planted at Flamingo during the 1950s) and can severely erode or obliterate other elements such as trails, roads, and small-scale features, resulting in long-term or permanent, moderate to major adverse impacts. All new construction at Flamingo to rehabilitate or replace facilities, as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 cultural landscape elements. Undertakings to preserve the integrity of Flamingo's surviving cultural landscape features would have overall long-term beneficial impacts. Proposed actions to preserve and rehabilitate cultural landscape features would also result in long-term or permanent, negligible to minor, adverse impacts.

Other foreseeable construction projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect cultural landscape features

associated with historic structures. The Old Ingraham Highway and its associated canals are eligible for the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the overall integrity of cultural landscape features because the road would continue to retain its existing configuration and character. Also, these actions would contribute to the park's conservation efforts. Adverse impacts would be long term and minor.

The impacts from storms and other natural processes, together with ongoing or foreseeable construction activities, could adversely affect the integrity of the park's cultural landscapes. This would result from the loss or damage of character-defining features such as contributing buildings and structures, vegetation, patterns of circulation, and small scale features. Implementation of the NPS preferred alternative would have long-term beneficial impacts, and negligible to minor, adverse impacts on the park's cultural landscapes. The impacts of this alternative, in combination with the beneficial and minor to major adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of the NPS preferred alternative, however, would be a small component of the adverse cumulative impacts.

Conclusion. Implementation of actions proposed in the NPS preferred alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's cultural landscapes. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term, or permanent, minor to moderate, adverse cumulative impacts on cultural landscapes from implementing the NPS preferred alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing the NPS preferred alternative would result in *no adverse effect* on cultural landscapes.

Ethnographic Resources

New construction is proposed at various park locations under the NPS preferred alternative (e.g., the Gulf Coast site at Everglades City and primitive campsites on East Everglades Addition tree islands). As appropriate, ethnographic surveys and/or monitoring would precede and accompany any ground-disturbing activity. Because previously disturbed areas would be selected where feasible for new construction, and ethnographic resources would be avoided to the extent possible, long-term or permanent, negligible to minor, adverse impacts on ethnographic resources are anticipated from proposed construction.

The park would establish a comprehensive cultural resource management program to improve and expand efforts to inventory, document, and protect all cultural resources. As part of the program, investigations would be increased to identify and evaluate ethnographic resources having traditional or cultural significance to the park's associated tribes and/or other groups such as those associated with the Gladesmen culture. The park would seek to strengthen its partnership with associated tribes to cooperatively integrate education programs, and these efforts could further understanding and protection of ethnographic resources. Significant sites would be regularly monitored to assess resource conditions and inform treatment strategies. In comparison with the no-action alternative, ethnographic resources would be more actively protected and stabilized as necessary to reduce or avoid possible impacts from erosion, visitor use, or other factors. Some tree islands could be closed to public use to protect sensitive

ethnographic sites, and a site stewardship program would be implemented to provide further protection. The Duck Camp in the East Everglades Addition (having possible Gladesmen associations) might be stabilized and interpreted. These actions would have long-term beneficial impacts on ethnographic resources. Any adverse impacts would be long-term and negligible to minor.

Ongoing investigations would continue (such as the long-term study of prehistoric shell works sites in the Ten Thousands Islands area), and ethnographic overviews and studies have been approved. Information acquired from these investigations and studies would expand the park's knowledge of important ethnographic resources, and provide the basis for appropriate resource management and preservation treatments. Although fieldwork conducted as part of these investigations could have permanent, minor, adverse impacts on portions of identified sites, the investigations would expand and contribute to the park's ethnographic database.

The NPS preferred alternative proposes substantial acreage in the East Everglades Addition for wilderness designation (42,200 acres) and potential wilderness (43,100 acres). Potential long-term, negligible to minor, adverse impacts on ethnographic resources important to the Gladesmen culture might occur from the elimination of private airboat use by eligible individuals in areas proposed as backcountry zone and as proposed wilderness. Although these measures would curtail motorized access to the tree islands and former camps by airboat, Gladesmen would continue to have nonmotorized access to these places by canoes, skiffs, and other paddle boats. Elimination of airboat use and the corresponding reduction in visitor numbers and associated impacts to traditionally sensitive areas would be a beneficial impact on ethnographic resources important to the park's associated tribes.

Cumulative Impacts. A variety of factors can disturb the park's ethnographic resources and disrupt the cultural connections between

resources and associated groups, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; ground-disturbing construction activities; inadvertent visitor use impacts; and site looting. These factors could contribute to adverse impacts on ethnographic resources as sites face risks from storm damage, erosion, and possible human-caused disturbance. Adverse impacts would be minor to moderate and long-term or permanent.

Foreseeable projects such as restoration of disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and invasive nonnative vegetation) could adversely affect ethnographic resources as a result of ground disturbance. In accordance with section 106 procedures and consultation requirements, ethnographic assessments and investigations would be completed for all proposed project areas to ensure that ethnographic resources are avoided or that adverse impacts are adequately mitigated before construction. Resulting adverse impacts would be long term and minor to moderate.

The impacts of implementing the NPS preferred alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's ethnographic resources. The impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of the NPS preferred alternative, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed by the NPS preferred alternative would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's ethnographic

resources. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on ethnographic resources from implementation of the NPS preferred alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing the NPS preferred alternative would result in *no adverse effect* on ethnographic resources.

Museum Collections

Under the NPS preferred alternative, the South Florida Collections Management Center would be relocated to a new facility in the Pine Island District. This new center would continue to store collection items from Everglades, Biscayne, and Dry Tortugas national parks; Big Cypress National Preserve; and De Soto National Memorial. In accordance with NPS museum collections policies and guidelines and the *South Florida Park Collection Management Plan* (NPS 2007b), the new facility would be equipped with state-of-the-art environmental control and protection systems to properly store and protect the collections. The facility would be adequately staffed and include sufficient space to accommodate projected future acquisitions, staff work space, and controlled areas for researchers and the public to access the collections. Part of the facility could be used as space for interpretive exhibits and/or a staging area for public tours of the Nike Missile Base site. The NPS Southeast Archeological Center in Tallahassee, Florida, would remain the primary repository for archeological artifacts and materials collected from the various regional park units. Relocation of the South Florida Collections Management Center to a new facility in the Pine Island District would have long-term, beneficial impacts on the collections. Packing and transporting the collections to the new

facility could also entail short-term, negligible impacts on the collections, although special handling procedures and care would be provided to ensure that items are not damaged or misplaced during transit.

Cumulative Impacts. Because of the hot and humid environmental conditions of south Florida, proper control of humidity levels has been difficult to achieve and wide humidity fluctuations have contributed to the damage of certain collection items and archival materials. The heating, ventilation, and air conditioning system did not adequately protect against mold growth that posed risks to both staff health and the collections. Some collection items have been damaged by pest infestations. Although these problems have been largely corrected, the current facilities lack a fire suppression system, placing the collections at risk of catastrophic loss. Previously, limited funding to adequately staff the center contributed to a backlog of items requiring accessioning and comprehensive curatorial management. Inadequate work space for staff and researchers continues to make it difficult to manage and access the collections. Museum collections at the current South Florida Collections Management Center have sustained long-term, minor to moderate, adverse impacts from inadequate environmental control systems, insufficient professional staff, limited accountability, and inadequate preventive conservation programs in the past.

The impacts associated with implementing the NPS preferred alternative would have predominantly long-term beneficial impacts on museum collections. The impacts of this alternative, in combination with the minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse cumulative impact. The NPS preferred alternative would not appreciably contribute to the adverse cumulative impact.

Conclusion. Implementation of actions proposed by the NPS preferred alternative

would have long-term beneficial and short-term negligible impacts on museum collections. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term, minor to moderate, adverse cumulative impacts on museum collections from implementing the NPS preferred alternative.

VISITOR USE

Implementation of management actions under the NPS preferred alternative would result in higher annual visitor use at Everglades National Park over the long term compared to the no-action alternative. The increases would be associated with completion of the Marjory Stoneman Douglas Visitor Center and associated redevelopment of the NPS area in Everglades City, improvement in the Florida Bay fishery and other ecological conditions (e.g., seagrass, wildlife) from actions such as the boater education program for all marine areas, implementation of pole/troll and pole/troll/idle zones in Florida Bay, and participation in visitor contact partnership opportunities in Florida City and/or the keys. If these actions are achieved, they would enhance the park's off-site educational program and encourage visitor use, longer stays, multiple entries, and repeat visitation. Completion of additional chickees along the Wilderness Waterway and in Florida Bay would provide additional capacity for backcountry camping, although the number of additional users would be low given the limited number of chickees proposed.

Completion of the RV site electric hookups, solar hot-water showers, and added concessions in Long Pine Key, coupled with similar improvements in Flamingo under the no-action alternative, would extend the shoulder seasons for camping and promote higher use during the entire season. The number of additional users would not be large in absolute terms.

Implementation of boater education requirements and pole/troll and pole/troll/idle

zones in Florida Bay would likely affect the level, geographic distribution, and patterns of boating use at the park. The boater education program might discourage some casual use by visitors with limited time availability. However, the requirement should not deter use by local motorboat owners, recreational anglers, outfitters, and others who visit for longer periods, and in fact this requirement may encourage new users to visit the park. Physical demands associated with implementation of the pole/troll and pole/troll/idle zones may deter some individual anglers and fishing guides from fishing in Florida Bay.

Some traditional motorboating use might shift from Florida Bay to the Gulf Coast or other areas outside the park because of the boating management actions associated with the NPS preferred alternative.

Pole/troll and pole/troll/idle zones could encourage more use by smaller watercraft. Joe Bay would be reopened for paddling use only (and managed as the backcountry zone). The rest of the area known as Crocodile Sanctuary would remain closed to public access. Additional paddling and boat access opportunities would be provided through the establishment of a car-top boat launch point near Long Sound (managed as a boat access zone, with idle and slow-speed enforced along shorelines). This launch point would encourage paddling in a location closer to the mainland by residents and visitors alike. The net effect of these boating changes would be expected to be a slower rate of increase in overall boating use than under the no-action alternative.

Visitor use might also increase if alternative transportation access is implemented from south Miami-Dade County to the Ernest F. Coe Visitor Center / Royal Palm area and/or to Flamingo. Factors such as service frequency, cost, schedule, and departure points would all have a bearing on the level of ridership and visitation.

Continued interpretive and education programs, coupled with ecological restoration efforts by the National Park Service and its partners, and special events and activities would support public interest and use. Formal establishment of wilderness in portions of the East Everglades Addition could attract some users interested in wilderness opportunities.

The net effect of the management and actions under the preferred action is expected to be slightly higher annual visitor use to the park compared to the no-action alternative. Reported recreation use at the national park would increase as commercial airboating operations are operated under concession contracts with the park and airboat users are counted as park visitors. Visitor use could increase at Shark Valley from having concession contracts for commercial airboating if airboating clients decide to also visit Shark Valley or other areas of the park as long as they have already paid the entrance fee. The level of commercial airboating activity might change over time in response to demand, requirements of the concession contracts, and consolidation of airboat operating sites.

The timing of the changes in visitor use is difficult to predict because it would depend on when projects are funded and carried out. Also, none of the projects represent major expansions in capacity, and most new opportunities are focused on dispersed and backcountry recreation use.

Year-round and seasonal residents of the area would be expected to account for most future visits, although the number of visitors from outside the region, including international visitors, would also increase.

Overall, implementation of the NPS preferred alternative would be expected to lead to a minor to moderate increase in visitor use (numbers of visitors) over time. The NPS preferred alternative would also be expected to result in some minor shifts in distribution or patterns of visitor use within the park.

Cumulative Impacts. Other past, present, and reasonably foreseeable projects that could result in cumulative effects on visitor use are described in chapter 1. Past actions include the development of the administration, maintenance, and visitor service facilities; roads; parking areas; exhibits; and other resources that support and host current visitor use at the park. The present and reasonably foreseeable projects with the highest potentials to affect use include Flamingo improvements (impact on visitor use is summarized under the no-action alternative) and construction activities such as replacing marine bulkheads at Flamingo and resurfacing the main park road. Effects on visitor use from Flamingo improvements would be long term and moderate beneficial because they reestablish overnight accommodations at Flamingo and improve the RV and camping experience. Other projects would primarily result in short-term inconveniences to visitors—for example travel delays during construction on the main park road. Typically the park staff would attempt to schedule such work during off-peak periods to minimize disruptions. Once the projects are completed, visitors would be unaffected by the actions. Combined with the actions proposed under the NPS preferred alternative, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial, cumulative effects. Impacts of the NPS preferred alternative would comprise a relatively small portion of the overall effect.

Conclusion. Increases in visitor opportunities related to additional visitor services and recreation-oriented facilities, off-site information and education opportunities, and access under the NPS preferred alternative would have a long-term, minor, beneficial impact on visitor use. Implementation of boating management actions in Florida Bay (e.g., pole/troll and pole/troll/idle zones) would result in short- and long-term changes in boating use, including the type and distribution and potentially the level of use. Establishing long-term concession contracts with commercial airboat operators might result in long-term changes in visitor use, but

the timing, magnitude, and increase or decrease in visitation are uncertain. The net effect is anticipated to be a minor to moderate increase in visitor use. To the extent that increased use can be accommodated while achieving the park's other environmental, ecological, and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact. Combined with the actions proposed under the NPS preferred alternative, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial, cumulative effects. Impacts of the preferred alternative would comprise a small portion of the overall effect.

Visitor Experience and Opportunities

The NPS preferred alternative would improve access to information, interpretation, and recreational and educational opportunities at a variety of locations in the national park and would implement additional ways for visitors to experience the Everglades. Visitor experience and opportunities in different areas of the park are detailed below.

East Everglades Addition. The NPS preferred alternative would continue to allow private airboating by individuals eligible under the 1989 Expansion Act, and such use would be confined to the frontcountry zone on designated routes (see “NPS Preferred Alternative” map). For such airboat users, these new restrictions would be a long-term, negligible to minor, adverse impact on their recreational experience. Paddlers, hikers, and other nonmotorized users might enjoy the effects of such restrictions (that is, creation of new areas in the East Everglades free of airboats), and this would be a long-term, local, negligible to minor, beneficial impact on those users.

Commercial airboat operations would continue on designated routes within the frontcountry zone in the northern portion of the East Everglades, with some islands

potentially closed seasonally or year-round to protect vulnerable natural or cultural resources. Airboat operators would be brought under the terms of a concessions contract to provide interpretation of park resources and values. Operators would also be required to ensure that all visitor services and facilities meet applicable local, state, and federal laws, regulations, and codes. Similar tours would be offered to what are available currently. Enhanced interpretation about park resources, ecosystem restoration, and recreational opportunities would represent an improvement in interpretive opportunities and would have a long-term, moderate beneficial impact on the visitor experience. Chekika would continue to be open seasonally as a day use area with an emphasis on education and recreation programs, a long-term, negligible, beneficial impact compared to the no-action alternative.

The NPS preferred alternative would add approximately 42,200 acres of wilderness and propose 43,100 acres for potential wilderness status within the East Everglades Addition. This would guarantee the availability of wilderness recreation opportunities in the East Everglades Addition in perpetuity, a large increase over the no-action alternative and a long-term, moderate beneficial impact to those visitors seeking these types of opportunities.

Recreation and education opportunities would be expanded along Tamiami Trail, SW 237th Avenue near Chekika, at some tree islands, and along the park's eastern boundary. The East Everglades Addition would become a prime area for exploring, wildlife viewing, and learning about the area. The NPS preferred alternative would also establish site stewardship programs to maintain and protect East Everglades Addition cultural sites while integrating Shark River Slough cultural/archeological resources into interpretive programs. These actions would have long-term, local, moderate, beneficial impacts on visitors by providing additional opportunities closer to Miami. The park would also pursue alternative

transportation to commercial airboat facilities and Shark Valley for day-long experiences. If accomplished, this would provide long-term, moderate, beneficial impacts by expanding access to the park to those lacking other means of transportation.

The NPS preferred alternative would establish a paddling access site along Tamiami Trail, local paddling trails, long-distance paddling routes (unmarked) to connect through the Shark River Slough to other areas of the national park, and primitive camping opportunities on tree islands within the East Everglades. These actions would have a long-term, minor to moderate, beneficial impact by expanding the range of recreational opportunities in the East Everglades Addition.

Headquarters / Pine Island / Royal Palm / Main Park Road. Under the NPS preferred alternative, the Ernest F. Coe Visitor Center would continue to provide information and interpretation to visitors. The park would also pursue a new interagency visitor contact station in Homestead/Florida City. An unstaffed orientation kiosk would be developed there as a short-term solution. This would have long-term, minor to moderate, beneficial impacts on visitors by improving opportunities for trip planning and pre-visit orientation.

The NPS preferred alternative would enhance visitor services at Royal Palm by updating interpretive media and integrating Anhinga Trail and Royal Palm cultural resources into interpretive media/programs. This would have long-term, minor, beneficial impacts locally on the visitor experience.

Visitor services at Long Pine Key campground would be enhanced under the NPS preferred alternative by installing electric hookups and solar hot water for restrooms and showers. Existing structures would be adaptively used to provide bike rentals, camping supplies, and food and beverage service. This would widen the appeal of the campground for certain potential visitors and compel them include the national park on their itinerary. This would

have long-term, moderate, beneficial impacts on the visitor experience.

Interpretation of the Hole-in-the-Donut restoration would be enhanced through wayside exhibits and self-guided day use opportunities for visitors. This would have a long-term, minor, beneficial impact on the visitor experience at the site.

Under the NPS preferred alternative, the South Florida Collections Management Center would be moved to a new collection facility in the headquarters / Pine Island / Daniel Beard Center-Robertson Building area and would include staging needs for the Nike Missile Base site interpretive efforts. Museum collections would become available for the general public to see. The Nike Missile Base site would have its season extended under the NPS preferred alternative. There would be increased emphasis on preservation of significant cultural resources and interpretation at the site would be enhanced. The park would also pursue a tram or shuttle for guided tours of the site. Such improvements would have long-term, minor, beneficial impacts.

Under the NPS preferred alternative, the park would pursue seasonal alternative transportation access to various park areas with stops along the main park road. The transportation would run from Homestead/Florida City to Flamingo. If accomplished, this would have long-term, regional (Royal Palm to Flamingo), moderate to major, beneficial impacts on visitors because it would make this area in the heart of the park available to those who otherwise might not visit because of the lack of transportation.

The NPS preferred alternative would improve self-directed interpretation and wayside exhibits along the main park road, a long-term, local, minor, beneficial impact on visitor experience.

Paddle launch sites along the main park road (e.g., Coot Bay Pond, Noble Hammock canoe trail, and Hells Bay canoe trail) and paddling

opportunities for persons with disabilities would be improved under this alternative. Examples include installing modest small floating docks or other nonmuddy interface between land and water (to make launching safer and easier), safety improvements at parking areas, and better water trail wayside signs. These would all have long-term, moderate, beneficial impacts for visitors with disabilities who enjoy paddling.

The NPS preferred alternative would continue to permit bicycling along the main park road—a long-term, negligible benefit to cyclists. There would continue to be a long-term, negligible to minor, adverse impact on motorists who have to contend with cyclists on the road. The park would also pursue increased hiking and bicycling opportunities on nonwilderness corridors between Royal Palm and Flamingo and would work with other agencies to establish regional hiking and biking routes, including a bicycle trail along the park's eastern boundary, from Tamiami Trail to the main park road. These additions would have a long-term, moderate benefit for visitors as more opportunities for hiking and biking in the park are developed. This would allow visitors without a boat to experience the park in more ways.

Florida Bay. This alternative would implement pole/troll and pole/troll/idle zones on about 127,400 acres of Florida Bay, and would also implement a backcountry (paddle only) zone in Joe Bay, and idle and slow-speed corridors along the northern shoreline of Florida Bay (see NPS Preferred Alternative and Florida Bay Management Zones maps for details). This would help reduce boat groundings and better protect Florida Bay resources (seagrass, wildlife, fisheries). All of these management strategies would enhance the experience for many visitors to this part of the park and protect natural resources.

New on-plane and slow-speed corridors would also be added to improve visitor safety and provide slightly faster access, navigating and transiting to key destinations within the bay while still protecting critical natural

resources. Slow-speed corridors would allow access at greater than idle speed with minimum wake in order to provide reasonable access across pole/troll and pole/troll/idle zones to motorboaters. For nonmotorized boaters who enjoy experiencing calm, quiet waters, these corridors would have a long-term, negligible, beneficial impacts. For boaters who prize unrestricted motorboat access to Florida Bay, slow-speed corridors would regulate speed of access and therefore have a long term, minor, adverse impacts. However, these same visitors would experience long term, minor, beneficial impacts from on plane corridors. New on-plane corridors would occur in deeper areas of the bay and allows for boats to operate at any speed.

Under this alternative, 66% of the bay would remain open to boating, managed as the boat access zone. Under this alternative, 24,588 acres (6% of the bay) would be set aside as pole/troll/idle zones, in the western part of Florida Bay (see NPS Preferred Alternative and Florida Bay Management Zones maps for details). These kinds of areas were desired by the public because they would provide easier access across areas that had previously been proposed as pole/troll zones. Internal combustion engines operating at idle speed may occasionally be used in these zones if water depths are suitable.

The pole/troll zones in this alternative were created while considering the distance that boaters would be required to pole or troll their boats before reaching their water destination. To access the majority (63%) of pole/troll zones, visitors would need to pole or troll 0.25 mile or less. Less than 25% of the pole/troll zones would require visitors to pole or troll between 0.26 to 0.5 mile, and about 2% of pole/troll areas would be more than 1.0 mile from traditional boat access zones. Given the majority of the bay would still be open to motorboat access and most pole/troll distances would be relatively short, these zones would have long-term and moderate adverse impacts for visitors who prize unrestricted motorboat access to Florida Bay.

For visitors who value nonmotorized boating these zones would provide opportunities for these calm and quiet experiences and would therefore have long-term, moderate, beneficial impacts.

For all visitors participating in fishing activities, pole/troll and pole/troll/idle zones would provide substantial improvements to fisheries and shallow water habitats. Once benefits are realized, visitors participating in fishing opportunities in these zones would experience long term, moderate, beneficial impacts.

Additional paddling access would be provided through establishment of a new car-top launch point near Long Sound on the 18-mile stretch of U.S. 1 (in partnership with the Florida Department of Transportation and others). Given public input, Long Sound would be managed as boat access zone, idle speed-no wake. Since this area had no previous restrictions on motorboat access, this would have long-term, minor, adverse impacts on boaters who prize unrestricted motorboat access to Long Sound. However, for paddlers who currently use Long Sound and would enjoy low wake, the idle speed no-wake zone would provide long-term, minor, beneficial impacts.

Joe Bay would be reopened for paddling use only (and managed as the backcountry zone), which would improve the experience for paddlers, especially those launching from the 18-mile stretch of U.S. 1, by providing an opportunity to experience a marine area without motorboats. This would be a long-term, moderate, beneficial impact for paddlers. For motorboaters excluded from Joe Bay, this would have a long-term, local, negligible, adverse impact on their experience because there are many other places in Florida Bay available to enjoy and explore.

Joe Bay would also be established as the first and only catch-and-release fishing area in the park. This use would be monitored and studied to determine if it is achieving desired resource and visitor experience conditions.

For visitors who enjoy fishing, this would have a local, minor, beneficial impact on their experience. It is not possible to determine duration of this opportunity, since the use will be studied to determine whether it should be made permanent.

The National Park Service would continue to pursue partnership opportunities for additional public boating access (both motorized and nonmotorized) into Florida Bay.

The NPS preferred alternative would implement planned and funded improvements to the Key Largo ranger station and Florida Bay Interagency Science Center. The ranger station is too small and is inadequate for visitor services; improvements would provide a long-term, negligible to minor, beneficial impact for visitors. At the NPS Key Largo site this alternative would provide a new visitor information kiosk and a venue to support the boater education/permit program would be established. At this same site or at Tarpon Basin a new canoe launch, and an interpretive trail through the hammock. These improvements would result in long-term, local, minor to moderate, beneficial impacts for visitors. The park would pursue additional multiagency visitor services using the Key Largo facilities and/or a new facility in Key Largo. If successful, this would provide a long-term minor benefit.

The NPS preferred alternative would develop a required boater education program/permit system for all operators of motorboats and nonmotorized boats within the park. Initially, the system would create a burden on visitors prior to their visit and might decrease visitor interest in using park waters for boating; the effects would be short term, minor to moderate, and adverse. As visitors become accustomed to the permit system, the effects of the education program would be long term, moderate, and beneficial by improving the boating experience through enhanced understanding and enjoyment of marine waters and through reduced incidences of

unfortunate boating situations (e.g., user conflicts and groundings).

Public access to the keys in Florida Bay would remain the same as in the no-action alternative—all keys would be closed to the public except North Nest, Little Rabbit, Carl Ross, and Bradley keys—and three additional backcountry chickees would be installed. This would make the distance paddlers must travel between Florida Bay chickees more manageable; effects would be long term, minor, and beneficial.

Under the NPS preferred alternative, visitors to the park would continue to have access to the numerous guides and commercial tours available in Florida Bay and the park. This would have continuing long-term, negligible to minor, beneficial impacts.

Gulf Coast / Ten Thousand Islands / Everglades City. Under the NPS preferred alternative, the park would continue to manage most marine areas of the Gulf Coast / Ten Thousand Islands area as they are now, including the Wilderness Waterway. The NPS preferred alternative includes site improvements to address visitor facilities needs at Gulf Coast. Enhancements would include a new visitor center, restrooms, a day use area, relocation of nonessential maintenance functions to an off-site location, additional parking, and maximization of outdoor space for interpretive, orientation, and educational programs. Given that this site is the primary visitor destination on the northwest side of the park and access portal to the wilderness waterway. These improvements would result in moderate to major beneficial impact on visitor experience at the Gulf Coast compared to the no-action alternative.

Gulf Coast site improvements would be ABA compliant. Accessible parking would be added and accessible trails for additional access and interpretive opportunities would be constructed. For visitors with disabilities, these developments would improve access to the site and increase opportunities for

connections to the natural surroundings. These site improvements would have a moderate, long-term, beneficial impact on visitor experience.

Additional land-based interpretive programs and activities linking the park and neighboring communities would be provided, and a cultural/heritage interpretive water trail in the Ten Thousand Islands Archeological District would be provided. (The latter would be unmarked on the water, but the trail and waypoints would be shown on interpretive pamphlets, in guidebooks, etc.). These visitor opportunities would have long-term, minor, benefits on the visitor experience in the Gulf Coast region.

The canoe/kayak launch at the Gulf Coast Visitor Center site would be improved under this alternative; parking for paddlers would be constructed. Additionally, the park would work cooperatively with public and private interests to provide better motorboat access to the park at non-NPS sites. Assuming the latter effort is successful, these actions would increase opportunities for access and help alleviate congestion at popular launch points during busy times resulting in long-term, minor, beneficial impacts on visitors to the Gulf Coast region.

Eight additional backcountry chickees would be provided in the Gulf Coast area, increasing overnight backcountry capacity and expanding camping destinations for paddlers and motorboaters. This would have a long-term, minor to moderate, beneficial impact. This alternative would also establish a minimally marked Everglades Paddling Trail, intended primarily for those seeking a wilder, more remote route. Some segments of the Everglades Paddling Trail would be zoned boat access (motorized and nonmotorized boats allowed). A few segments (e.g., Wood River, Shark-Watson River sites, and the Hells Bay areas) would be zoned seasonally as backcountry (paddle only). For visitors who desire a quieter, wilder experience but are not comfortable with advanced way finding in the maze of Ten Thousand Islands, this option

would provide a long-term, minor beneficial impact. For visitors who resent motorboat restrictions and/or dislike additional route markers, the Everglades Paddling Trail would have negligible to minor, adverse impacts on visitor experience.

Additionally, a seasonal idle speed segment would be established on Turner River (from Hurdles Creek junction to the Big Cypress National Preserve boundary). This seasonal segment would allow greater ease of access for motorboat users to and from park waters along Turner River, providing a long-term, minor, beneficial impact on visitor experience. For paddlers who desire quieter experiences, this seasonal slow-speed segment may have a long-term, minor, adverse, impact on the opportunity to experience a quiet or nonmotorized river segment.

Gopher Creek would be managed the same as the no-action alternative, and would continue to have a long-term, negligible, beneficial impact on most visitors and a long-term, negligible, adverse impact on paddlers who desire a paddle route free from motorboats.

Tamiami Trail / Shark Valley. To address a relative lack of visitor opportunities along Tamiami Trail, the NPS preferred alternative would develop a visitor information kiosk and series of turnouts along the trail for educational and recreational opportunities and to provide an overview of resource issues and ecosystem restoration. These new sites could be managed under partnerships with commercial airboat operators. These new visitor opportunities would have a long-term, moderate, beneficial impact on the visitor experience along Tamiami Trail and would increase awareness of the national park to visitors and residents. Under this alternative, the park would also pursue seasonal alternative transit connections from Miami to Tamiami Trail destinations, which if successful would also have long-term, moderate, beneficial impacts by providing different ways for visitors to experience and access the park.

The planned and funded facility improvements at Shark Valley would be implemented as under the no-action alternative. The NPS preferred alternative would establish additional evening programs at Shark Valley, add two shade structures or rest areas along the 15-mile Shark Valley loop road, expand the reservation system for tram tours and bicycle rentals at Shark Valley, and enhance pre-trip information available to visitors. The park would pursue working with the Miccosukee Tribe on interpretive programs and to share resources, facilities, and parking. Combined, these actions would improve visitor comfort, reduce crowding, and have a long-term, localized, moderate, beneficial impact on the visitor experience.

Overall, the NPS preferred alternative would have long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts.

Cumulative Impacts. The cumulative impacts of past, present, and reasonably foreseeable regional and NPS plans and projects would be the same as in the no-action alternative. Such projects include the park's long-range interpretive plan, Flamingo improvements, resurfacing of the main park road, and the Snake Bight pilot pole/troll zone project. Ecosystem restoration projects would indirectly impact visitor experience by creating a more enjoyable environment and better wildlife viewing opportunities. Collectively, these projects would have a long-term, minor to moderate, beneficial impact on the overall visitor experience at Everglades National Park.

The NPS preferred alternative would improve access to information, interpretation, and recreational and educational opportunities at a variety of locations throughout the park and would implement additional ways for visitors to experience the park. This alternative would also upgrade visitor-oriented park facilities and increase backcountry and wilderness opportunities. The required boater education/permit program and more restrictive management zones would have the greatest

adverse impacts to the visitor experience in this alternative. However, the improvements to visitor experience and the variety of new opportunities would outweigh most of the negative impacts to the visitor experience. The NPS preferred alternative would have long-term, negligible to moderate, adverse impacts as well as long-term, negligible to major, beneficial impacts. Combined with the actions of other plans and projects, the NPS preferred alternative would have a long-term, moderate to major, beneficial, cumulative effect on the visitor experience at Everglades National Park. The NPS preferred alternative would contribute substantially to these effects.

Conclusions. The NPS preferred alternative would have long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts. The NPS preferred alternative, combined with other plans and projects, would have long-term, moderate to major, beneficial impacts on visitor experience and opportunities. The NPS preferred alternative would contribute substantially to these effects.

REGIONAL SOCIOECONOMIC ENVIRONMENT

Implementing the NPS preferred alternative would occur against the same backdrop of economic, demographic, and social conditions across the region described under the no-action alternative, i.e., a gain of more than 1.07 million year-round residents by 2035. The effects of the NPS preferred alternative would add another set of influences affecting the region's economic and social environment, but leave the basic foundation of the area's economic and demographic outlook unchanged.

Visitor-related Economic Impacts

Implementation of the NPS preferred alternative would result in increased annual visitor use at the park over the long term than would occur under the no-action alternative

(see previous "Visitor Use" section related to the NPS preferred alternative). In addition, commercial airboat tours in the East Everglades Addition would continue. Year-round and seasonal residents of the area would be expected to account for most future visits to the park, although the number of visits by tourists, including those from international destinations, would also increase.

The timing of increases in visitor use is difficult to predict because it would depend on when projects are funded or carried out and other factors. Also, there are no projects proposed under the preferred alternative that represent major expansions in visitor use opportunities or facility capacity; most new opportunities would be focused on dispersed and backcountry recreation use. Implementation of new boating management in Florida Bay, including the establishment of pole/troll and pole/troll/idle zones, would affect recreational and sport fishing use patterns in the bay, potentially resulting in a minor shift in visitor use outside the park or to the Ten Thousand Islands area of the park. Such a shift could have adverse economic effects on concessions at Flamingo and on businesses in the Keys. At the same time, the potential exists for such management to result in improvements in the Florida Bay fishery, which could in turn result in higher levels of sport fishing. Opportunities for continued fishing within and while transiting the pole/troll and pole/troll/idle zones, and the continuing availability of high speed routes across the bay, would allow guides and related businesses to adapt their services to respond to changing conditions and avoid or minimize potential adverse economic effects.

Commercial fishing per se is not permitted in the park. Consequently, the proposed management actions would have no direct effect on commercial fishing as it relates to the Florida Keys Commercial Fishermen's Association, although some of the organization's members may be guides and outfitters that could be affected by the boating management actions.

Areas of the Keys that are adjacent to the park would not be directly affected by management actions associated with the preferred alternative. Some indirect long-term social and economic effects, both beneficial and adverse, could result from changes in public use in the Florida Bay portion of the park, although any such effects would be expected to be limited in scope and the net effect uncertain.

Completion of the new Gulf Coast Visitor Center, improved parking, and other site improvements would also encourage more recreation visitor use, not only in the Everglades City area but in Shark Valley, with the commercial airboat tour operators, and other locations in the park. The establishment of effective partnering opportunities outside the park would have similar positive effects on visitor use over time.

Retail, lodging, and other tourism-related spending would accompany the increased visitor use with expenditures projected at about \$6.5 million annually by 2035. Economic spin-offs of visitor spending include higher personal income and additional jobs as compared to the no-action alternative. Some individual businesses may experience a reduction in revenues or other effects in response to management actions undertaken as part of this alternative, although the overall increase in visitor use and spending could create expanded opportunities for tourism-related businesses in the region. The limited scale of anticipated changes in visitor use effectively eliminates the need for detailed analysis of the potential economic effects under the preferred alternative.

The park would collect more in entry fees and sales of passes, and the Everglades Association and concessioners would sell more goods, services, and overnight camping and lodging.

Many of these effects would be concentrated in the peak season (winter). The visitor-related impacts would occur gradually during the long term, but would be limited in scale

relative to current employment and personal income in south Florida. Implementation of the NPS preferred alternative could provide additional concession/commercial service opportunities—for example in conjunction with redevelopment of Gulf Coast site at Everglades City. Many of these benefits would accrue in the gateway communities.

State and local governments would collect additional sales tax from the increased visitor spending.

The above visitor-related economic impacts would be beneficial, negligible in the short term, and negligible to minor and beneficial in the long term.

Economic Impacts Related to Implementation and NPS Operations

Implementing the NPS preferred alternative would provide a sustained economic infusion to the region over the life of this plan—larger than that under the no-action alternative. The infusion would result from increases in the park's ongoing operating budget, including added payroll, and in future one-time costs. Future one-time costs for the NPS preferred alternative include \$7.9 million for site improvements and construction of the Gulf Coast Visitor Center. Projected budget needs for other major projects would be the same as for the no-action alternative.

As under the no-action alternative, NPS maintenance staff would perform much of the work to address facility and infrastructure maintenance and preservation, restoration, and rehabilitation activities. Future construction expenditures would be more than under the no-action alternative, supporting the local construction trades industry and associated vendors and suppliers.

Everglades National Park would continue to provide vitally important ecosystem services to south Florida under the NPS preferred alternative. The types and levels of such

services would be comparable to those under the no-action alternative. These services would be long term and beneficial.

Acquisition of some or all of the current privately owned parcels associated with commercial airboating in the East Everglades, including easements to accommodate improved water flow, could result in negligible to minor reductions in property taxes and other public sector revenues. Minor changes in the associated long-term employment and income could also occur in response to changes in operations associated with consolidation/relocation. Consolidation / relocation / site rehabilitation of existing locations would generate short-term beneficial economic effects in construction and related industries. In the event of acquisition of real estate, current property owners would receive compensation for the value of property rights and interests acquired.

Changes in the business model for commercial airboat operators along Tamiami Trail, after federal government acquisition of the properties and award of concessions contract with the National Park Service, would be short-term minor adverse, and short-term minor beneficial impacts, and long-term minor to moderate beneficial impacts, as compared to the no-action alternative. Short-term impacts would be associated with costs to the concessioner for facility improvements (e.g., to meet safety and accessibility requirements); additional staff training, equipment, and reporting costs; and a franchise fee paid to the National Park Service (negotiated percentage of revenue). Although uncertain, there may be short-term reductions in revenues due to the elimination of certain activities currently offered (e.g., wildlife shows, RV camping). Short-term beneficial impacts would be based on capitalizing the value of the properties and established business operations with the land purchase by the federal government. Long-term beneficial impacts would be expected due to the business stability and higher business value from a long-term contract with the National

Park Service. A concession contract would, over time, provide opportunities for increased revenues by enhancing airboat tour experiences with coordinated interpretation with park staff, additional tour itineraries, and co-marketing with other park activities (e.g., Shark Valley tours) that may increase visitation and revenues and further support park goals.

Annual NPS payroll and operating and maintenance expenditures would result in long-term effects on employment, taxes, business sales, and income. Completion of specific projects and implementation of programs and management would support increased staffing levels over time. Direct staffing requirements associated with full implementation of the NPS preferred alternative would be 16% above that for the no-action alternative. Staffing would be added across all divisions and districts. Under the NPS preferred alternative, park operations would indirectly support an estimated 120 to 125 jobs, as compared to an estimated 104 jobs indirectly supported currently, which would continue under the no-action alternative.

The National Park Service would seek to recruit more volunteers to assist the park in implementing this alternative.

An increase in budgeted funds for NPS operations is assumed for the NPS preferred alternative. Available resources would include base budget appropriations, concession revenues, entry and camping fees, and various nonrecurring funding for supplemental and specific project construction. Implementation of the NPS preferred alternative might help the park attract additional funding for ecological research and restoration.

Retained revenues from entry and camping fees would likely increase with higher visitation. Concession revenues would be higher because of the increased patronage at on-site concession services and commercial airboat concession revenues and park entry fees. The revenues could be substantial.

Research, educational, and other activities sponsored by the park's partner organizations would continue to provide additional sources of economic stimulus. The timing, magnitude, and indirect economic consequences of those activities under the NPS preferred alternative are indeterminate.

The economic effects associated with NPS operations under this alternative would be beneficial and negligible to minor in the short and long terms.

Effects on Regional Population Growth

Implementation of the NPS preferred alternative would have little direct impact on regional population growth. The increases in construction, long-term jobs, and visitor use over the life of this plan would provide a negligible impetus for growth and would be insufficient to trigger additional new economic development and job-related migration. It is more likely that many of the jobs would be filled by individuals already residing in the area.

The effects on regional population growth under this alternative would be negligible, both in the short and long term.

Community Services

Impacts on community services and facilities associated with implementing the NPS preferred alternative would be similar to those under the no-action alternative, although the demands related to levels of visitor use would be slightly higher. The limited scale, seasonal nature, and spatial dispersion of such demands across the region would be unlikely to necessitate additional facilities, major equipment, or staffing on the part of non-NPS service providers.

Effects on community services under this alternative would be indeterminate and negligible over the short and long terms.

Attitudes and Lifestyles

The NPS preferred alternative establishes future management direction for the park that best reflects public input and supports the park's purpose and significance and the mission of the National Park Service as a whole. In terms of attitudes, some individuals might believe that the management zones and wilderness proposals do not go far enough to achieve their particular preferences, although they might also acknowledge the efforts made to balance the desired outcomes of a large and divergent public, some with a more holistic perspective and some with a more narrow focus. As such, this alternative might be characterized as offering management direction, wilderness proposal, recreational opportunities, and preservation and interpretation of cultural heritage resources for all to appreciate, but also aspects for some to disfavor.

Management and access policies established under the NPS preferred alternative might have indirect consequences on attitudes and lifestyles over the long term. For example, changes in Florida Bay management and wilderness proposals in the East Everglade Addition might contribute to conflicts between user groups.

Effects on attitudes and lifestyles under this alternative would be indeterminate over the short and long terms.

Overall, the economic effects of the NPS preferred alternative would include negligible short-term and negligible to minor long-term economic benefits, the latter due to increased visitation expected under this alternative. Short- and long-term consequences include a negligible contribution to population growth and demands on community infrastructure and services and indeterminate consequences on lifestyles and attitudes.

Cumulative Impacts. Social and economic impacts from implementing the NPS preferred alternative would be similar to those of other past, current, and future development across

the region and those under the no-action alternative. The effects include population and economic growth across the region that would result in minor long-term increases in traffic on highways and roads in the area; moderate, long-term increases in resident and visitor spending, bolstering retail trade and service-oriented businesses in the region; long-term demands on community services; and tax and fee revenues to fund public services and facilities. These actions could result in some long-term, negligible, economic effects on visitor-related businesses and on local traffic and safety because of changes in visitor use levels and distribution.

The effects of these other past, present, and reasonably foreseeable actions by others, in combination with the effects of the NPS preferred alternative, would result in negligible to minor, beneficial, cumulative effects. The effects of the NPS preferred alternative would add only a small contribution to these effects. For example, the retail spending from visitors would be small in relationship to the total spending by area residents, businesses, and other visitors to the area. Additional visitor spending under the NPS preferred alternative would benefit existing businesses and enhance the commercial development potential for private lands along the access roads to the park.

Conclusion. The economic effects of the NPS preferred alternative would include negligible short-term and negligible to minor long-term economic benefits, the latter due to increased visitation expected under this alternative. Short- and long-term consequences include a negligible contribution to population growth and demands on community infrastructure and services and indeterminate consequences on lifestyles and attitudes. The effects of these other past, present, and reasonably foreseeable actions by others, in combination with the effects of the NPS preferred alternative, would result in negligible to minor, beneficial, cumulative effects. Impacts of implementing the NPS preferred alternative would comprise only a small portion of these

overall cumulative social and economic effects.

PARK OPERATIONS

The NPS preferred alternative would establish many new park initiatives that would require new staff and investment to plan and implement, which would be addressed through staff and funding proposed in the alternative.

Parkwide

Under the NPS preferred alternative, the boater education program and permitting system would help reduce the number of groundings and propeller scarring's in Florida Bay and elsewhere. Boaters would become more adept at navigating park waters and would increase their awareness of boating impacts and safety. These changes would have a long-term beneficial impact on park operations by reducing the need for search and rescue as well as seagrass restoration to repair damage caused by groundings and scarring's.

East Everglades Addition. Under the preferred alternative, designated boating areas and management of commercial airboat contracts would be established and result in a long term beneficial impact on park operations. Boat traffic would be kept on designated routes, which would reduce the need for restoration due to boating impacts on the landscape, and would reduce the need for rescue patrols to find lost or stranded boaters. Land recently acquired outside the park boundary near Chekika would be used for development of administrative and operational facilities for the East Everglades Addition. These new facilities near the area of operations would have a long-term beneficial impact by increasing operational efficiency and providing facilities needed to better manage the Addition.

The NPS preferred alternative would add approximately 42,200 acres of wilderness and propose 43,100 acres for potential wilderness status within the East Everglades Addition. This would not increase the operational burden because park staff is already using the wilderness minimum requirement process within the wilderness-eligible area (most of the Addition).

The park would pursue alternative transportation to commercial airboat facilities and Shark Valley for day-long excursions. This would have short-term, minor, adverse impacts on park operations by reducing staff transit time and providing additional housing space for park staff.

Headquarters / Pine Island / Royal Palm / Main Park Road. Under the preferred alternative, park staff would pursue a new interagency visitor contact station in Homestead/Florida City with potential partners. In the long term, this would have a beneficial impact by sharing the costs and staff with partner groups.

Vacated portions of the Robertson Building and Daniel Beard Center would be used for administrative needs. This would have a long-term beneficial impact on park operations by providing needed space for administration activities.

Park staff would pursue seasonal alternative transportation access to various park areas with stops along the main park road. The transportation would run from Homestead/Florida City to Flamingo. This service could result in long-term beneficial impacts from reduced traffic congestion on park roadways and associated traffic management and safety issues.

Under the preferred alternative the public use opportunities at the Key Largo ranger station would be expanded, including a new visitor information kiosk, a venue to support the boater education/permit program, and housing for visitor and resource protection staff. In addition to these expansions,

additional multiagency visitor services would be pursued using the existing and/or a new facility in Key Largo. These changes would have a long-term beneficial impact on park operations by facilitating recruitment and retention of staff and reducing costs and space needs by sharing facilities with other agencies.

Motorboat restrictions would be expected to reduce propeller scarring and boat groundings, thereby reducing the resultant law enforcement and restoration work. Establishment of these restrictions would have a long-term beneficial impact on operations.

Gulf Coast / Ten Thousand Islands / Everglades City. Under the NPS preferred alternative, all nonessential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. In the long term, this would have a beneficial impact by reducing costs and space needs by sharing resources and infrastructure. This action would also result in minor adverse impacts due to some added inconveniences and lost time when transporting equipment and materials to and from the maintenance site at Big Cypress National Preserve approximately 15 minutes each way.

Tamiami Trail / Shark Valley. Under the NPS preferred alternative, the park would pursue working cooperatively with the Miccosukee Tribe on interpretive programs and explore the idea of sharing resources, facilities, and parking. If successful, this would have a long-term beneficial impact on operations at Shark Valley by expanding the number of facilities available to visitors and easing congestion without much additional cost.

Most of the administrative and operational facilities from Shark Valley and the Tamiami ranger station would be relocated and centralized to a new, previously disturbed location within the park (such as Gator Park). These actions would result in long-term beneficial impacts by simplifying park logistics and providing staff with a modern facility.

SUMMARY

Overall, as elements of the NPS preferred alternative are implemented the park would be expected to function more effectively than it would under the no-action alternative. The NPS preferred alternative would result in long-term, moderate, beneficial impacts on park operations.

Cumulative Impacts. Many other projects that impact park operations have recently occurred, are occurring, or will occur in the near future. These projects can be loosely grouped into the following categories—visitor services, ecosystem and site restoration, vegetation and wildlife management, infrastructure management, and resource management. Implementation of these other plans and projects would improve park infrastructure, staff efficiency, and reduce deferred maintenance. The NPS preferred alternative, combined with other plans and projects, would have a long-term, moderate beneficial cumulative impact on park operations. The contribution of the NPS preferred alternative to this effect would be fairly substantial.

Conclusions. The NPS preferred alternative would result in long-term, moderate, beneficial impacts. Combined with other plans and projects, the preferred alternative would have long term, moderate, beneficial, cumulative impact on park operations. The contribution of the NPS preferred alternative to this effect would be fairly substantial.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are those environmental consequences of an action that cannot be fully mitigated or avoided.

Under the NPS preferred alternative some unavoidable impacts to water resources, soils, wildlife, vegetation, natural sounds, and wilderness character would result from continued motorboat use in marine areas of the national park (though impacts within Florida Bay should be greatly reduced compared to the no-action alternative); from recreation access to tree islands and certain keys; and from continuation of private and commercial airboating within the East Everglades.

Irreversible and Irretrievable Commitments of Resources

With the exception of consumption of fuels and raw materials for maintenance activities, no actions in this alternative would result in consumption of nonrenewable natural resources or use of renewable resources that would preclude other uses for a period of time.

Relationship of Short-term Uses and Long-term Productivity

The park would continue to be used by the public, and most areas would be protected in a natural state. The National Park Service would continue to manage the park to maintain ecological processes and native biological communities and to provide appropriate recreational opportunities consistent with preservation of cultural and natural resources. Actions would be taken with care to ensure that uses do not adversely affect the productivity of biotic communities. Under the NPS preferred alternative, with management zones within Florida Bay to help protect seagrasses, there would be no appreciable loss of long-term ecological productivity.

IMPACTS FROM IMPLEMENTING ALTERNATIVE 2

HYDROLOGIC RESOURCES

Elements of alternative 2 that would affect surface waters in the park include construction and the boater education/permit requirement. Impacts from construction would be short term, localized, negligible to minor, and adverse (e.g., turbidity, sediment resuspension).

Under alternative 2, Florida Bay would be managed similar to now (no-action). However, the boater education/permit program would be likely to reduce the incidence of bottom disturbance from groundings and from motorboat propellers, which increase turbidity. Impacts from the boater education program would be long term, localized, minor, and beneficial (slight decreased in turbidity).

As described for the NPS preferred alternative, most changes to facilities under alternative 2 would occur within existing developed areas. Impacts during construction would be short term, localized, negligible to minor, and adverse (e.g., turbidity, sedimentation) because construction best management practices would reduce or eliminate such impacts.

Impacts on water resources, water quality, and wetlands from new and upgraded facilities might result from (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along the main park road to Flamingo and along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) five new chickees in Florida Bay, and (5) a new visitor center and improved boat launch at Gulf Coast. As in the no-action alternative, impacts on water quality during construction would be short term, localized, negligible to minor, and adverse. Long-term, adverse impacts on wetlands

would depend on project design, location, and size, the specifics of which are unknown at this time. More detailed analysis for these projects would occur in project-specific environmental impact analyses done before each project is being implemented.

Improvement of the boat launch at Gulf Coast would involve impacts from dredging of less than 4 acres of previously disturbed bay bottom sediments. There would be short-term, localized, moderate, adverse impacts on turbidity from a temporary increase in sediment resuspension during construction. The increased size and use of the boat launch could stir up bottom sediments; increase the amount of wet exhaust, bilge waste, petroleum spills; and have other adverse impacts that may arise from boat operations. These impacts on water quality would be long term, localized, minor, and adverse. The construction of the visitor center and associated development would occur in a previously disturbed area, so there would be no new impacts expected on wetlands.

As in the NPS preferred alternative, the park would implement an adaptive management approach to resource conservation under alternative 2. The potential benefits of these actions on water resources could be short or long term and range from negligible to minor, depending on the actions taken.

Overall, the impacts of alternative 2 on water resources would be long term, localized, minor to moderate, and beneficial within Florida Bay (e.g., decreased turbidity), and short term, localized, minor, and adverse (e.g., turbidity, sedimentation) elsewhere during construction projects.

NPS policies require that planning documents justify decisions regarding the retention or removal of facilities in wetlands or that may adversely affect wetlands. In the existing

basin, the area is already disturbed; relocating the facility would increase wetland impacts and would distance the basin from the visitor center. Expansion of the basin would require full compliance with NPS policies. Current law and NPS policies require avoiding or minimizing impacts on wetlands and mitigating remaining unavoidable impacts under most circumstances. Depending on the impacts, a wetland statement of findings may ultimately be required.

Cumulative Impacts. As noted in the introduction, most impacts on water resources and wetlands in the park arise from changes in the amount, timing, and distribution of water and related changes in water quality (i.e., excess nutrients). As described under the no-action alternative, impacts from other projects and plans—such as Everglades restoration plans, activities intended to reduce the nutrient content of waters flowing into the park, implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, and restoration of areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds)—would be long term, parkwide, moderate to major, and beneficial. The cumulative effect of alternative 2, combined with other projects and plans, would be long term, parkwide, minor to moderate, and beneficial. Alternative 2 would contribute a very small amount to the cumulative total.

Conclusion. The impacts of alternative 2 on water resources would be long term, localized, minor, and beneficial (e.g., slightly lower incidence of sea bottom disturbance that increases turbidity), and short term, localized, minor, and adverse (e.g., turbidity, sedimentation). The cumulative effect of alternative 2, combined with other projects and plans, would be long term, parkwide, minor to moderate, and beneficial. The cumulative effect of alternative 2 and other projects and plans would be long term, parkwide, moderate, and beneficial.

LANDSCAPE AND SOILS

Under alternative 2, soils would continue to be affected by visitor use (e.g., compaction). Visitor effects on soil would continue to be long-term, localized, negligible to minor, and adverse. Certain tree islands or areas that were open to visitor use could be closed seasonally or year-round (e.g., for wildlife protection, water level management, or the protection of cultural resources). Although such closures would help protect soils in these areas from visitor use impacts, overall effects on soils from visitor use would remain long term, localized, negligible to minor, and adverse.

Some facility upgrades (such as at Shark Valley and Key Largo) would occur within the developed or disturbed footprint. Impacts on soils from construction activities would be long term, localized, negligible to minor, and adverse (e.g., erosion, removal of surface layer). Construction best management practices would limit such impacts.

Impacts on soils (disturbance or loss) from new and upgraded facilities would be associated with (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) five new chickees in Florida Bay, (5) a new visitor center and an improved boat launch at Gulf Coast, (6) a few campsites on tree islands within the East Everglades Addition, and (7) a new collections management facility in the headquarters/Pine Island area. Each of these actions would affect from 0.25 to 10.0 acres of soil. Impacts on soils would be long term, localized, moderate, and adverse (e.g., disturbance of surface layer, erosion). Best management practices during construction would help limit construction-related impacts.

During construction, impacts on soils would be short term, localized, negligible to minor, and adverse (e.g., disturbance of surface layer, erosion). Construction best management practices, such as revegetation of disturbed

areas, would reduce or eliminate short-term impacts. After construction, adverse impacts on soils would be long term and localized and range from negligible to moderate depending on the size of the development footprint.

Overall, impacts on soils under alternative 2 would be long-term localized, minor to moderate, and adverse. These impacts result from visitor use and construction.

Cumulative Impacts. The effects of other projects and plans on park soils would be as described for the no-action alternative—long term, parkwide, minor to moderate, and beneficial. Such projects include (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) restoration activities in areas disturbed by prior land uses, (4) implementing the park's fire management plan, and (5) implementation of the park's strategic management plan and resource stewardship strategy. In combination with the long-term, localized, negligible to moderate, adverse effects of alternative 2, overall cumulative effects would be long term, parkwide, minor to moderate, and beneficial. Alternative 2 would have a very slight contribution to the cumulative effects.

Conclusion. Impacts on soils under alternative 2 would be long term localized, minor to moderate, and adverse. These impacts result from visitor use and construction. The cumulative effect of alternative 2, when combined with other projects and plans, would be long term, parkwide, minor to moderate, and beneficial.

VEGETATION

Commercial, private, and administrative airboating can damage freshwater vegetation such as sawgrass (and compact, stir up, or transport sediments, increasing water turbidity) in areas where airboats run repeatedly. However, airboating would continue to occur in the East Everglades Addition in an area similar to where airboats

run in the no-action alternative. Damage would continue to be worse along the commercial airboat routes in the northern portion of the Addition. This would be a continued, long-term, localized, minor, adverse impact.

In alternative 2, as in the NPS preferred alternative, certain islands or areas within the East Everglades Addition could be closed to visitor use seasonally or year-round for natural resource reasons (such as wildlife protection or water level management) or cultural resource reasons. Such closures would help reduce vegetation impacts (e.g., from airboat landings or trampling) compared to the no-action alternative; such impacts would be short term, localized, negligible to minor, and adverse.

Under alternative 2, vegetation would be affected by facility upgrades within developed areas (e.g., at Shark Valley and Key Largo). Construction impacts on vegetation would be short term, localized, negligible to minor, and adverse (e.g., removal of surface layer). Construction best management practices, such as revegetation of disturbed areas, would minimize such impacts.

Impacts on vegetation from new and expanded facilities would result from (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along the main park road and along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) five new chickees in Florida Bay, (5) a new visitor center and an improved boat launch at Gulf Coast, (6) two to three campsites on tree islands within the East Everglades Addition, (7) turnouts along Tamiami Trail, and (8) a new collections management facility in the headquarters/Pine Island area. Each of these actions would affect from 0.25 acre to 10.0 acres. Impacts on vegetation would result from loss of or damage to vegetation on the construction site during and after construction. These impacts would be short term and long term, adverse, localized, and

minor to moderate depending on size of the development footprint. Although the chickees would be elevated to limit shading of sea bottom vegetation, installation and new visitor use would probably cause long-term, localized, and negligible to minor adverse impacts.

Under alternative 2, nearly all of Florida Bay would be zoned boat access, meaning very few restrictions on motorboat use. The boater education/permit requirement and increased patrols/enforcement would help reduce the incidence of seagrass (and sea bottom sediments) damage from propeller scarring and boat groundings compared to the no-action alternative. The comprehensive seagrass restoration program would also help to improve the overall health of Florida Bay seagrass communities. Nonetheless, effects on sea bottom vegetation in Florida Bay would likely remain long term, moderate, and adverse.

Little Madeira Bay would be managed as a pole/troll zone, while Joe Bay and adjacent smaller water bodies would be managed as the backcountry zone (paddle only) with fishing allowed. Because most damage to sea bottom vegetation results from motorboat groundings or propeller scarring and not from trolling motors or paddle only boating, impacts on vegetation in these areas would be negligible.

Under this alternative, the park would implement an adaptive management approach to resource conservation. Under adaptive management, if monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. Examples include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on vegetation could be short or long term and range from negligible to minor depending on the actions taken.

Short-term adverse impacts on vegetation under alternative 2 (from facility upgrades or

construction) would be localized and minor to moderate. Beneficial impacts would be short and long term and negligible to minor. Long-term impacts (from visitor use and construction) would be localized, negligible to moderate, and adverse.

Cumulative Impacts. As described for the no-action alternative, impacts from other projects and plans would be long term, parkwide, moderate to major, and beneficial. Such projects include (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, (4) restoration activities in areas disturbed by prior land uses, (5) implementing the park's fire and invasive nonnative plant management plans, and (6) implementing the park's strategic management plan and resource stewardship strategy. The effect of alternative 2 combined with other projects and plans outside Florida Bay would be long term, regional, moderate to major, and beneficial cumulative impacts. Within Florida Bay, the effect of alternative 2 and other projects and plans would be long term, baywide, minor, and beneficial cumulative effects. This alternative would contribute a slight amount to the overall cumulative effects outside Florida Bay, and a modest amount to cumulative effects within Florida Bay.

Conclusion. Short-term adverse impacts on vegetation under alternative 2 (from facility upgrades or construction) would be localized and minor to moderate. Beneficial impacts would be short and long term and negligible to minor. Long-term impacts (from visitor use and construction) would be localized, negligible to moderate, and adverse. Outside Florida Bay, the effect of alternative 2 combined with other projects and programs (e.g., ecosystem and site restoration) would be long term, regional, moderate to major, and beneficial cumulative impacts. Within Florida Bay the cumulative effect would be long term, baywide, minor, and beneficial.

WILDLIFE

East Everglades Addition

Additional recreational opportunities (e.g., hiking, paddling, and wildlife viewing) for park visitors in the undeveloped areas of the park, such as the East Everglades Addition, would likely increase human presence and activity and sensory-based disruption to wildlife. Animals could flush from human presence or noise, interrupting foraging, mating, or nesting activities and resulting in long-term, negligible, adverse impacts.

Within the frontcountry zone (see “Alternative 2” map), commercial airboating would continue to occur in the East Everglades Addition. Private airboating (by eligible individuals) would continue but would also be confined to the frontcountry zone and on designated routes. Airboat use would continue to disturb or displace wildlife and diminish wildlife habitat, but the area of impact would be reduced by the requirement to stay on designated routes within the frontcountry zone. Impacts on vegetation would be mitigated under low-water conditions in the East Everglades Addition to reduce impacts on wildlife habitat. The impacts on wildlife from airboats would be continued, minor, and adverse.

Closing certain tree islands to visitor use seasonally or year-round to protect wildlife and/or wildlife habitat would have long-term, local, minor, beneficial impacts on wildlife. Designation of two or three campsites on tree islands could locally increase impacts on wildlife (from increased human activity), but locations of such campsites would be carefully chosen to minimize impacts. Impacts would be localized, long-term, minor, and adverse on birds and other wildlife that use tree islands for forage or reproduction.

Moving NPS operational facilities to a consolidated center outside the Addition would allow restoration of wildlife habitat at the current site. Also, increased ranger patrols in the Addition would improve visitor

awareness of the fragility of the Everglades ecosystem, including wildlife, and possibly reduce the incidence of wildlife harassment, poaching, or other illegal interactions with wildlife. Impacts on wildlife would be long term, local, minor, and beneficial.

Chekika would continue to be open for seasonal day use in which park visitors could access marl prairies and hike or watch wildlife. Primitive camping would be a new visitor opportunity at Chekika in alternative 2. Impacts on wildlife (from sensory-based disturbance, flushing, etc.) would be localized, minor, and adverse.

Headquarters / Pine Island / Royal Palm / Main Park Road

The Nike Missile Base site would remain open for visitor interpretation with no to negligible effects on wildlife. Visitors would continue to hike and bicycle on selected trails and fire roads, and new such opportunities would be available at Hole-in-the-Donut; impacts on wildlife would be long term, localized, minor, and adverse. There would continue to be instances of wildlife being killed or injured from collisions with vehicles traveling on the main park road, resulting in long-term, localized, minor to moderate, adverse impacts. If alternative transportation were successfully implemented as far as the Long Pine Key area, there would be localized, long-term, minor, beneficial impacts on wildlife. Depending on the number of visitors using such options, vehicle volume could be reduced, resulting in fewer wildlife/vehicle collisions.

Florida Bay

Boat access in Florida Bay would be similar to that in the no-action alternative because most of Florida Bay would be zoned boat access. Maintaining the few idle speed, no-wake areas would help minimize wildlife impacts in those localities, a continued long-term, minor, beneficial impact. Baywide boating activity would continue to disturb sensitive wildlife

species and habitat, including shoreline species and habitat. Continued disturbance of wildlife from human activity and noise would especially be expected near the Florida Bay chickees. Boat groundings and propeller scarring would continue to disturb the sea bottom and seagrass beds that sea turtles, crustaceans, and other wildlife species depend on. Noise and wave action from motorboats would continue to adversely affect shoreline wildlife such as wading birds. However, several elements of alternative 2 would have long-term, minor benefits on wildlife and wildlife habitat. The mandatory boater education program and increased law enforcement presence would improve boater awareness about potential impacts to wildlife and compliance with regulations meant to protect wildlife. The comprehensive seagrass restoration program would help to restore damage from boat groundings and propeller scarring, benefitting sea turtles, crustaceans, and other wildlife that depend on seagrass. Considering these measures, the impact of boating activity on Florida Bay wildlife would be long term, minor, and adverse.

Developing a boat launch for carry-in boats along the 18-mile stretch of U.S. 1 would probably lead to increased levels of use in nearby areas (e.g., Long Sound). This action would lead to additional human-wildlife interactions, a long-term, localized, minor to moderate, adverse impact on wildlife. Similar impacts would be expected if small-scale visitor-oriented recreational improvements are developed at Tarpon Basin.

Managing Little Madeira Bay as pole/troll zone and Joe Bay as a backcountry (nonmotorized) zone would have localized, long-term, minor, adverse impacts (flushing, sensory-based disturbance, etc.) on wildlife and habitat in both bays. These would be new impacts compared to the no-action alternative, with no public use permitted in these areas.

Under alternative 2, five new chickees would be constructed in the Florida Bay region and would be used by boaters and paddlers.

Human activity in these local areas would increase—a long-term, localized, minor, adverse impact on wildlife because of sensory-based disruption from human presence and activities.

Gulf Coast / Ten Thousand Islands / Everglades City

The implementation of a boater education/permit requirement and increased ranger patrols would increase boaters' knowledge and understanding of park resources. The increased understanding and compliance would result in long-term minor benefits to wildlife through the public, causing reduced sensory-based disturbance associated with boating, harassing wildlife, and disturbing shoreline and bottom land habitat used by wildlife.

An upgraded canoe launch and improved boat launch and other developments at the Gulf Coast Visitor Center would result in long-term, minor, adverse impacts on wildlife, mostly associated with an increase in human presence and sensory-based impacts on wildlife. Eight chickees in the backcountry areas of the park would result in short-term, local, minor, adverse impacts associated with construction-related noise in undeveloped areas of the Gulf Coast. Additionally, there would be localized, long-term, minor, adverse impacts from the increased presence and activity of humans in the backcountry areas.

Establishing the unmarked Everglades Paddling Trail, which would be identified in visitor guides and marine charts, etc., would have negligible impacts on wildlife in this alternative because there would be no new visitor use restrictions.

Gopher Creek would be managed as in the no-action alternative. Along most of the creek there would be continued long-term, localized, minor to moderate, adverse impacts (flushing, sensory-based disturbance, etc.) on wildlife from human use. Impacts on wildlife would continue to be minor in the

easternmost segment, which would remain managed as idle speed, no wake.

Tamiami Trail / Shark Valley

The expanded evening activities at Shark Valley might increase the presence of and noise generated by park visitors in the evening hours, which might disturb wildlife activities at night in the areas near the Shark Valley visitor contact station. Impacts on wildlife from increased evening activities would be expected to be long term, local, negligible to minor, and adverse.

Relocating and centralizing operational activities to a new (previously disturbed) location such as Gator Park would allow restoration of wildlife habitat at the current operational sites but increase the level of activity at the new site. Impacts associated with construction would be short term and minor. Over the longer term, the increased human presence at the new (disturbed) site would have minor adverse impacts on wildlife.

Under this alternative, increased ranger patrols near Shark Valley and Tamiami Trail would increase visitor awareness of the fragility of the Everglades ecosystem. The presence of officers would presumably lead to reduced illegal wildlife feedings, harassment, and other direct human interactions with wildlife. The impacts on wildlife would be long term, negligible to minor, and beneficial.

Adaptive Management. Under alternative 2, the park would implement adaptive management, as described for the NPS preferred alternative. The potential benefits of these actions on wildlife could be short or long term and range from negligible to minor, depending on the actions taken. If necessary, such actions would be subject to additional NEPA planning and compliance.

Overall, alternative 2 would result in short- and long-term, moderate, adverse impacts and long-term negligible to minor beneficial impacts.

Cumulative Impacts. The impacts of other past, present, and anticipated projects on wildlife and habitats, through habitat restoration and enhancement, would be as described for the no-action alternative—long term, minor to moderate, and beneficial. Such projects/plans include the Modified Water Deliveries Project and the Tamiami Trail modification projects, several individual elements of the *Comprehensive Everglades Restoration Plan*, restoration of previously disturbed areas, and reduction of invasive nonnative plants and wildlife. The impacts from alternative 2 would be short and long term, negligible to moderate, and adverse because of sensory-based disturbance and other effects of visitor use, and short and long term, negligible to minor, and beneficial because of changes in management of visitor activities in various park areas. The cumulative impacts of other actions combined with the impacts of alternative 2 would be long term, minor to moderate, and beneficial. This alternative would have a small contribution to the total cumulative impacts.

Conclusion. Alternative 2 would have short- and long-term, moderate, adverse impacts, and long-term, negligible to minor, beneficial impacts. The cumulative impacts of alternative 2, combined with other past, present, and reasonably foreseeable actions, would be long term, minor to moderate, and beneficial.

FISHERIES

Freshwater Fishes

Adverse impacts on freshwater fishes under alternative 2 would arise from projects that may disrupt local aquatic habitat or local water quality during construction (e.g., projects that would create turbidity). An example of such a project would be the addition of visitor turnouts along Tamiami Trail. Impacts from these changes would be long term, localized, negligible to minor, and adverse.

Estuarine and Marine Fishes

Adverse impacts on estuarine and marine fishes arise from construction projects and increased visitor access to and operation of watercraft. As described for the NPS preferred alternative, construction projects include installation of five additional chickees in Florida Bay and eight more in the Gulf Coast / Ten Thousand Islands area.

Disturbance during installation would result in short-term, localized, minor, and adverse impacts. Increased use of the areas of the new chickees would result in long-term, localized, negligible to minor, and adverse impacts on fish.

Additional access for carry-in boats would be provided by a new boat access point along the main park road and at Long Sound (along the 18-mile stretch of U.S. 1) within Florida Bay. Management of the sound would remain the same. Impacts from increased visitor access in both areas would be long term, localized, negligible to minor, and adverse.

Little Madeira Bay would be managed as a pole/troll zone, and Joe Bay and adjacent smaller water bodies would be managed as a backcountry zone (paddle only) with fishing allowed. This would be a change from the no-action alternative, with both areas closed to public access. Therefore, this change would create fishing pressure where there has been none for more than 20 years. Impacts would be long term, localized, moderate, and adverse.

The new Gulf Coast Visitor Center and improved boat launch would slightly increase visitor use of that area, which would increase disturbance to fish. Those impacts would be assumed to be long term, localized, negligible to minor, and adverse. Impacts on fish during construction would be short term, localized, minor, and adverse. Establishment of an unmarked Everglades Paddling Trail is proposed under alternative 2; all segments would be zoned boat access (motorboats allowed), which would mean no change from

current conditions and therefore no to negligible new impacts.

Visitor use and access of Florida Bay would generally be as described for the no-action alternative—there would be few changes in access and use restrictions. Propeller scarring of the bay is extensive and likely increasing, and scarred areas are not recovering. Improved marking and signs do not necessarily decrease impacts on seagrass habitat (Stowers et al. 2002; NPS 2008c), although the cost is small and the net habitat gains may be worthwhile (Engeman et al. 2008). There are many stressors impacting seagrass habitat in the bay that are unrelated to boating. Nonetheless, impacts on fish from generally continuing current boat management of the bay would likely be long term, minor to moderate, and adverse. The proposed boater education/permit requirement would somewhat offset these adverse impacts by decreasing accidental groundings and inappropriate uses by boaters less familiar with the bay. Impacts would be long term, baywide, minor to moderate, and beneficial. The expanded seagrass restoration program in Florida Bay would also provide long-term, baywide, minor, beneficial impacts on fish and fish habitat.

Adaptive Management. As described for the NPS preferred alternative, under alternative 2 the park would implement an adaptive management approach to resource conservation. The potential benefits of these actions on fish and fish habitat could be short or long term and range from negligible to minor, depending on the actions taken. If necessary, such actions would be subject to additional NEPA planning and compliance.

Overall, under alternative 2, adverse impacts on fish and fish habitat would be short and long term, localized, and moderate from continued visitor activities (including continued full access by motorboats to Florida Bay) and from construction.

Cumulative Impacts. As described under the no-action alternative, impacts from past,

present, and reasonably foreseeable actions would be long-term, parkwide, minor, and adverse overall, with the bulk of adverse effects resulting from ongoing fishing. In combination with the benefits and long-term, adverse, negligible to moderate effects of alternative 2, overall cumulative effects would be long term, parkwide, minor, and adverse. The contribution of alternative 2 to this overall effect would be small.

Conclusion. Under alternative 2, adverse impacts on fish and fish habitat would be short and long term, localized, and moderate from continued visitor activities (including continued full access by motorboats to Florida Bay) and from construction. Impacts from past, present, and reasonably fore-seeable actions would be long-term, parkwide, minor, and adverse overall, with the bulk of adverse effects resulting from ongoing fishing. The overall cumulative effect of alternative 2 combined with other past, present, and reasonably foreseeable actions would be long term, parkwide, minor, and adverse.

Essential Fish Habitat

In alternative 2, implementation of the boater education/permit program and seagrass restoration projects would result in slight improvements to the health and functioning of benthic habitat. Existing adverse impacts on essential fish habitat in estuarine and benthic substrates (mud, sand, shell, and rock) and on associated biological communities (including submerged vegetation such as seagrasses and algae, marshes and mangroves, and oyster shell reefs/banks) from boat groundings and propeller scarring would be somewhat reduced as boaters learn to better navigate through the bay. Implementing alternative 2 would result in long-term, negligible, beneficial impacts on shallow-water habitats.

Cumulative Impacts. Ongoing park efforts to remove nonnative vegetation and conduct passive and active restoration of infested mangrove habitats would improve essential

fish habitat, resulting in an overall, long-term, minor to moderate benefit. Seeding, planting, and/or use of soil amendments to actively restore treated areas within the park would have short-term, negligible to minor, adverse effects on essential fish habitats from the transport of sediments or nutrients that affect water quality. Nonnative vegetation treatments and large-scale restoration actions in Everglades National Park adjacent to areas of essential fish habitat could result in the transport of sediments that would temporarily degrade the water quality and the habitat. With implementation of mitigation measures, the short-term effects would be negligible to minor. Overall cumulative effects would be short- and long-term, minor, adverse and beneficial impacts to essential fish habitat. Alternative 2 would constitute the majority of the beneficial cumulative impacts.

Conclusion. Implementing alternative 2 would result in long-term, negligible, beneficial impacts on shallow-water habitats. Other sections in this chapter include more details on specific effects on resources. As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be no adverse effects on essential fish habitat under this alternative.

FEDERAL SPECIAL STATUS SPECIES

Florida Panther

Within the frontcountry zone (see “Alternative 2” map), commercial airboating would continue within the East Everglades Addition, and a wider range of tours to more destinations would be offered. Private airboating (by eligible individuals) would continue but would also be confined to the frontcountry zone on designated routes. Overall, the intensity and geographic range of airboat use would be comparable to the no-action alternative. The presence of airboats and associated noise in much of the northern half of the East Everglades Addition would continue to disturb panthers and reduce the

quality of panther habitat in this area of the park. The network of airboat trails would also continue to alter dispersal and foraging corridors for panthers as well as deer, which are their primary prey. Thus, over the long term, Florida panthers and their habitat in this area would be disturbed by airboat activity to a similar degree as under the no-action alternative (current management). This would have continued long-term, minor, adverse impacts on Florida panthers in the park.

Visitor access to tree islands for camping and other recreational purposes would continue to locally diminish the attractiveness of habitat to panthers; however, seasonal or year-round closures of certain tree islands or areas for resource protection reasons would reduce impacts on moving or foraging panthers. Increased visitor use of frontcountry areas would have no detectable effects on panther populations compared to the no-action alternative because panthers would likely continue to avoid areas where high levels of human activities were occurring.

Cumulative Impacts. Regional impacts on Florida panther populations would be the same as described under the no-action alternative—threats to Florida panthers are their health problems, mostly related to poor habitat conditions, genetic defects from inbreeding, and continuing loss of habitat. Protection efforts by the National Park Service and U.S. Fish and Wildlife Service (area wildlife refuges) and state conservation efforts have resulted in an increase in the panther population, which provides localized, long-term, moderate benefits. However, continued habitat fragmentation and loss outside these areas and increasing vehicle traffic resulting in increasing panther deaths (collisions with vehicles continue to be a leading cause of panther mortality) would continue to limit these benefits. The minor beneficial and adverse impacts of alternative 2 actions, combined with the other beneficial actions that occur at the regional level, would result in minor beneficial cumulative effects. The contribution of alternative 2 to this cumulative effect would be small.

Conclusion. Continued visitor activities in habitat used by panthers would have discountable short- and long-term consequences on the panther. Actions under alternative 2 would result in long-term, minor, adverse impacts and long-term, minor, beneficial impacts; however, this impact would not rise to the level of a measurable effect. Cumulative effects would be minor and beneficial.

Key Largo Woodrat and Key Largo Cotton Mouse

Under alternative 2, effects on the woodrat and cotton mouse would be similar to those described under the no-action alternative. A potential visitor information facility and NPS replacement housing would be developed on already disturbed lands. Placement of a visitor kiosk at the Key Largo ranger station developed area would have no appreciable effect on woodrats or cotton mice. Overall, alternative 2 would result in continuing negligible adverse impacts on these species. These impacts would be insignificant or discountable.

Cumulative Impacts. Widespread effects on the woodrat and cotton mice would be as described for the no-action alternative. These species would continue to be threatened by habitat degradation caused by development, pollution, and human intrusion on hardwood hammocks across the animals' ranges. The effects of implementing alternative 2 would be negligible, and when combined with the adverse effects of other actions that occur at the regional level, would result in moderate adverse cumulative effects on the Key Largo woodrat and Key Largo cotton mouse. Alternative 2 would contribute very slightly to the overall cumulative effects.

Conclusion. Under alternative 2, some continuing negligible, adverse, impacts on woodrats and cotton mice may occur. Since Key Largo woodrat populations would be sensitive to any loss in habitat, special attention would be paid to even small habitat

losses. Cumulative effects would be moderate and adverse.

Manatee

Continued relatively unrestricted motorboat access in Florida Bay would mean that boating activity would continue to harm manatees and critical habitat for manatees through strikes and habitat disturbance (propeller scarring and boat groundings in shallows), a long-term effect. The manatee would potentially benefit from alternative 2 as a result of the parkwide boater education/ permit system and increased law enforcement patrols if, as a result, boaters were more aware of and would avoid areas frequented by manatees. Active seagrass restoration would improve manatee forage areas damaged by propeller scarring and boat groundings. The national park's manatee protection plan effort would eventually lead to long-term benefits, which would be expected to be minor.

Little Madeira Bay would be managed as a pole/troll zone, and Joe Bay and adjacent smaller water bodies would be managed as the backcountry zone (paddle only) with fishing allowed. Manatee using these waters would remain relatively well-protected from boat strikes through the implementation of these management zones.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees could lead to increased use, particularly in certain areas, which could increase the incidence of boats striking manatees. Considering these changes, manatees would still be at risk from direct boat strikes and critical habitat degradation under alternative 2.

Overall, alternative 2 would have long-term, minor benefits and continuing moderate adverse effects on manatees and critical habitat for manatees.

Cumulative Impacts. Regional impacts on manatees from past hunting and poaching, from injuries from boats and their propellers, from injuries in water-control structures, from critical habitat loss, from salinity changes, and from water quality changes would be the same as described under the no-action alternative. The negligible beneficial and moderate adverse impacts of alternative 2 actions, combined with the adverse impacts of other actions that occur at the regional level, would result in moderate adverse cumulative impacts on manatees and critical habitat for manatees. Alternative 2 would make a small contribution to these adverse cumulative effects.

Conclusion. Continued motorboat activity and visitor access in the park's marine waters would result in long-term, moderate, adverse effects on manatees and critical habitat for manatees from boat and propeller strikes and habitat disturbance. Improved boater education, increased on-the-water law enforcement, seagrass restoration, and a manatee management plan would result in reduced boat strikes and improved critical habitat and create minor benefits. Cumulative effects would be moderate and adverse. The beneficial effects of this alternative would not be enough to offset overall cumulative effects

Bottlenose Dolphin

Under alternative 2 bottlenose dolphins would benefit from reduced disturbance from restoration of seagrass habitats within Florida Bay. However, bottlenose dolphins would continue to be at risk from visitor activities in the park. Bottlenose dolphins would benefit from the parkwide boater education and permit system and increased law enforcement. The implementation of a channel/access route marking and management plan would provide minimal benefits from reduced boater speeds in the bay and limited benefits on the dolphin's food sources in the bay compared to the no-action alternative. Management of Little Madeira Bay as pole/troll zone and Joe Bay as a backcountry (nonmotorized) zone would have long-term benefits on bottlenose

dolphins and their food sources. The continued relatively unrestricted boat access in park marine waters would continue hazards to bottlenose dolphin foraging activities, as described in the no-action alternative.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees would increase boat access and visitation near these locations and might cause them to vacate an area.

Compared to the no-action alternative, adverse impacts would be reduced somewhat by the boater education/permit requirement and the comprehensive seagrass restoration program. Overall, alternative 2 would have negligible, long-term, beneficial effects on bottlenose dolphins.

Cumulative Impacts. Bottlenose dolphin populations are threatened by commercial fishing practices and disturbance of bays and estuaries. These threats are global and represent both direct injury to and mortality of bottlenose dolphins. Adverse impacts on the bottlenose dolphins would be similar to those described under the no-action alternative—regional and long term. When the negligible beneficial effects of alternative 2 are combined with the adverse effects of other past, present, and future actions, the overall cumulative effects would be minor and adverse on the bottlenose dolphin. The contribution of alternative 2 to these cumulative effects would be slight.

Conclusion. Alternative 2 would have long-term, negligible, beneficial effects on bottlenose dolphin. Cumulative effects would be minor and adverse.

Wood Stork

Within the frontcountry zone (see “Alternative 2” map), commercial airboating would continue within the East Everglades Addition, and a wider range of tours to more

destinations would be offered. Private airboating (by eligible individuals) would continue but would also be confined to the frontcountry zone on designated routes. Overall the intensity and geographic range of airboat use would be comparable to the no-action alternative. Airboating has been occurring for many years in the East Everglades Addition. The two colonies in the Addition area are probably habituated to human use, so any adverse effects from recreational activities would likely be minor. Although a wider range of commercial airboat tours to new destinations would be offered, these tour routes would be sited to avoid known wood stork colonies, so new impacts would not be expected. The occurrence of nonmotorized and low-level visitor activities in densely wooded mangrove areas, such as along the Wilderness Waterway and near Florida Bay, would likely have no detectable effects on storks. The eight additional chickees in the Gulf Coast / Ten Thousand Islands area would be sited to avoid known nesting or foraging areas, so no new impacts would be expected.

Under alternative 2, any minor adverse effects (e.g., disturbance or flushing of wood storks) would likely be discountable or insignificant.

Cumulative Impacts. The regional benefits on wood stork populations would be the same as described for the no-action alternative—long term, moderate, and beneficial. According to the U.S. Fish and Wildlife Service, the wood stork population is increasing and expanding its range and appears to have adapted to some degree to changes in habitat in south Florida. Successful nesting has increased since its listing as an endangered species (USFWS 2007c). Although individual colonies are declining in size, the overall number of colonies is increasing, and the U.S. Fish and Wildlife Service is considering changing the status of the species from endangered to threatened. Any minor adverse effects of alternative 2 in combination with the moderate beneficial effects of other actions that occur at the regional level would result in minor to moderate beneficial effects on the

wood stork and are not likely to adversely affect the wood stork. Alternative 2 would not diminish the overall cumulative benefits.

Conclusion. Any adverse effects from alternative 2 on wood storks would be continued, long term, minor, and adverse as a result of visitor activities. Cumulative effects would be moderate and beneficial.

Piping Plover, Roseate Tern, and Red Knot

Under alternative 2, visitor access via boat to coastal areas of the park in Florida Bay and Ten Thousand Islands would continue similar to the no-action alternative. There is no site-specific scientific evidence to suggest that plovers, terns, or red knots are being adversely affected by ongoing boating activities. These species use the park's shorelines and keys, sometimes close to where boating and related activities occur. Any displacement of terns, plovers, or red knots from preferred areas (which could increase energy expenditure or temporarily disrupt behavior (USFWS 2003e) would likely have minor adverse effects. Ongoing minor adverse effects to designated piping plover critical habitat would continue to occur through alteration of natural coastal processes as a result of boat wakes and damage to mud bank/seagrass from boat propellers. Minor benefits to critical habitat would result from limiting access and associated direct disturbance of critical habitat. Managing Little Madeira Bay as a pole/troll zone and Joe Bay as a backcountry zone would likely increase sensory-based disturbance from recreationalists in the bays, a new, minor, adverse effect.

Overall, any adverse effects of alternative 2 to these species and critical habitat would likely be minor and adverse but insignificant.

Cumulative Impacts. Widespread effects on the piping plover, roseate tern, red knot, and piping plover critical habitat would be as described for the no-action alternative—long term, moderate, and adverse. The piping

plover, roseate tern, and red knot continue to be threatened across their ranges by coastal habitat loss from development, predation, poor water quality, and unnatural water delivery and salinity. Alternative 2 actions would result in minor adverse impacts that, when combined with other actions occurring at the regional level, would result in moderate adverse cumulative effects on the piping plover, roseate tern, red knot, and piping plover critical habitat. Alternative 2 would make a very slight contribution to widespread effects.

Conclusion. Overall, alternative 2 would contribute long-term, minor, adverse impacts to piping plovers, roseate terns, red knots, and critical habitat for piping plovers. There would be moderate, adverse, cumulative effects.

Everglade Snail Kite

Under alternative 2, the intensity and geographic range of airboat use would be comparable to the no-action alternative. Designating certain tree islands for recreation and establishing campsites in the East Everglades Addition would probably not adversely affect snail kites because known snail kite habitat would be avoided. Ground-disturbing activities around the Gulf Coast Visitor Center would not be in the snail kite's preferred habitat, and therefore no effects are likely. Overall, alternative 2 would be expected to have long-term, minor, adverse and beneficial impacts that are insignificant or discountable.

Additionally, because the designated critical habitat for the Everglade snail kite lies outside East Everglades, there are no proposed actions in alternative 2 that will affect designated critical habitat.

Cumulative Impacts. The Everglade snail kite population continues to be threatened throughout its range in south Florida because of hydrologic fluctuations affecting its food source, in addition to widespread habitat

degradation caused by human-induced hydrologic changes. In addition to habitat loss, the lack of recruitment of new breeders into the population and the lack of fledging success have negative effects on the Everglade snail kite population. These threats have resulted in widespread, long-term, adverse effects on the snail kite population despite habitat protection measures provided by Everglades National Park. The minor impacts of alternative 2 actions, combined with the adverse impacts of other actions that occur at the regional level, would have moderate adverse cumulative effects on the snail kite. Alternative 2 would not make a detectable contribution to these effects.

Conclusion. Alternative 2 would have long-term, minor, adverse and beneficial effects on the Everglade snail kites in the East Everglades.

Eastern Indigo Snake

Within the frontcountry zone (see “Alternative 2” map), commercial airboating would continue within the East Everglades Addition, and a wider range of tours to more destinations would be offered. Private airboating (by eligible individuals) would continue but would also be confined to the frontcountry zone on designated routes. Overall the intensity and geographic range of airboat use would be comparable to the no-action alternative. Continued intermittent use of tree islands in the East Everglades Addition could temporarily displace snakes or disturb their activities, resulting in short-term effects. Ground-disturbing activities for construction would not be in the snake’s preferred habitat and therefore would have no effect. Designation of campsites on tree islands in the East Everglades Addition could disturb burrowing snakes if small-scale excavation is required. However, the park would implement their standard eastern indigo snake protection and education plan for all construction personnel to follow in compliance with the park’s conservation and protection plan for the snake. Alternative 2

would contribute short- and long-term adverse effects on snakes from ongoing human activities and if habitat is disturbed during development of campsites on tree islands in the East Everglades Addition.

Overall, alternative 2 would have short- and long-term, minor (mostly continuing), adverse effects on the eastern indigo snake.

Cumulative Impacts. The decline in eastern indigo snake populations is attributed to loss of habitat to agriculture and to collecting for the pet trade. The species has also suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection. These regional effects on the snake would continue to have long-term, moderate, adverse impacts on eastern indigo snakes. Alternative 2 would have short- and long-term, minor (mostly continuing), adverse effects, and when combined with the moderate adverse effects of other actions that occur at the regional level, would have a moderate, adverse, cumulative effect on the eastern indigo snake. Alternative 2 would have a slight contribution to the cumulative effects on this species.

Conclusion. Alternative 2 would have short- and long-term, minor (mostly continuing), adverse effects on indigo snakes. Cumulative effects would be moderately adverse.

American Alligator

Under alternative 2 visitor and administrative use (airboating, encounters on popular trails, collisions with vehicles on park roads, etc.) and construction or facility improvements would be the primary activities with potential to affect alligators. Under this alternative the intensity and geographic range of airboat use would be comparable to the no-action alternative. During construction of a new administrative facility outside the park near the East Everglades Addition, facility upgrades, and installation of new shade structures at Shark Valley, resident alligators would likely leave the vicinity but would not

be harmed and would return once construction is completed. The American alligator would continue to benefit from habitat protection and reduced potential for individual animals to be affected by poaching or other human threats in the park. Although alligators are sometimes found in brackish water, no adverse impacts would be anticipated from designation of an unmarked Everglades Paddling Trail or installation of eight additional chickees in the Gulf Coast / Ten Thousand Islands area. Under alternative 2, there would continue to be a risk of airboats or boat strikes, a long-term, minor, adverse effect.

Cumulative Impacts. Once on the brink of extinction, well over one million alligators can be found today in the southeastern United States. Although there were once far greater numbers in the Everglades, the alligator population has recovered nicely and it is no longer classified as an endangered species because of actions that had a parkwide, long-term, moderate benefit. However, degradation from development of alligator habitat continues to cause concern for the long-term well-being of the species. The minor effects of alternative 2 actions, combined with other actions that occur at the regional level to benefit recovery of alligator populations, would result in a minor beneficial cumulative effect on alligators. Alternative 2 would contribute a modest amount to these cumulative effects.

Conclusion. Overall, the park would continue to protect American alligators and their habitat. The cumulative effect would be minor and beneficial.

American Crocodile

The American crocodile inhabits the brackish and saltwater habitats of the park's mangrove coasts. Designated critical habitat for this species extends across the Florida Bay shoreline and estuary habitats southward to the keys. Under alternative 2 visitors would continue to have largely unrestricted access to

the shoreline of Florida Bay, the Gulf Coast, and the Wilderness Waterway. Visitor and administrative activities would result in localized and short-term disturbances from motorboats and human presence and continued localized and short-term effects on designated critical habitat. The American crocodile would potentially benefit from a parkwide boater education/permit requirement and from increased law enforcement. These changes could result in a long-term reduction of human interactions with crocodiles and their habitat.

Little Madeira Bay would be managed as a pole/troll zone, and Joe Bay and adjacent smaller water bodies would be managed as a backcountry zone (paddle only) with fishing allowed. Crocodiles inhabiting these waters would likely experience some disturbance from boating activity, but any impacts would probably be negligible to minor because the boats (paddled craft or poled/trolled boats) would be traveling at slow speeds.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees would distribute visitor use and increase boat use in some areas. It is not expected that nesting or important life functions would be interrupted because the numbers and distribution of this species have been increasing in south Florida and the park (USFWS 1999h).

Overall, actions taken under alternative 2 would result in short- and long-term, negligible, adverse, and negligible to minor beneficial impacts on the American crocodile and designated critical habitat for the American crocodile.

Cumulative Impacts. Predation, degraded hydrologic conditions, and habitat loss are the most important factors influencing the status of crocodiles in the park and south Florida. However, the status of the Florida population has been changed to threatened because of a recent sustained increase in numbers,

particularly nesting females. The nesting population continues to slowly increase, both in abundance and nesting range since effective protection of wildlife and nesting habitat was established. Within Everglades National Park, crocodiles have access to relatively undisturbed habitat, which has allowed their local population to increase and to consistently use high quality habitat.

Alternative 2 actions, combined with the other actions that occur at the regional level, would result in cumulative effects that are widespread, long term, moderate, and adverse to both the American crocodile and designated critical habitat for the American crocodile. The contribution of alternative 2 to the overall cumulative effects would be small.

Conclusion. The park would continue to provide protection of American crocodiles and their designated critical habitat, although some minor adverse effects from visitor and administrative uses would be expected. Cumulative effects would be long term, moderate, and adverse.

Sea Turtles

Under alternative 2 sea turtles would continue to benefit from access to undeveloped shoreline and availability of seagrass habitats within Everglades National Park. However, sea turtles would be at continued potential risk from visitor and management activities in the park. The turtles' slow-moving nature makes them susceptible to strikes by fast-moving boats, and seagrass habitat would continue to be degraded by propeller scarring and boat groundings. Continued relatively unrestricted boat access in the park's marine waters would present hazards to sea turtles' nesting and foraging activities. Compared to the no-action alternative these impacts might be reduced somewhat by the boater education/permit requirement and the comprehensive seagrass restoration program. Management of Little Madeira Bay as a pole/troll zone and Joe Bay as a backcountry (nonmotorized) zone would probably not add

to these hazards because turtles could avoid slow-moving boats.

Additionally, direct effects on sea turtles could include incidental catches by recreational anglers using hook-and-line methods that could lead to injury and, in some instances, eventual death. These impacts are expected to be long term, adverse, and moderate.

Continued boat use and recreational beach use along Cape Sable, Shark Point, and Highlands Beach would result in continued minor adverse effects to both NOAA and USFWS proposed loggerhead sea turtle critical habitat. Boater education programs may result in minor benefits to proposed critical habitat.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) along with installation of new chickees would increase boat access near these locations.

Overall, alternative 2 would have long-term benefits and moderate (mostly continuing) adverse effects on sea turtles and minor adverse impacts to proposed loggerhead sea turtle critical habitats.

Cumulative Impacts. All sea turtle species are threatened by commercial fishing and habitat destruction. These threats are global in nature and result in both direct injury to and mortality of turtles and loss of nesting habitat due to shoreline development (e.g., coastal runoff, marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, increased underwater noise, and boat traffic). These combine to produce long-term, moderate to major, adverse effects on sea turtle populations. The effects of alternative 2, in combination with the adverse effects of other actions that occur at the regional level and larger scales, would result in moderate, adverse, cumulative effects on sea turtles.

Conclusion. Alternative 2 would reduce impacts on sea turtles and their habitats, resulting in some long-term, minor benefits to sea turtles. However, alternative 2 would also result in some continued, long-term, moderate, adverse effects to sea turtles from human activities (primarily motorboating and recreational fishing). This alternative would result in a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act for sea turtles.

The alternative would result in minor, adverse impacts and a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for and NOAA and USFWS proposed critical habitat for the loggerhead sea turtle. Overall, cumulative effects would be moderate and adverse.

Smalltooth Sawfish

Visitor and administrative uses (primarily boating, recreational fishing, and in-water construction/ maintenance projects) would be the primary activities with the potential to affect the smalltooth sawfish under alternative 2. In particular, smalltooth sawfish may be adversely affected by recreational fishing activity within the park, through incidental hooking, entanglement, or digestion of fishing line. Boat access in Florida Bay would remain generally unrestricted under alternative 2. However, implementing the mandatory boater education/permit system and increased ranger patrols would add to boater knowledge and understanding of park resources, including sawfish and sawfish habitat. These changes, coupled with active seagrass restoration to protect important habitat for the sawfish's food source, could result in some measure of reduced adverse impacts to the smalltooth sawfish.

There would be no additional protective measures for juvenile smalltooth sawfish found throughout Ten Thousand Islands. Motorboating would continue in areas such as Hurdles Creek where monitoring of juvenile sawfish is underway. Boating activity would

continue to disturb habitat and any nearby sawfish.

Adverse impacts would be long term, moderate, and adverse for the smalltooth sawfish, and minor and insignificant for smalltooth sawfish designated critical habitat.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch, habitat loss and degradation, and disturbance of natural behavior from human activities (NMFS 2006). These widespread threats have resulted in a large reduction in their population size. Alternative 2 actions would result in moderate adverse and negligible beneficial impacts and when combined with the adverse impacts of other actions that occur at the regional level, would result in cumulative effects that are moderate and adverse. The contribution of alternative 2 to these adverse cumulative effects would be slight.

Conclusion. Alternative 2 would result in minor, beneficial impacts and moderate, adverse impacts to the smalltooth sawfish from human activities (primarily recreational fishing)—a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act. The alternative would result in minor, adverse impacts and a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for designated critical habitat for the smalltooth sawfish. Cumulative effects would be moderate and adverse.

NATURAL SOUNDSCAPES

Under alternative 2, noise levels across the park would be expected to remain relatively similar to present-day levels in most areas, with natural sounds continuing to predominate. Human-generated noise in the park would continue to stem primarily from vehicular traffic, aircraft overflights, and administrative activities involving airboat and/or aircraft use. Areas most affected by human-generated noise would be developed

areas, popular boating (and airboating) areas, campgrounds, and areas near major roads. If alternative transportation to various park areas is successfully implemented, noise levels could be locally decreased by the reduction in numbers of individual passenger vehicles.

East Everglades Addition

Airboating would continue in the East Everglades Addition within the frontcountry zone (see “Alternative 2” map). Commercial airboat operators would continue to function seven days per week. Noise from private airboats is more common on weekends, when more airboats are on the water. Park staff also use airboats for maintenance, research, law enforcement, and fire/vegetation management. As described in the no-action alternative, airboat-generated peak instantaneous noise levels measured between 95 dB(A) and 110 dB(A) at 50 feet and at maximum operating conditions (Glegg et al. 2005). Because of the intensity of airboat noise, commercial and private airboat use in the East Everglades Addition would continue to have long-term, moderate, adverse impacts on the natural soundscape near areas with airboat use. Private airboating (by eligible individuals) in the East Everglades Addition would be confined to the frontcountry zone on designated routes; the long-term benefit would be negligible because of the relatively large extent of this zone in alternative 2. Under alternative 2, commercial airboat operations would be placed under concessions contracts with the park, which would restrict commercial airboating to designated routes and implemented resource protection measures, similar to the NPS preferred alternative; however, a wider range of tours and routes would be available than under the NPS preferred alternative. This would result in long-term, negligible to minor, beneficial impacts on the soundscape compared to the no-action alternative. Overall, the restrictions on both private and commercial airboating would have a long-term, regional, negligible to minor, beneficial

impact on the soundscape of the East Everglades Addition.

Natural soundscapes of the Addition would continue to be affected by administrative use of helicopters and airboats under alternative 2. The East Everglades Addition wilderness proposal in this alternative would have little effect on the natural soundscape because the National Park Service already uses the wilderness minimum requirement process (which is designed to protect wilderness values such as natural quiet) in this wilderness-eligible area. Thus, impacts on the natural soundscape would remain long term, localized, moderate, and adverse.

The Tamiami Trail borders the East Everglades Addition to the north, and the heavy traffic along the highway would continue to cause long-term, localized, moderate, adverse impacts on the soundscape in areas near the road.

Headquarters / Pine Island / Royal Palm / Main Park Road

Under alternative 2 the main park road and various developed and frontcountry areas in the Pine Island District would remain a focus of visitor and administrative activities. The main difference compared to the no-action alternative would be reduced noise from recreational vehicle generators at the Long Pine Key campground because of the installation of electrical hookups. Generator use would continue to be prohibited during nighttime quiet hours, as under the no-action alternative, so this would be a continuing, negligible to minor, beneficial impact. Long-term, local, minor, adverse impacts on natural soundscapes from human activity and park operations would continue in the Pine Island District under the alternative 2.

Florida Bay

Alternative 2 would allow recreational access to the same sites in Florida Bay as the no-

action alternative. However, this alternative would add five additional chickees in Florida Bay, which would be additional localized areas of increased human activity. These new recreational and camping sites in Florida Bay would have localized, long-term, minor, adverse effects on the natural soundscape.

Under alternative 2 there would continue to be relatively unrestricted motorboat access throughout most of Florida Bay, so soundscapes would continue to be affected by intermittent motorboat noise. This would continue a long-term, localized, minor, adverse impact on natural soundscapes of the bay.

Under alternative 2, Little Madeira Bay would be managed as a pole/troll zone, and Joe Bay and its adjacent smaller water bodies would be managed as a backcountry (nonmotorized) zone. This would open Crocodile Sanctuary to public use, and the increase in noise associated with human activity (voices, etc.) would result in long-term, localized, negligible, adverse impacts on the natural soundscape.

Gulf Coast / Ten Thousand Islands / Everglades City

Alternative 2 would add eight backcountry chickees to the Gulf Coast / Ten Thousand Islands area of the park, and these would be additional localized areas of increased human activity. Impacts on the natural soundscape would be long term, minor, and adverse. Construction of developments to the Gulf Coast area would result in short-term, localized, minor, adverse impacts to the soundscape.

The new Everglades Paddling Trail would probably have little, if any, impact on natural soundscapes under this alternative because there would be no new restrictions (via management zoning) on recreational boating use.

Throughout the Gulf Coast region there would continue to be unrestricted motorboat access, with the exception of a few idle speed, no-wake areas, so the natural soundscape would continue to be diminished by intermittent motorboat noise. This would continue to be a long-term, localized, moderate, adverse impact on the natural soundscape.

Tamiami Trail / Shark Valley

At Shark Valley, the impacts of alternative 2 would be the same as for the no-action alternative—long term, local, minor to moderate, and adverse from various noises associated with vehicle sounds, park operational activities, facilities (e.g., air-conditioners), and human voices. There would also be short-term, localized, moderate, adverse impacts from construction activities associated with new and upgraded facilities.

Alternative 2 would have long-term, local, moderate, adverse as well as negligible to minor, beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, and aircraft).

Cumulative Impacts. Most unnatural sounds from other past, present, and reasonably foreseeable plans and projects would continue to be from localized human activity, motorboats, vehicle traffic, aircraft, and airboats. Some projects are planned or underway that would add to such noise by generating localized, short-term noise impacts from construction and restoration activities. Examples of such plans include the Modified Water Deliveries project; the *Comprehensive Everglades Restoration Plan*, wetland and disturbed area restoration plans; the Tamiami Trail modifications; the main park road resurfacing; the replacement of the marine bulkheads at Flamingo; and Flamingo improvements. These efforts would have local, long-term, negligible to moderate,

adverse effects depending on the location and the source of the noise. External sources would continue to affect the natural soundscape of the park, similar to the no-action alternative, with long-term, minor, adverse effects on the park. The effects of alternative 2 would be long term, local, minor to moderate, and adverse as well as negligible to minor and beneficial, depending on the location and the source; the greatest sources of noise would be motorboat use in marine areas, airboat use in the East Everglades, and human activity in developed areas of the park, such as Shark Valley. Under alternative 2, impacts on the natural soundscape would continue to be mostly confined to developed areas, popular boating (and airboating) areas, campgrounds, and along major roads. The effects from other park plans, projects, operations, and external sources, combined with the impacts of alternative 2 on natural soundscapes would be long-term, minor, adverse, cumulative impacts. Alternative 2 would contribute a modest amount to the total cumulative impacts.

Conclusions. Alternative 2 would have long-term, local, minor to moderate, adverse as well as negligible to minor, beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, and aircraft). The effects of alternative 2 combined with other past, present, and reasonably foreseeable plans, projects, operations, and external sources would have long-term, minor, adverse, cumulative effects on the overall soundscape of the park.

WILDERNESS CHARACTER

Nearly 1.3 million acres of Everglades National Park would continue to be managed as designated wilderness, as it has been since 1978. This includes approximately 530,000 acres of submerged marine wilderness. An additional 82,000 acres would continue to be managed as potential wilderness, as it has been since 1978. Alternative 2 would expand

the park's wilderness. About 39,500 acres in the southern portion of the East Everglades Addition would be proposed for wilderness designation.

Untrammelled

Under alternative 2, the park would continue to manage natural resources in all areas of the park from an ecosystem perspective (e.g., wetland restoration, invasive nonnative plant/wildlife management, and fire management efforts, which would have a long-term, minor, adverse impact on the untrammelled quality of the park's wilderness. The East Everglades Addition would remain an area of specific focus for these activities.

Alternative 2 would establish the same seagrass restoration program in Florida Bay as in the NPS preferred alternative. These efforts would have short-term, localized, minor to moderate, adverse impacts on the untrammelled quality of submerged wilderness areas that undergo restoration efforts.

Natural

Main Portion of the Park (all but East Everglades Addition). Similar to the NPS preferred alternative, alternative 2 would establish a comprehensive seagrass restoration program in Florida Bay for sites and areas damaged by boat groundings and propeller scarring. This would have long-term, local, minor to moderate, beneficial impacts on the natural quality of the submerged wilderness.

Alternative 2 would establish a boater education/permit requirement for operators of motorboats and nonmotorized boats. This program, along with increased patrols and enforcement, would help reduce boat groundings and propeller scarring. Although there would continue to be obvious scarring of seagrass and the sea bottom from propeller scarring, boat groundings, and anchoring, especially in Florida Bay where the water tends to be clearer, and the permanent

channel/access routes that have been prop-dredged through submerged marine wilderness would remain, the boater education/permit requirement, increased patrols and enforcement, and the comprehensive seagrass restoration program would likely decrease the prevalence of such impacts. Compared to the no-action alternative, impacts on the natural quality of submerged marine wilderness would be long term, minor to moderate, and beneficial.

Under alternative 2, the park would continue to manage the network of backcountry and wilderness campsites and chickees while adding chickees (five in Florida Bay and eight in the Gulf Coast / Ten Thousand Islands area). Such facilities diminish the naturalness of a locale, both in terms of scenery and in relation to the natural soundscape. This would locally reduce naturalness, a minor, long-term, adverse effect. The proposed Everglades Paddling Trail would be unmarked in this alternative, so it would have no adverse effect on naturalness.

East Everglades Addition. The proposed designation of 39,500 acres as wilderness would ensure that most of this area would be permanently protected and managed to preserve its natural quality from an ecosystem perspective. Because of the large area that would be designated as wilderness in perpetuity, this would have a major, long-term, beneficial impact on the area's natural quality.

Within the East Everglades Addition, alternative 2 would limit private airboating to designated routes in the frontcountry zone. Commercial airboats would continue to run in the northern portion of the frontcountry zone, with a wider range of tours to more destinations available. However, the eventual elimination of private airboats in the area proposed for wilderness designation would end the creation of new airboat trails (which are apparent because they damage or destroy sawgrass vegetation) and allow existing airboat trails to recover over time in the area proposed for wilderness. Because relatively

few airboats travel in the area proposed for wilderness designation in this alternative, impacts on the natural quality of wilderness would be long term, minor to moderate, and beneficial.

Undeveloped

Main Portion of the Park (all but East Everglades Addition). Under alternative 2, the park would continue to manage the network of backcountry and wilderness campsites and chickees and would add eight chickees in the Gulf Coast / Ten Thousand Islands area. These actions would have a long-term, localized, minor, adverse effect on the undeveloped quality of land-based wilderness. The proposed Everglades Paddling Trail would be unmarked, so it would have no effect on the undeveloped quality of the main park area.

In Florida Bay, five new chickees would impact the undeveloped quality of the submerged wilderness because their pilings are embedded into the submerged (marine wilderness) bottom. This would be true as well of boundary markers, channel/access route markers, and navigational aids (all improved in alternative 2, but using the minimum necessary to provide direction while preserving scenery). There would be long-term, negligible to minor, adverse impacts on the undeveloped quality of submerged wilderness where new chickee pilings and boundary markers/ navigation aids are driven into the submerged bottom.

East Everglades Addition. Most of the wilderness-eligible portion of the East Everglades Addition lacks human developments. Alternative 2 would propose 39,500 acres in the southern portion of the Addition for wilderness designation. With wilderness designation, the area would be permanently protected from future development, except as required for resource protection or visitor safety, per NPS management policies. Unless they are determined to be historic, some structures

such as hunting cabins, airboat docks, road traces, and canals within these areas would eventually be removed, and the areas would be restored to natural conditions. With the designation of wilderness and removal of some nonhistoric developments, impacts on the undeveloped quality of wilderness within the East Everglades Addition would be long-term (in perpetuity), regional, minor, and beneficial.

The designation of wilderness would also affect the undeveloped quality by eventually eliminating the use of private airboats and limiting administrative use of in this area. This would give the perception that this is an undeveloped area compared to the no-action alternative, and would be a moderate, long-term, beneficial effect on this quality.

Opportunities for Solitude or Primitive and Unconfined Recreation

Main Portion of the Park (all but East Everglades Addition). The sense of solitude for visitors in wilderness areas would be affected primarily by motorized craft. These effects might be from spillover motorboat noise from nearby marine waters (e.g., into beach areas used by visitors), noise from nearby roads, and noise/sightings of airplanes and helicopters. These effects would be essentially the same as in the no-action alternative. There are relatively few areas where motorboat spillover noise is audible, so this would be a continuing, long-term, local, minor, adverse impact on the opportunity for solitude in wilderness areas.

The required education program/permit system would adversely affect the sense of a primitive, unconfined experience for the Florida Bay submerged wilderness. This would reduce visitors options to go where they want without restriction and would be a moderate, long-term, adverse impact on this quality

East Everglades Addition. The 39,500 acres of proposed designated wilderness in the

southern portion of the East Everglades would permanently protect opportunities for solitude. In most of this area visitors would be assured of outstanding opportunities for solitude and primitive and unconfined recreation. However, there still would be spillover noise into the periphery of designated wilderness from airboats running in the northern half of the Addition (frontcountry zone). Overall, impacts on opportunities for solitude and primitive, unconfined recreation would be long term (in perpetuity), regional, minor to moderate, and beneficial compared to no-action conditions.

Taking all four qualities of wilderness character together, the management actions and the wilderness proposal for the East Everglades in alternative 2 would have a variety of impacts on wilderness character. Compared to the no-action alternative, for the existing designated wilderness alternative 2 would result in some long-term, minor, adverse impacts due to the new chickees (affecting the natural and undeveloped qualities). For the Florida Bay submerged wilderness, there would be a minor to moderate, long-term, beneficial impact primarily due to the boater education/permit requirement and increased patrols and enforcement, which would help reduce bottom scarring. (This impact level considers both the beneficial impact on the natural quality and the adverse effect on the primitive, unconfined recreation quality.) In the East Everglades Addition, the proposed wilderness designation would have a major, long-term beneficial impact on wilderness character, primarily due to the designation of a large area as wilderness—ensuring the naturalness, undeveloped, and solitude qualities of wilderness character for 39,500 acres would continue in perpetuity.

Cumulative Impacts. The impacts from other plans, projects, and activities would be the same as described in the no-action alternative. During the period of ecological restoration work in the main wilderness and East Everglades Addition, which would include the use of motorized and mechanical equipment,

there would be minor to moderate adverse impacts in various areas on the undeveloped, untrammeled, and solitude qualities of wilderness character. But in the long term, there would be moderate, beneficial impacts on wilderness character of the terrestrial portion of the main wilderness and East Everglades Addition proposed wilderness, and a long-term, minor to moderate, localized, beneficial impact on the existing Florida Bay submerged wilderness. Sources of these long-term beneficial impacts would include various ecosystem restoration projects—the Snake Bight pilot pole/troll zone project, the implementation of vegetation and fire management plans, and the activity of the Miccosukees along Tamiami Trail.

Impacts of alternative 2, combined with impacts of the other past, present, and reasonably foreseeable future projects and activities, would have a long-term, moderate, beneficial cumulative impact on wilderness character in the terrestrial portion of the main wilderness and the Florida Bay submerged wilderness, and a major, beneficial cumulative impact on the East Everglades Addition. The contribution of alternative 2 to the overall cumulative impacts would be modest for the main terrestrial portion of the existing wilderness area, but the alternative would be responsible for most of the beneficial cumulative impacts for the East Everglades Addition and Florida Bay submerged wilderness.

Conclusions. Under alternative 2, management actions and the wilderness proposal for the East Everglades Addition would have a variety of impacts on wilderness character. For the main portion of the wilderness, excluding Florida Bay, the alternative would have a minor, long-term, adverse impact primarily due to the development and use of several chickees. In the Florida Bay submerged wilderness, alternative 2 would have a minor to moderate, long-term, beneficial impact to wilderness character primarily due to management actions that would reduce bottom scarring. In the East Everglades Addition, alternative 2

would have a major, long-term, beneficial impact on wilderness character, primarily due to the designation of wilderness over a large area. When the actions in alternative 2 are combined with other past, present, and reasonably foreseeable future projects and activities, there would be a moderate, long-term, beneficial, cumulative impact on wilderness character in the terrestrial portion of the main wilderness and Florida Bay submerged wilderness, and a major, beneficial, cumulative impact on the East Everglades Addition. Alternative 2 would add a small increment to the overall beneficial cumulative impact wilderness character for the main terrestrial portion of the existing wilderness area, but the alternative would contribute the greatest substantial portion of the overall beneficial cumulative impacts for the East Everglades Addition and Florida Bay submerged wilderness.

ARCHEOLOGICAL RESOURCES

New construction is proposed at various park locations under alternative 2, including Gulf Coast site improvements at Everglades City, the South Florida Collections Management Center (built near the Daniel Beard Center), improvements to NPS facilities at Key Largo, and primitive campsites on East Everglades Addition tree islands. As appropriate, archeological surveys and/or monitoring would precede and accompany any ground-disturbing activity. Because previously disturbed areas would be selected as feasible for new construction and archeological sites would be avoided to the extent possible, few if any adverse impacts would be expected as a result of such construction. Any adverse impacts would be of negligible to minor intensity and permanent.

The park would establish a comprehensive cultural resource management program to improve and expand efforts to inventory, document, and protect all cultural resources. As part of the program, archeological sites would be regularly monitored to assess resource conditions and inform treatment

strategies. As in the NPS preferred alternative, sites would be actively protected and stabilized as necessary to reduce or avoid possible impacts from erosion, visitor use, or other factors. Some tree islands could be closed to public use to protect sensitive archeological sites, and a site stewardship program would be implemented to provide further site protection. Implementing the comprehensive cultural resource management program would have a long-term beneficial impact on the park's archeological resources.

Archeological sites adjacent to or easily accessible in visitor use areas would continue to be vulnerable to inadvertent damage and vandalism. Alternative 2 proposes considerably less acreage (39,500 acres) than the NPS preferred alternative in the East Everglades Addition for wilderness designation. Private and commercial airboat use would continue in the frontcountry zone, allowing visitor use activities and access to a large portion of the East Everglades Addition tree islands. This could potentially place archeological resources at greater risk of adverse impacts from inadvertent damage, trampling, erosion, and other factors. However, continued ranger patrol and visitor education about the significance and fragility of such resources and how visitors can reduce their impacts to them would help discourage inadvertent impacts and vandalism. Adverse impacts on archeological resources resulting from visitor activities would be negligible to minor and permanent.

Ongoing archeological investigations would continue, such as the long-term study of prehistoric shell work sites in the Ten Thousand Islands area. Although test excavations conducted as part of these investigations would have permanent, minor adverse impacts on portions of identified sites, the investigations would expand and contribute to the park's archeological database.

Cumulative Impacts. The park's archeological resources are subject to a variety of disturbances, including erosion and other

natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; invasive nonnative plants such as Brazilian pepper whose deep roots can disturb buried sites; ground-disturbing construction activities; inadvertent visitor use impacts; and artifact looting. These factors could contribute to permanent, minor to moderate, adverse impacts on archeological resources as sites face risks from storm damage, erosion, and possible human-caused disturbance.

Foreseeable projects such as increased efforts to restore disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and invasive nonnative vegetation) could have permanent, minor to moderate, adverse impacts on archeological resources because of ground disturbance. The above disturbances could adversely affect the integrity of archeological resources because the potential of impacted sites to yield important prehistoric or historic information could be diminished. However, ongoing and future archeological research and investigations that contribute to the understanding of regional prehistory and history would have long term beneficial impacts.

The impacts associated with implementation of alternative 2 would have long-term beneficial impacts, and permanent, negligible to minor, adverse impacts on the park's archeological resources. The impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a permanent, minor to moderate, adverse cumulative impact. The adverse effects of alternative 2, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed by alternative 2 would have long-term beneficial and permanent, negligible to minor, adverse impacts on the park's prehistoric and historic archeological

resources listed in or eligible for listing in the National Register of Historic Places. In conjunction with other past, present, or reasonably foreseeable actions, there would also be permanent, minor to moderate, adverse cumulative impacts on archeological resources from implementing alternative 2.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 2 would result in *no adverse effect* on archeological resources.

Historic Structures, Sites, and Districts

Under alternative 2 the park staff would implement a comprehensive cultural resource management program, to promote, in part, the ongoing inventory, documentation, and historic preservation planning of historic sites, structures, and districts. The surveys and research to be undertaken would be a prerequisite for understanding a resource's significance and provide the basis for informed decision making regarding how the resource should be managed. Such surveys and research would result in a long-term, beneficial impact to historic structures.

The park would continue to rehabilitate and adaptively use selected historic buildings, such as those associated with Nike Missile Base site (HM-69), for administrative and other purposes. In common with the no-action alternative, seasonal guided tours of the Nike site would continue to occur. In addition, structures at the Duck Camp (a former hunting camp in the East Everglades Addition) would be stabilized and possibly rehabilitated for interpretive purposes if determined eligible for listing in the national register. The rehabilitation of historic buildings and structures would be undertaken in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. Materials removed during rehabilitation

efforts would be evaluated to determine their value to the park's museum collections and/or for their comparative use in future preservation work. Because the repair and replacement of historic fabric associated with the rehabilitation of historic buildings and structures would be undertaken in accordance with the Secretary of the Interior's Standards, any adverse impacts would be permanent and of negligible to minor intensity. Implementation of proposed preservation undertakings would have overall long-term, beneficial impacts on the park's historic buildings and structures.

Historic structures could suffer wear and tear from increased visitation, but monitoring the user capacity of historic structures could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to inadvertent impacts and vandalism. However, visitor education regarding the significance of such resources and how visitors can reduce their impacts to them would help discourage inadvertent impacts and vandalism. Adverse impacts would be negligible to minor in intensity and long-term or permanent.

Cumulative Impacts. Historic structures and buildings in the park are often damaged by exposure to severe storms, hurricanes, and humid climate conditions. Several of the NPS Mission 66 buildings at Flamingo (e.g., marina store, maintenance buildings, and lodge) were substantially damaged by recent hurricanes and were subsequently determined ineligible for the national register because of lost or diminished historical integrity. Several of these damaged buildings were demolished and removed. The damage and loss of buildings from hurricanes has resulted in a permanent moderate to major adverse impact on resources contributing to the historical integrity of the Flamingo Mission 66 developed area. All new construction at Flamingo to rehabilitate or replace facilities as outlined in chapter 2 of this general

management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 buildings and cultural landscape elements. The visitor center would be rehabilitated. Undertakings to preserve Flamingo's surviving buildings and site features would have overall long-term beneficial impacts. Long-term or permanent, negligible to minor, adverse impacts would also result from the repair and/or replacement of deteriorated historic building materials and fabric, and the introduction of modern structural elements to effect rehabilitation treatments.

Other foreseeable projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect historic structures. The Old Ingraham Highway and associated canals are eligible for listing in the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the road's overall integrity because the road would continue to retain its existing configuration and character. Such construction would also contribute to the park's conservation efforts. Adverse impacts would be long term and minor.

The impacts from storms and other natural processes, together with ongoing or foreseeable construction activities, could adversely affect the integrity of historic structures. This would result from the loss or damage of character-defining features and architectural elements. The impacts associated with implementation of alternative 2 would result in long-term beneficial impacts and negligible to minor adverse impacts on the park's historic structures, sites, and districts. The impacts of this alternative, in combination with the beneficial and minor to major adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse cumulative impact. The

adverse effects of alternative 2, however, would be a small component of the adverse cumulative impact.

Implementation of actions proposed by alternative 2 would result in long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on historic structures from implementing alternative 2.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementing alternative 2 would result in *no adverse effect* on historic structures, sites, and districts.

Cultural Landscapes

Under alternative 2, the park would implement a comprehensive cultural resource management program to promote, in part, the ongoing inventory and documentation of cultural landscapes. The surveys and research to be undertaken are a prerequisite for understanding a landscape's significance, as well as provide the basis for informed decision making regarding how the features and patterns of the landscape should be managed. Such surveys and research would result in a long-term beneficial impact on cultural landscapes.

Significant cultural landscapes, such as those associated with the Nike Missile Base site and the Ingraham Highway historic district, would be preserved and possibly rehabilitated in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties (with Guidelines for the Treatment of Cultural Landscapes)*. If a cultural landscape is

rehabilitated, the significant landscape patterns and features (e.g., spatial organization, land use patterns, circulation systems, topography, vegetation, buildings and structures, cluster arrangements, small-scale features, views and vistas, and archeological sites) would be protected and maintained. Alterations or additions to the landscape could occur, and existing historic fabric that has become damaged or deteriorated would be repaired or replaced. Because the rehabilitation of cultural landscapes would be undertaken in accordance with the Secretary of the Interior's standards, any adverse impacts would be of negligible to minor intensity and long term or permanent.

Construction that occurs in significant cultural landscapes would introduce visual, audible, and atmospheric intrusions into the landscape's setting. Although the effects of such intrusions would be adverse, the impacts would be construction-related only, i.e., short term, localized, and of negligible to minor intensity.

Cumulative Impacts. Cultural landscapes in the park are often at risk from damage by severe storms and hurricanes. Storm winds and surges can uproot ornamental vegetation planted as part of designed landscapes (such as that planted at Flamingo during the 1950s) and can severely erode or obliterate other elements such as trails, roads, and small-scale features, resulting in long-term or permanent, moderate to major, adverse impacts. All new construction at Flamingo to rehabilitate or replace facilities, as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 cultural landscape elements. Undertakings to preserve the integrity of Flamingo's surviving cultural landscape features would have overall long-term beneficial impacts. Proposed actions to preserve and rehabilitate cultural landscape features would also result in long-term or permanent, negligible to minor, adverse impacts.

Some foreseeable construction projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect cultural landscape features associated with historic structures. The Old Ingraham Highway and its associated canals are eligible for the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the overall integrity of cultural landscape features because the road would continue to retain its existing configuration and character. Also, these actions would contribute to the park's conservation efforts. Adverse impacts would be long term and minor.

The impacts from storms and other natural processes together with ongoing or foreseeable construction activities could adversely affect the integrity of the park's cultural landscapes. This would result from the loss or damage of character-defining features such as contributing buildings and structures, vegetation, patterns of circulation, and small scale features. Implementation of alternative 2 would have long-term, beneficial impacts and long-term or permanent, negligible to minor, adverse impacts on the park's cultural landscapes. The major impacts of this alternative, in combination with the beneficial and minor to moderate, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of the alternative 2, however, would be a small component of the adverse cumulative impacts.

Conclusion. Implementation of actions proposed in alternative 2 would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's cultural landscapes. In conjunction with other past, present, or reasonably foreseeable actions, there would

also be long-term or permanent, minor to moderate, adverse cumulative impacts on cultural landscapes from implementing alternative 2.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 2 would result in *no adverse effect* on cultural landscapes.

Ethnographic Resources

New construction is proposed at various park locations under alternative 2 (e.g., at the Gulf Coast site in Everglades City and primitive campsites on East Everglades Addition tree islands). As appropriate, ethnographic surveys and/or monitoring would precede and accompany any ground-disturbing activity. Because previously disturbed areas would be selected where feasible for new construction, and ethnographic resources would be avoided to the extent possible, long-term or permanent, negligible to minor, adverse impacts on ethnographic resources are anticipated from proposed construction.

The park would establish a comprehensive cultural resource management program to improve and expand efforts to inventory, document, and protect all cultural resources. As part of the program, investigations would be increased to identify and evaluate ethnographic resources having traditional or cultural significance to the park's associated tribes and/or other groups such as those associated with the Gladesmen culture. The park would seek to strengthen its partnership with associated tribes to cooperatively integrate education programs, and these efforts could further understanding and protection of ethnographic resources. Significant sites would be regularly monitored to assess resource conditions and inform treatment strategies. In comparison with the no-action alternative, ethnographic resources would be more actively protected and

stabilized as necessary to reduce or avoid possible impacts from erosion, visitor use, or other factors. Some tree islands could be closed to public use to protect sensitive ethnographic sites, and a site stewardship program would be implemented to provide further protection. The Duck Camp in the East Everglades Addition (having possible Gladesmen associations) might be stabilized and interpreted. These actions would have long-term beneficial impacts on ethnographic resources. Any adverse impacts would be long term and negligible to minor.

Ongoing investigations would continue (such as the long-term study of prehistoric shell works sites in the Ten Thousands Islands area) and ethnographic overviews and studies have been approved. Information acquired from these investigations and studies would expand the park's knowledge of important ethnographic resources, and provide the basis for appropriate resource management and preservation treatments. Although fieldwork conducted as part of these investigations could have permanent, minor, adverse impacts on portions of identified sites, the investigations would expand and contribute to the park's ethnographic database.

In comparison with the NPS preferred alternative, alternative 2 proposes considerably less acreage (39,500 acres) in the East Everglades Addition for wilderness designation. Private and commercial airboat use would continue in the frontcountry zone, allowing visitor use activities and access to a larger portion of the East Everglades Addition tree islands. This could potentially place ethnographic resources important to the park's associated tribes at greater risk of adverse impacts from inadvertent damage, trampling, erosion, etc. Adverse impacts would be long term and minor to moderate. However, this alternative would allow long-term, beneficial, impacts on ethnographic resources important to the Gladesmen culture by the retention of airboat access to tree island camps and other places within the frontcountry zone.

Cumulative Impacts. A variety of factors can disturb the park's ethnographic resources and disrupt the cultural connections between resources and associated groups, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; ground-disturbing construction activities; inadvertent visitor use impacts; and site looting. These factors could contribute to adverse impacts on ethnographic resources as sites face risks from storm damage, erosion, and possible human-caused disturbance. Adverse impacts would be minor to moderate and long term or permanent.

Foreseeable projects such as restoration of disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and invasive nonnative vegetation) could adversely affect ethnographic resources as a result of ground disturbance. In accordance with section 106 procedures and consultation requirements, ethnographic assessments and investigations would be completed for all proposed project areas to ensure that ethnographic resources are avoided or that adverse impacts are adequately mitigated before construction. Resulting adverse impacts would be long-term and minor to moderate.

The impacts of implementing alternative 2 would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse impacts on the park's ethnographic resources. The impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of alternative 2, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed by alternative 2 would have long-term beneficial impacts, and long-term or permanent, negligible to minor, adverse

impacts on the park's ethnographic resources. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on ethnographic resources from implementing alternative 2.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 2 would result in *no adverse effect* on ethnographic resources.

Museum Collections

Under alternative 2, the South Florida Collections Management Center would be relocated to a new facility in the Pine Island District. This new center would store collection items from Everglades, Biscayne, and Dry Tortugas national parks; Big Cypress National Preserve; and De Soto National Memorial. In accordance with NPS museum collections policies and guidelines and the *South Florida Park Collection Management Plan* (NPS 2007b), the new facility would be equipped with state-of-the-art environmental control and protection systems to properly store and protect the collections. The facility would be adequately staffed and include sufficient space to accommodate projected future acquisitions, staff work space, and controlled areas for researchers and the public to access and examine the collections. The NPS Southeast Archeological Center in Tallahassee, Florida, would remain the primary repository for archeological artifacts and materials collected from the various regional park units. Relocation of the South Florida Collections Management Center to a new facility in the Pine Island District would have long-term, beneficial impacts on the collections. Packing and transporting the collections to the new facility could also entail short-term, negligible impacts on the collections, although special handling procedures and care would be provided to

ensure that items are not damaged or misplaced during transit.

Cumulative Impacts. Because of the hot and humid environmental conditions of south Florida, proper control of humidity levels has been difficult to achieve and wide humidity fluctuations have contributed to the damage of certain collection items and archival materials. The heating, ventilation, and air-conditioning system did not adequately protect against mold growth that posed risks to both staff health and the collections. Some collection items have been damaged by pest infestations. Although these problems have been largely corrected, the current facilities lack a fire suppression system, placing the collections at risk of catastrophic loss. Previously, limited funding to adequately staff the center contributed to a backlog of items requiring accessioning and comprehensive curatorial management. Inadequate work space for staff and researchers continues to make it difficult to manage and access the collections. Museum collections at the current South Florida Collections Management Center have sustained long-term, minor to moderate, adverse impacts from inadequate environmental control systems, insufficient professional staff, limited accountability, and inadequate preventive conservation programs in the past.

The impacts associated with implementing alternative 2 would have predominantly long-term beneficial impacts on museum collections. The impacts of this alternative, in combination with the minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse cumulative impact. Alternative 2 would not appreciably contribute to the adverse cumulative impact.

Conclusion. Implementation of actions proposed in alternative 2 would have long-term beneficial and short-term, negligible impacts on museum collections. In conjunction with other past, present, or reasonably foreseeable actions, there would

also be long-term, minor to moderate, adverse cumulative impacts on museum collections from implementation of alternative 2.

VISITOR USE

Annual visitor use at the park under alternative 2 would be expected to be higher than under the no-action alternative but slightly lower than under the NPS preferred alternative. The net change would result from a number of counterbalancing factors affecting visitor use. Commercial airboat tours would continue in the East Everglades Addition, but would be included in reported use as operators enter into concession contracts with the park. Other factors promoting increased use would include Gulf Coast site improvements at Everglades City and associated improvements, improvements at Long Pine Key campground, new overnight camping at Chekika, day use opportunities at the Nike Missile Base site and Hole-in-the Donut, development of boat access (for carry-in boats) to Long Sound, and the placement of additional chickees in Florida Bay and along the Wilderness Waterway. Alternative 2 would open Little Madeira Bay and Joe Bay to fishing and to visitors, providing an opportunity to explore a new area and increasing use. Current trends and patterns of boating and fishing use in Florida Bay would continue.

The development of additional interpretation and turnouts along Tamiami Trail, although not constituting additional visitor use per se, would enhance the park's education efforts with respect to environmental, ecological, and cultural resource protection and restoration goals.

The net effect of the management and actions under alternative 2 would probably be slightly higher annual visitor use to the park compared to the no-action alternative. Net changes of about 40,000 visitors per year might reasonably be expected over the long term. The effects on visitor use would be evident parkwide.

The timing of the changes in visitor use is difficult to predict because it would depend on when projects are funded and carried out. Also, none of the projects represent major expansions in capacity, and most new opportunities are focused on dispersed and backcountry recreation use.

Year-round and seasonal residents of the area would be expected to account for most of the future visits, though the number of visitors from outside the region, including international visitors, would also increase.

Overall, implementation of alternative 2 would be expected to lead to a minor to moderate increase in visitor use (numbers of visitors) over time. Alternative 2 would also be expected to result in some minor shifts in distribution or patterns of visitor use within the park.

Cumulative Impacts. Other past, present, and reasonably foreseeable projects that could result in cumulative effects on visitor use are described in chapter 1. Past actions include the development of the administration, maintenance, and visitor service facilities; roads; parking areas; exhibits; and other resources that support and host current visitor use at the park. The present and reasonably foreseeable projects with the highest potentials to affect use include Flamingo improvements, construction projects such as replacing the marine bulkheads at Flamingo, and resurfacing the main park road. Effects on visitor use from Flamingo improvements would be long term, beneficial, and minor to moderate because they reestablish overnight accommodations at Flamingo and improve the camping experience. The other projects would primarily result in short-term inconveniences to visitors—for example travel delays during construction on the main park road. Typically the park staff would attempt to schedule such work during off-peak periods to minimize disruptions. Once the projects are completed, visitors would be unaffected by the actions. Combined with the actions proposed under alternative 2, the past, present, and reasonably foreseeable actions

would have long-term, minor to moderate, beneficial cumulative effects. Impacts of alternative 2 would comprise a relatively small portion of the overall cumulative effect.

Conclusion. Increases in visitor opportunities related to additional visitor services and recreation-oriented facilities, off-site information and education opportunities, and access under alternative 2 would have a long-term, minor, beneficial impact on visitor use. Alternative 2 would open Little Madeira Bay and Joe Bay to fishing and to visitors, providing an opportunity to explore a new area and increasing use. Boating use in Florida Bay would remain similar to current trends and patterns. Establishing long-term concession contracts with commercial airboat operators might result in long-term changes in visitor use, but the timing, magnitude, and increase or decrease in visitation are uncertain. The net effect is anticipated to be a minor to moderate increase in visitor use. To the extent that increased use could be accommodated while achieving the park's other environmental, ecological, and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact. Combined with the actions proposed under alternative 2, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial cumulative effects. Impacts of alternative 2 would comprise a relatively small portion of the overall cumulative effect.

Visitor Experience and Opportunities

Alternative 2 would improve access to information, interpretation, recreational, and educational opportunities at a variety of locations throughout the park and would implement new ways for visitors to experience the Everglades. Visitor experience and opportunities in different areas of the park are detailed below.

East Everglades Addition. Alternative 2 would continue to allow private airboating by

individuals eligible under the 1989 Expansion Act, and such use would be confined to the frontcountry zone on designated routes (see “Alternative 2” map). For such airboat users these new restrictions would be a long-term, negligible, adverse impact on their recreational experience because of the relatively large frontcountry zone in this alternative.

Commercial airboat operations would continue on designated routes within the frontcountry zone in the East Everglades, with some islands potentially closed seasonally or year-round to protect vulnerable natural or cultural resources. Airboat operators would be brought under the terms of a concessions contract to provide interpretation of park resources and values. A wider variety of commercial airboat tour options would be provided, including specialized tours to more destinations supporting park natural and cultural resource education. Enhanced tour opportunities and interpretation about park resources, ecosystem restoration, and recreational opportunities would improve interpretive opportunities and would have a long-term, moderate, beneficial impact on the visitor experience.

Chekika would continue to be open seasonally as a day use area with an emphasis on education and recreation programs, and the area would also be open seasonally for primitive camping (closures would depend on flooding). The addition of primitive camping and a change in interpretive emphasis would have a long-term, local, minor, beneficial impact on visitor experience in the area.

Alternative 2 would add approximately 39,500 acres of wilderness within the East Everglades Addition. This would guarantee the availability of wilderness recreation opportunities in the East Everglades Addition in perpetuity, a long-term, minor, beneficial impact.

Similar to the NPS preferred alternative, recreation and education opportunities would be expanded along Tamiami Trail, SW 237th

Avenue near Chekika, at some tree islands, and along the park’s eastern boundary. The East Everglades Addition would become a prime area for exploring, wildlife viewing, and learning about the area. These actions would have long-term, local, minor, beneficial impacts on visitors by providing some additional opportunities closer to Miami.

Alternative 2 would establish paddling trails and several primitive camping opportunities on tree islands within the East Everglades Addition. This would have a long-term, minor to moderate, beneficial impact on paddlers by expanding the range of recreational opportunities in the East Everglades Addition. This would create long-term, local, minor, beneficial impacts by introducing new backcountry camping opportunities in the East Everglades.

Headquarters / Pine Island / Royal Palm / Main Park Road. Under alternative 2, the Ernest F. Coe Visitor Center would continue to provide information and interpretation to visitors. This alternative would enhance and update the interpretive media at Royal Palm. This would have long-term, local, negligible to minor benefits on visitors by enhancing the interpretive opportunities at Royal Palm.

Similar to the NPS preferred alternative, visitor services at Long Pine Key campground would be enhanced by installing electric hookups and solar hot water for restrooms and showers. This would strengthen the appeal of the campground for certain potential visitors and encourage them include the national park on their itinerary. This would have a long-term, minor beneficial impact on visitor experience.

Alternative 2 would improve interpretation at the Hole-in-the-Donut similar to the NPS preferred alternative but would provide a greater range of visitor day use opportunities, including hiking, biking, guided tours, and evening programs. This alternative would also implement limited primitive camping opportunities at one or more of the mound sites. These new opportunities would have

long-term, local, minor, beneficial impacts on the visitor experience.

As in the NPS preferred alternative, the South Florida Collections Management Center would be moved to a new collection facility in the headquarters/Pine Island area. The improvements to the collections center would improve interpretive and day use opportunities and would have a long-term, negligible to minor, beneficial impact. The Nike Missile Base site would be managed the same as in the no-action alternative, with continued long-term, local, negligible, beneficial impacts on the visitor experience.

Alternative 2 would also pursue seasonal alternative transportation access to various park areas with stops along the main park road. The transportation would run from Homestead/Florida City to Long Pine Key (a shorter route than in the NPS preferred alternative). If accomplished, this would have long-term, regional, moderate, beneficial impacts on the visitor experience because it would help open this portion of the park to visitors who otherwise would not visit because of the lack of transportation.

Alternative 2 would improve self-directed interpretation and wayside exhibits along the main park road, a long-term, local, minor, beneficial impact on the visitor experience.

Alternative 2 would continue to permit bicycling along the main park road—a long-term, negligible benefit to cyclists. There would continue to be a long-term, negligible to minor, adverse impact on motorists who have to contend with cyclists on the road. With other agencies and entities, the park would pursue establishment of regional hiking and biking routes, including a bicycle trail along the park's eastern boundary, from Tamiami Trail to the main park road. These additions would have a long-term, moderate benefit for visitors because more opportunities for hiking and biking in the park would be developed. This would allow visitors without a boat to experience the park in more ways.

Florida Bay. Similar to the no-action alternative, alternative 2 would continue to allow relatively unrestricted motorboat access throughout most of Florida Bay. For visitors who value unrestricted motorboat access within Florida Bay, this would continue to have long-term, moderate, beneficial impacts on their experience. For visitors seeking solitude and/or wilderness experiences in Florida Bay, relatively unrestricted motorboat access would continue to have long-term, minor, adverse impacts. Little Madeira Bay would be opened to the public as a pole/troll zone, and Joe Bay and adjacent smaller water bodies would be backcountry (paddle only) zones. This would have long-term, local, moderate, beneficial impacts on visitors, especially paddlers, who would be able to access previously closed areas.

Alternative 2 would implement planned and funded improvements to the Key Largo ranger station and Florida Bay Interagency Science Center. The ranger station is too small and is inadequate for visitor services; improvements would provide a long-term, negligible to minor, beneficial impact for visitors. At this same site this alternative would provide a new visitor information kiosk and a venue to support the boater education/permit program. These improvements would result in long-term, local, minor beneficial impacts for visitors. The park would pursue additional multiagency visitor services using facilities or opportunities in Key Largo. If successful, this would provide a long-term minor benefit.

Alternative 2 would develop a required boater education program/permit system for all operators of motorboats and nonmotorized boats within the park. Initially, the system would create a burden on visitors prior to their visit and might decrease visitor interest in using park waters for boating; the effects would be short term, minor to moderate, and adverse. As visitors become accustomed to the permit system, the effects of the education program would be long term, moderate, and beneficial by improving the boating experience through enhanced understanding and enjoyment of marine waters and through

reduced incidences of boat groundings and user conflicts.

Alternative 2 would enhance carry-in boat launch sites along the main park road and establish a new site along the 18-mile stretch at Long Sound for improved paddling trail accessibility and opportunities for persons with disabilities. This would have long-term, minor, beneficial impacts on the visitor experience.

As in the no-action alternative, all keys would be closed to the public, except North Nest, Little Rabbit, Carl Ross, and Bradley keys, and five additional backcountry chickees would be installed. This would make the distance paddlers must travel between Florida Bay chickees more manageable; effects would be long term, minor, and beneficial.

Under alternative 2, visitors to the park would continue to have access to the numerous fishing guides and commercial tours available in Florida Bay and the park. The current ban on commercial fishing in the park would continue. This would have continuing long-term, negligible to minor, beneficial impacts.

Alternative 2 would improve national park boundary markings, channel/access route markings, and navigational aids to enhance boater safety and natural resource protection. For motorboaters and paddlers to the bay, this would improve navigation of the bay, which would enhance the experience and opportunities offered by Florida Bay. The impacts on visitors from improving navigation in the bay would be long-term, moderate to major, and beneficial. However, for those visitors seeking solitude and the wilderness experience in the vastness of Florida Bay, improved navigational aids would likely have long-term, minor to moderate, adverse impacts on their experience of Florida Bay because more boaters could access the bay.

Gulf Coast / Ten Thousand Islands / Everglades City. Under alternative 2 the park would continue to manage most marine areas of the Gulf Coast / Ten Thousand Islands area

as they are now, including the Wilderness Waterway. Compared to the no-action alternative, this alternative includes site improvements to address visitor facility needs at Gulf Coast. Enhancements would include a new visitor center, restrooms, a day use area, relocation of nonessential maintenance functions to an off-site location, additional parking, and maximization of outdoor space for interpretive, orientation, and educational programs. This would have a moderate to major beneficial impact on visitor experience at Gulf Coast.

Gulf Coast site improvements would be ABA-compliant. Accessible parking would be added, and accessible trails for additional access and interpretive opportunities would be constructed. For visitors with disabilities these developments would improve access to the site and increase opportunities for connections to the natural surroundings. These site improvements would have moderate, long term, beneficial impacts on visitor experience.

Unlike the NPS preferred alternative, a cultural heritage interpretive water trail would not be established in the Ten Thousand Islands area. However, additional land-based interpretive programs and activities linking the park and neighboring communities would be provided. Increased land-based interpretive programs and connections to nearby communities would have a long-term, negligible to minor benefit on the visitor experience in the Gulf Coast region.

The canoe/kayak launch at the Gulf Coast Visitor Center site would be improved under this alternative and parking for paddlers would be constructed. Additionally, the park would work cooperatively with public and private interests to provide better motorboat access to the park at non-NPS sites. Assuming the latter effort is successful, these actions would increase opportunities for access and help alleviate congestion at popular launch points during busy times resulting in long-term, minor, beneficial impacts on visitors to the Gulf Coast region.

Eight additional backcountry chickees would be provided in the Gulf Coast area, increasing overnight backcountry capacity and expanding camping destinations for paddlers and motorboaters. This would have a long-term, minor to moderate, beneficial impact. This alternative would also establish an unmarked Everglades Paddling Trail, intended primarily for those seeking a wilder, more remote route. Nearly the entire Everglades Paddling Trail would be zoned boat access (motorized and nonmotorized boats allowed). For visitors who desire a quieter, wilder experience and can rely on charts or GPS to find their way along this route, this option would provide a long-term, minor, beneficial impact. This action would likely have negligible impacts on motorboaters because in alternative 2 there would be no new zoning or other restrictions associated with motorboats along the Everglades Paddling Trail.

Gopher Creek would be managed the same as the no-action alternative. This would continue to have a long-term, negligible, beneficial impact on most visitors and a long-term, negligible, adverse impact on paddlers who desire a paddle route free from motorboats.

Tamiami Trail / Shark Valley. To address a relative lack of visitor opportunities along Tamiami Trail, alternative 2 would develop a visitor information kiosk and a series of turnouts along the trail for educational and recreational opportunities and to provide an overview of resource issues and ecosystem restoration. These new visitor opportunities would have a long-term, minor, beneficial impact on the visitor experience along Tamiami Trail and would increase awareness of the national park to visitors and residents.

The planned and funded facility improvements at Shark Valley would be implemented as under the no-action alternative. Alternative 2 would establish additional evening programs at Shark Valley, add several shade structures or rest areas along the 15-mile Shark Valley loop road, and use current administration areas as overflow

and/or bicycle parking. These changes would ease parking congestion somewhat, provide off-peak day use opportunities (through evening programs), provide additional interpretive opportunities, and make the experience at Shark Valley a bit more comfortable. These actions would have a long-term, minor, beneficial impact on the visitor experience at Shark Valley.

Overall, alternative 2 would have long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable Everglades and NPS plans and projects would be the same as the no-action alternative. Such projects include the park's long-range interpretive plan, Flamingo improvements, resurfacing of the main park road, and the Snake Bight pilot pole/troll zone project. Ecosystem restoration projects would indirectly impact the visitor experience by creating a more enjoyable environment and better wildlife viewing opportunities. Collectively, these projects would have a long-term, minor to moderate, beneficial impact on the overall visitor experience at Everglades National Park.

Alternative 2 would improve access to information, interpretation, recreational, and educational opportunities at a variety of locations throughout the park and would implement new ways for visitors to experience the Everglades (compared to the no-action alternative). This alternative would also upgrade many of the facilities throughout the park that provide visitor services and would increase the available backcountry and wilderness opportunities; alternative 2 would install more backcountry campsites in Florida Bay and the East Everglades compared to the other alternatives. Management zones that would restrict certain types of use (e.g., motorized use) would be applied in a few selected areas to improve certain types of visitor experiences or protect resources. This and implementation of the boater

education/permit requirement would be considered an adverse impact for certain categories of visitors. However, the improvements to the visitor experience and the variety of new opportunities created by this alternative would outweigh the negative impacts of alternative 2 for most visitors. Alternative 2 would have long-term, negligible to moderate, adverse impacts as well as long-term, negligible to major, beneficial impacts. Combined with the actions of other park plans and projects, alternative 2 would have a long-term, moderate to major, beneficial, cumulative effect on the visitor experience at Everglades National Park. Alternative 2 would contribute substantially to these effects.

Conclusions. Alternative 2 would have long-term, minor to moderate, adverse impacts as well as long-term, moderate to major, beneficial impacts. Alternative 2, combined with other plans and projects, would have long-term, moderate to major, beneficial cumulative impacts on visitor experience and opportunities. Alternative 2 would contribute substantially to these effects.

REGIONAL SOCIOECONOMIC ENVIRONMENT

Implementing alternative 2 would occur against the same backdrop of economic, demographic, and social conditions across the region described under the no-action alternative. The economic and social effects of alternative 2 would contribute to those conditions, but not fundamentally change the area's economic and demographic outlook.

Visitor-related Economic Impacts

Annual visitor use at the park under alternative 2 would be expected to increase above that under the no-action alternative. The timing and geographic distribution of increased visitor use is difficult to predict because it depends on when projects are funded or carried out and other factors. In addition, use associated with continuing

commercial airboat operations would also be counted. Among the management actions established under alternative 2, the completion of the new Gulf Coast Visitor Center and the opening of Little Madeira Bay and Joe Bay to public use would likely have the most effect on visitor use levels and recreation use patterns.

Year-round and seasonal residents of the area would be expected to account for most future visits to the park, although the number of visits by tourists, including those from international destinations, would also increase.

Future increases in annual visitor use would be accompanied by incremental increases in visitor spending. Economic spin-offs of that visitor spending would include a minor increase in jobs and personal income, as compared to the no-action alternative. Some individual businesses may experience a reduction in revenues or other effects in response to management actions undertaken as part of this alternative, with the net effect uncertain, but limited in scale. The limited scale of anticipated changes in visitor use obviates the need for detailed economic analysis.

More in entry fees and from the sales of various passes would be collected, and the Everglades Association and concessioners would sell more goods and services. Concession revenues from lodging and camping would be higher compared to the no-action alternative, but less than the NPS preferred alternative. Eco-tour operators, outfitters, and businesses in the keys would likely capture much of the additional spending in conjunction with visitor use to Little Madeira Bay and Joe Bay.

The economic effects of alternative 2 would be seasonal in nature.

State and local governments would collect additional sales tax from the increases in visitor spending.

The above visitor-related economic impacts would be beneficial, but negligible in the short term and negligible to minor over the long term.

Economic Impacts Related to Implementation and NPS Operations

Implementing alternative 2 would provide a sustained economic infusion to the region over the life of this plan. The infusion would result from the park's ongoing operating expenditures, and a series of one-time construction outlays. The latter would include \$7.9 million for site improvements and construction of the Gulf Coast Visitor Center. Future construction would support the local construction trades industry and associated vendors and suppliers. Under alternative 2, other major projects identified under the no-action alternative would also be included.

Commercial fishing activity in the Florida Keys by members of the Florida Keys Commercial Fishermen's Association would not be affected by management actions proposed under alternative 2.

Areas of the Keys that are adjacent to the park would not be directly affected by management actions associated with alternative 2, but some indirect, long-term social and economic effects, both beneficial and adverse, could result from changes in public use in the Florida Bay portion of the park.

As under the no-action alternative, NPS maintenance staff would perform much of the work to address facility and infrastructure maintenance and preservation, restoration, and rehabilitation activities. Estimated costs for future construction would be higher than under the no-action alternative, which if implemented, would support the local construction trades industry and associated vendors and suppliers.

Everglades National Park would continue to provide vitally important ecosystem services to south Florida under alternative 2. The types

and levels of such services would be comparable to those under the no-action alternative. These services would be long term and beneficial.

Acquisition of some or all of the current privately owned parcels associated with commercial airboating in the East Everglades, including easements to accommodate improved water flow, could result in negligible to minor reductions in property taxes and other public sector revenues. Minor changes in the associated long-term employment and income could also occur in response to changes in operations associated with consolidation/relocation. Consolidation / relocation / site rehabilitation of existing locations would generate short-term beneficial economic effects in the construction and related industries. In the event of acquisition of real estate, current property owners would receive compensation for the value of property acquired.

Changes in the business model for the commercial airboat operators along Tamiami Trail, after federal government acquisition of the properties and award of concessions contract with the National Park Service, would be short term minor adverse, and short-term minor beneficial impacts, and long-term minor to moderate beneficial impacts, as compared to the no-action alternative. Short-term impacts would be associated with costs to the concessioner for facility improvements (e.g., to meet safety and accessibility requirements); additional staff training, equipment, and reporting costs; and a franchise fee paid to the National Park Service (negotiated percentage of revenue). Although uncertain, there may be short-term reductions in revenues due to the elimination of certain activities currently offered (e.g., wildlife shows, RV camping). Short-term beneficial impacts would be based on capitalizing the value of the properties and established business operations with the land purchase by the federal government. Long-term beneficial impacts would be expected due to the business stability and higher business value from a long-term contract with

the National Park Service. A concession contract would, over time, provide opportunities for increased revenues by enhancing airboat tour experiences with coordinated interpretation with park staff, additional tour itineraries, and co-marketing with other park activities (e.g., Shark Valley tours) that may increase visitation and revenues and further support park goals.

Annual NPS payroll and operations, and maintenance expenditures would result in long-term effects on employment, taxes, business sales, and income. Management under alternative 2 would support increased staffing of up to 26 FTE employees compared to the no-action alternative. Staff needs would expand over time as projects, programs, and the approved plan are implemented. Actual staffing levels would reflect the availability of adequate budgets. It is anticipated that most of the additional staffing would be seasonal. The park would seek to attract more volunteers to assist at the park.

Under alternative 2, park operations would indirectly support an estimated 120 to 125 jobs, as compared to an estimated 104 jobs indirectly supported currently, which would continue under the no-action alternative.

An increase in budgeted funds for NPS operations is assumed for alternative 2. Available resources would include base budget appropriations, concession revenues, entry and camping fees, and various nonrecurring funding for supplemental and specific project construction. Implementation of alternative 2 might help the park attract additional funding for ecological research and restoration.

Retained revenues from entry and camping fees would likely increase with higher visitation. Concession revenues would increase because of the increased patronage at on-site concession services and commercial airboat concession revenues and park entry fees. The revenues could be substantial.

Research, educational, and other activities sponsored by the park's partner organizations would continue to provide additional sources of economic stimulus. The timing, magnitude, and indirect economic consequences of those activities under alternative 2 are indeterminate.

The economic effects associated with NPS operations would be beneficial and negligible to minor in the short and long term.

Effects on Regional Population Growth

Implementing alternative 2 would have little effect on regional population growth. The increases in short-term and long-term jobs and visitor use over the life of this plan would provide a negligible impetus for growth and would be insufficient to trigger additional new economic development and job-related migration. Many of the jobs would likely be filled by individuals already residing in the area.

The effects on regional population growth under this alternative would be negligible, both in the short and long term.

Community Services

The effects of implementing alternative 2 on community services and facilities across the region would be similar to those under the no-action alternative, although slightly larger in scale/magnitude. The limited scale, seasonal nature, and spatial dispersion of the effects across the broader region would be unlikely to necessitate additional facilities, major equipment, or staffing on the part of non-NPS service providers.

Effects on community services under this alternative would be indeterminate and negligible over the short and long terms.

Attitudes and Lifestyles

Alternative 2 establishes future management direction for the park that reflects public input and supports the park's purpose and significance, but with less emphasis directed toward managing boating to protect sea bottom resources in Florida Bay and less proposed wilderness in the East Everglades Addition. That emphasis would generally appeal to those valuing the more traditional recreation opportunities at the park. Those individuals and interest groups more interested in developing facility-based recreation or maximizing the economic contributions associated with the park might be less enthusiastic about the management direction set forth in alternative 2.

Like the no-action alternative, the management direction for this alternative would result in relatively few direct lifestyle consequences because the influences of the park would generally be consistent with those established under the no-action alternative.

The effect on attitudes and lifestyles would be indeterminate.

Overall, the economic and social effects of implementing alternative 2 would include negligible to minor short-term and minor long-term economic benefits comparable to those under the no-action alternative. Short- and long-term effects on lifestyles and attitudes would be indeterminate. Long-term social consequences would include a negligible contribution to long-term population growth and demands on community infrastructure and services.

Cumulative Impacts. Social and economic impacts from implementation of alternative 2 would be similar to those of other past, current, and future development across the region and those under the no-action alternative. The effects of underlying development trends in the region include long-term, moderate population and economic growth; long-term increases in traffic on local roads; related impacts on

public safety; higher spending that bolsters community and recreation-oriented businesses in the region; and additional tax revenues to fund public services and facilities.

The small and generally beneficial economic and social effects of implementing alternative 2, including those associated with increases in visitor and NPS operating expenditures, would be negligible to minor in the short term and negligible to minor in the long term. Alternative 2 actions, combined with other actions described above, would result in minor, short- and long-term, adverse cumulative effects on traffic and highway safety and negligible to minor beneficial impacts on local economic conditions. Impacts of alternative 2 would comprise a relatively small portion of the overall cumulative social and economic effects.

Conclusion. The economic and social effects of implementing alternative 2 would include negligible to minor short-term and minor long-term economic benefits comparable to those under the no-action alternative. Short- and long-term effects on lifestyles and attitudes would be indeterminate. Long-term social consequences would include a negligible contribution to long-term population growth and demands on community infrastructure and services. Alternative 2 actions, combined with other actions described above, would result in minor, short- and long-term, adverse cumulative effects on traffic and highway safety and negligible to minor beneficial impacts on local economic conditions. Impacts of alternative 2 would comprise a relatively small portion of the overall cumulative social and economic effects.

PARK OPERATIONS

Similar to the NPS preferred alternative, Alternative 2 would establish many new park initiatives that would require new staff and investments to plan and implement, which would be addressed through staff and funding proposed in the alternative.

Parkwide

Alternative 2, the boater education program and permitting system would help reduce the number of groundings and propeller scarring's in Florida Bay and elsewhere. Boaters would become more adept at navigating park waters and would increase their awareness of boating impacts and safety. These changes would have a long-term beneficial impact on park operations by reducing the need for search and rescue as well as seagrass restoration to repair damage caused by groundings and scarring's.

East Everglades Addition

Under alternative 2, designated boat trails and management of commercial airboat contracts would be established and result in a long-term beneficial impact on park operations. Boat traffic would be kept on designated routes, which would reduce the need for restoration due to boating impacts on the landscape and the need for rescue patrols to find lost and stranded boaters.

Land recently acquired outside the park boundary near Chekika would be used for development of administrative and operational facilities for the East Everglades Addition. These new facilities near the area of operations would have a long-term beneficial impact on park operations by reducing staff transit time and providing additional housing space for park staff.

Headquarters / Pine Island / Royal Palm / Main Park Road

Similar to the no-action alternative, vacated portions of the Robertson Building and Daniel Beard Center would be used for administrative needs under alternative 2. This would have a long-term beneficial impact on park operations by providing needed space for administration activities.

Under alternative 2 the park would pursue seasonal alternative transportation access to various park areas with stops along the main park road. The transportation would run from Homestead/Florida City to Long Pine Key (a shorter route than in the NPS preferred alternative). This service could result in a long-term beneficial impact from reduced traffic congestion on park roadways and associated traffic management and safety issues.

Gulf Coast / Ten Thousand Islands / Everglades City. Under alternative 2, all nonessential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. In the long term, this would have a beneficial impact by reducing costs and space needs by sharing resources and infrastructure. This action would also result in minor adverse impacts due to some added inconveniences and lost time when transporting equipment and materials to and from the maintenance site at Big Cypress National Preserve approximately 15 minutes each way.

Florida Bay

Alternative 2 would implement improvements at the Key Largo ranger station and Florida Bay Interagency Science Center as in the NPS preferred alternative, and it would establish a visitor information kiosk and venue to support the boater education/ permit requirement at the ranger station. In addition to these expansions, additional multiagency visitor services would be pursued using existing facilities in Key Largo. These changes would have a long-term beneficial impact on park operations by reducing the costs and space needs by sharing facilities with other agencies.

Boundary markers, channel/access route markers, and navigational aids would be improved in the bay for boater safety and resource protection. This change would have beneficial impacts on operations by improving

boater navigation in the tricky Florida Bay environment, reducing grounding, scarring, and the need for rescues.

Tamiami Trail / Shark Valley

Under alternative 2, most of the administrative and operational facilities from Shark Valley and the Tamiami ranger station would be relocated and centralized to a new, previously disturbed location within the park (such as Gator Park). These actions would result in long-term beneficial impacts by simplifying park logistics and providing staff with a modern facility.

SUMMARY

Overall, as elements of alternative 2 are implemented, the park would be expected to function more effectively than it would under the no-action alternative. Alternative 2 would result in long-term, minor to moderate, beneficial impacts on park operations.

Cumulative Impacts. Many other projects that impact park operations have recently occurred, are occurring, or will occur in the near future. These projects can be loosely grouped into the following categories—visitor services, ecosystem and site restoration, vegetation and wildlife management, infrastructure management, and resource management. Implementation of these other plans and projects would improve park infrastructure, staff efficiency, and reduce deferred maintenance.

Conclusions. Alternatives result in long-term, minor to moderate, beneficial impacts. Combined with other plans and projects, the preferred alternative would have a long-term, moderate beneficial cumulative impact on park operations. The contribution of alternative 2 to this effect would be significant.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are those environmental consequences of an action that cannot be fully mitigated or avoided.

Under alternative 2 some unavoidable impacts to water resources, soils, wildlife, vegetation, natural sounds, and wilderness character would result from continued motorboat use in marine areas of the national park (though impacts within Florida Bay should be greatly reduced compared to the no-action alternative); from recreation access to tree islands and certain keys; and from continuation of private and commercial airboating within the East Everglades.

In addition to actions common to all alternatives, long-term, adverse impacts under alternative 2 would occur through (1) unrestricted boat access throughout most of Florida Bay, (2) recreation access to keys and tree islands, (3) construction of a new facilities, and (4) continuation of private and commercial airboating. Impacts would occur on water resources, soils, wildlife, vegetation, natural sounds, and wilderness character, including soil compaction, vegetation trampling and disturbance, wildlife disturbance, and decreased opportunities for solitude.

Irreversible and Irretrievable Commitments of Resources

With the exception of consumption of fuels and raw materials for maintenance activities and construction, no actions in this alternative would result in consumptions of nonrenewable natural resources or use of renewable resources that would preclude other uses for a period of time.

Relationship of Short-Term Uses and Long-Term Productivity

The park would continue to be used by the public, and most areas would be protected in a natural state. The National Park Service would continue to manage the park to maintain ecological processes and native biological communities and to provide appropriate recreational opportunities consistent with preservation of cultural and natural resources. Actions would be taken

with care to ensure that uses do not adversely affect the productivity of biotic communities. Actions would be taken with care to minimize effects to productivity of biotic communities, and these would include measures such as the boater education/permit requirement, increased on-the-water ranger patrols, and the comprehensive seagrass restoration program. Nonetheless, nearly unrestricted motor-boating within Florida Bay could continue to affect seagrasses to a degree that could adversely affect long-term productivity.

IMPACTS OF IMPLEMENTING ALTERNATIVE 4

HYDROLOGIC RESOURCES

Some elements of alternative 4 that would benefit hydrologic resources include establishment of substantial pole/troll zones in Florida Bay and the boater education/ permit requirement. Alternative 4 proposes substantial changes in how motorboats access various portions of Florida Bay. Establishment of the most extensive pole/troll zones of any alternative and the boater education and permit program would result in fewer boat groundings and fewer incursions into the shallowest areas, with fewer disturbances to bottom sediments from motorboat propellers; this would decrease turbidity in Florida Bay. Impacts would be long term, localized, minor to moderate, and beneficial.

Upgraded facilities and several shade structures at Shark Valley, upgraded NPS facilities at Key Largo, and development of visitor turnouts along Tamiami Trail would be constructed within the footprint of development or disturbed areas so impacts on wetlands are not expected. Water quality impacts during construction (e.g., turbidity, sedimentation) would be short term, localized, negligible to minor, and adverse. Construction best management practices would reduce or eliminate such impacts.

Impacts on water resources, water quality, and wetlands from new and upgraded facilities might result from development of (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along the main park road and along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) four new chickees in Florida Bay, and (5) possible construction of a new multiagency visitor contact facility near Tamiami Trail and Krome Avenue, and (6) the improved boat launch at Gulf Coast. As in the no-action alternative, impacts on water

quality during construction would be short term, localized, negligible to minor, and adverse. Long-term, adverse impacts on wetlands would depend on project design, location, and size, the specifics of which are unknown at this time. More detailed analysis for these projects would occur in project-specific environmental impact analyses done before each project is being implemented.

Improvement of the boat launch at the Gulf Coast would involve impacts from dredging of less than 4 acres of previously disturbed bay bottom sediments. There would be short-term, localized, moderate, adverse impacts on turbidity from a temporary increase in sediment resuspension during construction. The increased size and use of the boat basin could stir up bottom sediments; increase the amount of wet exhaust, bilge waste, petroleum spills; and have other adverse impacts that may arise from boat operations. These adverse impacts on water quality would be long term, localized, and minor. The construction of the visitor center and associated development would occur in a previously disturbed area, so there would be no new impacts expected on wetlands.

Under alternative 4, the park would implement an adaptive management approach to resource conservation. Under adaptive management, if monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. Examples of adaptive management could include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on water resources could be short or long term and range from negligible to minor, depending on the actions taken.

Overall, impacts on hydrologic resources under alternative 4 would be long term,

localized, moderate, and beneficial (e.g., decreased turbidity) in Florida Bay, and short term, localized, negligible to minor, and adverse (e.g., turbidity, sedimentation) during construction projects.

NPS policies require that planning documents justify decisions regarding the retention or removal of facilities in wetlands or that may adversely affect wetlands. In the existing basin, the area is already disturbed; relocating the facility would increase wetland impacts and would distance it from the visitor center. Expansion of the basin would still require full compliance with NPS policies. Current law and NPS policies require avoiding or minimizing impacts on wetlands and mitigating remaining unavoidable impacts under most circumstances. Depending on the impacts, a wetland statement of findings may ultimately be required.

Cumulative Impacts. As noted in the introduction, most impacts on water resources and wetlands in the park arise from changes in the amount, timing, and distribution of water and related changes in water quality (i.e., excess nutrients). As described under the no-action alternative, impacts from other project and plans—such as Everglades restoration plans, activities intended to reduce the nutrient content of waters flowing into the park, implementation of a pilot pole/troll zone at Snake Bight in Florida Bay, and restoration of areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds)—would be long term, parkwide, moderate to major, and beneficial. The cumulative effect of alternative 4 combined with other projects and plans would be long term, parkwide, moderate to major, and beneficial. Alternative 4 would contribute a modest amount to the total cumulative effects.

Conclusion. The impacts of alternative 4 on water resources would be long term, localized, moderate, and beneficial (e.g., decreased turbidity) in Florida Bay, and short term, localized, negligible to minor, and adverse (e.g., turbidity, sediment resuspension) during construction projects. The cumulative effect

of other projects and plans combined with alternative 4 impacts would be long term, parkwide, moderate to major, and beneficial.

LANDSCAPE AND SOILS

Under alternative 4, soils would continue to be affected by visitor use (e.g., compaction). Visitor effects on soils would continue to be long-term, localized, negligible to minor, and adverse. Certain tree islands or areas that were open to visitor use could be closed seasonally or year-round (e.g., for wildlife protection, water level management, or the protection of cultural resources). Although such closures would help protect soils in these areas from visitor use impacts, overall effects on soils from visitor use would remain long term, localized, negligible to minor, and adverse. Cessation of commercial airboat operations in the East Everglades Addition would mean less visitor use in this portion of the park, but any resultant reduction in soils impacts would be negligible.

Some facility upgrades (such as at Shark Valley and Key Largo) would occur within the developed or disturbed footprint. Impacts on soils from construction activities would be long term, localized, negligible to minor, and adverse (e.g., erosion, removal of surface layer). Construction best management practices would help limit such impacts to this level of intensity.

Impacts on soils (disturbance or loss) from new and upgraded facilities would be associated with (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area; (4) four new chickees in Florida Bay, (5) Gulf Coast site improvements at Everglades City, (6) a few campsites on tree islands within the East Everglades Addition, and (7) a new collections management facility in the Homestead/Florida City area. Each of these actions would affect from 0.25 to 10 acres of soil. Impacts on

soils would be long term, localized, moderate, and adverse (e.g., disturbance of surface layer, erosion). Best management practices during construction would help limit construction-related impacts.

During construction, impacts on soils would be short term, localized, negligible to minor, and adverse (e.g., disturbance of surface layer, erosion). Construction best management practices, such as revegetation of disturbed areas, would reduce or eliminate short-term impacts. After construction, adverse impacts on soils would be long term and localized and range from negligible to moderate depending on size of the development footprint.

Overall, impacts on soils under alternative 4 would be long term localized, minor to moderate, and adverse. These impacts result from visitor use and construction.

Cumulative Impacts. The effects of other projects and plans on park soils would be as described for the no-action alternative—long term, parkwide, minor to moderate, and beneficial. Such projects include (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) restoration activities in areas disturbed by prior land uses, (4) implementing the park's fire management plan, and (5) implementation of the park's strategic management plan and resource stewardship strategy. In combination with the long-term, localized, negligible to moderate adverse effects of alternative 4, overall cumulative effects would be long term, parkwide, minor to moderate, and beneficial. Alternative 4 would have a very slight contribution to the cumulative effects.

Conclusion. Impacts on soils under alternative 4 would be long-term localized, minor to moderate, and adverse. These impacts result from visitor use and construction. The cumulative effect of alternative 4, when combined with other projects and plans, would be long term, parkwide, minor to moderate, and beneficial.

VEGETATION

Airboating can damage wetland vegetation such as sawgrass (and compact, stir up, or transport sediments, increasing water turbidity) in areas where airboats run repeatedly. However, private and administrative airboating would continue to occur in the East Everglades Addition under alternative 4, resulting in adverse impacts in areas where airboat use is concentrated. That area is smaller compared to the no-action alternative because of the size of the frontcountry zone and elimination of commercial airboat operations. Also, commercial airboating would be eliminated in this alternative, however, so overall impacts from changes in airboat use would be long term, localized, minor to moderate, and beneficial.

Under alternative 4, certain islands or areas within the East Everglades Addition could be closed to visitor use seasonally or year-round for natural resource reasons (such as wildlife protection or water level management) or cultural resource reasons. Such closures would help reduce vegetation impacts (e.g., from airboat landings or foot traffic) compared to the no-action alternative; such impacts would be short-term, localized, negligible to minor, and adverse.

Comprehensive seagrass restoration efforts in Florida Bay have long-term, localized, minor to moderate, beneficial impacts. The mandatory boater education and permit program would help visitors understand how to avoid damage to seagrass beds, a long-term, localized, minor, beneficial impact on seagrass more so for Florida Bay than for other areas of the park.

Under alternative 4, vegetation would be affected by facility upgrades within developed areas (e.g., at Shark Valley and Key Largo). Construction impacts on vegetation would be short term, localized, negligible to minor, and adverse (e.g., removal of surface layer). Construction best management practices,

such as revegetation of disturbed areas, would minimize such impacts.

Impacts on vegetation from new and expanded facilities would result from (1) a new administrative/operations center outside the East Everglades Addition, (2) additional carry-in boat access to Florida Bay along the main park road and along U.S. 1 near Long Sound, (3) eight new chickees in the Gulf Coast / Ten Thousand Islands area, (4) four new chickees in Florida Bay, (5) Gulf Coast site improvements at Everglades City, (6) two to three campsites on tree islands within the East Everglades Addition, and (7) turnouts along Tamiami Trail. Each of these actions would affect from 0.25 acre to 10.0 acres. Vegetation impacts on vegetation would result from loss of or damage to vegetation on the construction site during and after construction. These impacts would be short term and long term, adverse, localized, and minor to moderate depending on size of the development footprint. Although the chickees would be elevated to limit shading of sea bottom vegetation, installation and new visitor use would probably cause long-term, localized, and negligible to minor impacts.

Alternative 4 proposes substantial changes in how motorboats access various portions of Florida Bay. Most of the recommendations made by the recent propeller scarring study (NPS 2008d) are incorporated in this alternative. Pole/troll zones, the most extensive of any alternative, would be established on nearly 150,000 acres throughout the bay (see “Alternative 4” map), which is about 25,000 acres more than in the NPS preferred alternative. Establishment of substantial pole/troll zones would result in fewer boat grounding and fewer incursions into the shallowest areas, with fewer disturbances to seagrasses, other sea bottom vegetation, and sea bottom sediments. The proposed mandatory boater education and permit program would presumably support and accelerate adjustment to these changes in boat access and management. Overall, these changes represent long-term, moderate to major, beneficial impacts on vegetation as

degraded habitat recovers and new seagrass damage is greatly reduced.

The north shore of Florida Bay between Middle Cape and East Cape would be designated as idle speed, no-wake, a long-term, localized, minor to moderate benefit on shoreline vegetation from the reduced wake-caused erosion.

Joe Bay, Little Madeira Bay, and adjacent smaller water bodies would continue to be managed as a special protection zone and serve as a baseline area for long-term ecological monitoring and restoration efforts. This means they would remain closed to public use, so impacts (from protection of seagrass from propeller scarring and boat groundings) would remain localized, moderate, and beneficial.

Under this alternative, the park would implement an adaptive management approach to resource conservation. Under adaptive management, if monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. Examples include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on vegetation could be short or long term and range from negligible to minor, depending on the actions taken.

Overall, short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Construction of new and expanded facilities would result in long-term, localized, minor to moderate, adverse impacts. New programs and changes in motorboat access in Florida Bay would result in long-term, baywide, moderate to major, beneficial impacts.

Cumulative Impacts. As described for the no-action alternative, impacts from other projects and plans would be long term, parkwide, moderate to major, and beneficial. Such

projects include (1) Everglades restoration plans, (2) activities intended to reduce the nutrient content of waters flowing into the park, (3) implementation of a pilot pole/troll zone at Snake Bight in Florida Bay; (4) restoration activities in areas disturbed by prior land uses, (5) implementing the park's fire and nonnative plant management plans, and (6) implementing the park's strategic management plan and resource stewardship strategy. The cumulative effect of alternative 4 combined with other projects and plans outside Florida Bay would be long term, regional, moderate to major, and beneficial. This alternative would contribute substantially to the total cumulative effects, representing a large portion of the beneficial impacts(in Florida Bay at least).

Conclusion. Short-term impacts on vegetation from construction-related facility upgrades would be localized, negligible to minor, and adverse. Construction of new and expanded facilities would result in long-term, localized, minor to moderate, adverse impacts. New programs and changes in motorboat access in Florida Bay would result in long-term, baywide, moderate to major, beneficial impacts. Impacts from other projects and plans would be long term, regional, major, and beneficial, particularly plans involving improvements to water quality and restoration of surface water quantities, distribution, and timing. The cumulative effect of alternative 4 and other projects and plans would be long term, regional, moderate to major, and beneficial.

WILDLIFE

East Everglades Addition

Additional recreational opportunities (e.g., hiking, paddling, and wildlife viewing) for park visitors in the undeveloped areas of the park, such as the East Everglades Addition, would likely increase human presence and activity and sensory-based disruption to wildlife. Animals could flush from human presence or noise, interrupting foraging,

mating, or nesting activities, resulting in long-term, negligible, adverse impacts.

Commercial airboat tours would be discontinued in the East Everglades Addition. Private airboating (by eligible individuals) would continue but would be confined to the frontcountry zone on designated routes. Airboat use would continue to disturb or displace wildlife and diminish wildlife habitat, but the area and intensity of impact would be reduced by the requirement to stay within the frontcountry zone, the requirement to stay on designated routes within that zone, and the elimination of commercial airboat tours. Impacts on vegetation would be mitigated under low-water conditions in the East Everglades Addition to reduce impacts on wildlife habitat. Nonetheless, impacts on wildlife would still be characterized as minor to moderate and adverse. Commercial airboat infrastructure would be removed and the sites would be restored or used for recreational purposes, resulting in long-term, minor benefits for wildlife because of improved habitat and reduced sensory-based disturbance to wildlife.

Closing certain tree islands to visitor use seasonally or year-round to protect wildlife and/or wildlife habitat would have long-term, local, minor, beneficial impacts on wildlife. Designation of a couple of primitive campsites on tree islands could locally increase impacts on wildlife (from increased human activity), but locations of such campsites would be carefully chosen to minimize impacts. Impacts would be localized, long-term, minor, and adverse on birds and other wildlife that use tree islands for forage or reproduction.

Moving NPS operational facilities to a consolidated center outside the Addition would allow restoration of wildlife habitat at the current site. Also, increased ranger patrols in the Addition would improve visitor awareness of the fragility of the Everglades ecosystem, including wildlife, and possibly reduce the incidence of any wildlife harassment, poaching, or other illegal interactions with wildlife. Impacts on wildlife

would be long term, local, minor, and beneficial.

Chekika would continue to be open for seasonal day use in which park visitors could access marl prairies and hike or watch wildlife. Impacts on wildlife (from sensory based disturbance, flushing, etc.) would continue to be localized, negligible to minor, and adverse. Chekika would also serve as one of the park's environmental education program venues, which could include overnight programs. Impacts on wildlife (from sensory based disturbance, flushing, etc.) would be localized, minor, and adverse.

Headquarters / Pine Island / Royal Palm / Main Park Road

The Nike Missile Base site would remain open for visitor interpretation with no to negligible effects on wildlife. Visitors would continue to hike and bicycle on selected trails and fire roads, and impacts on wildlife from these activities would continue to be long term, localized, negligible, and adverse.

Florida Bay

Establishment of extensive pole/troll zones in Florida Bay would reduce motorboat noise and boat speed in those areas. Designation of a 300-foot idle speed, no-wake area along the northern shoreline of Florida Bay between Middle Cape and East Cape would help protect estuary habitat and mangroves from noise and motorboat wakes. The slower speeds and lower noise levels associated with these actions would reduce sensory-based disruption of wildlife nesting, roosting, and foraging activities compared to the no-action alternative, a long-term, minor to moderate, beneficial impact.

The mandatory boater education program and increased law enforcement presence would also increase boater awareness and compliance, reducing impacts on seagrass habitat and other resources in the bay that are

used by wildlife. This would have long-term, local, moderate, beneficial impacts on wildlife and habitat throughout the bay.

Under alternative 4, a comprehensive seagrass restoration program would work to restore damage from boat groundings and propeller scarring. Seagrass habitat and associated wildlife (such as sea turtles and crustaceans) would be expected to experience long-term, minor, localized benefits.

Developing a boat launch for carry-in boats along the 18-mile stretch of U.S. 1 would probably lead to increased levels of use in nearby areas (e.g., Long Sound). This action would lead to additional human-wildlife interactions, a long-term, localized, minor to moderate, adverse impact on wildlife. Similar impacts would be expected if small-scale recreational improvements were provided at Tarpon Basin.

The impacts on wildlife from managing Little Madeira Bay, Joe Bay, and adjacent smaller water bodies as a special protection zone (no public access) would continue to have a long term, localized, minor to moderate, beneficial impact on wildlife and wildlife habitat.

Under alternative 4, four new chickees would be constructed in Florida Bay and these chickees would be used by boaters and paddlers. Human activity in these local areas would increase—a long-term, localized, minor, adverse impact on wildlife because of sensory-based disruption from human presence and activities.

Gulf Coast / Ten Thousand Islands / Everglades City

The implementation of a boater education/permit requirement and increased ranger patrols would increase boaters' knowledge and understanding of park resources. The increased understanding and compliance would result in long-term benefits to wildlife through the public, causing reduced sensory-based disturbance associated with boating,

harassing wildlife, and disturbing shoreline and sea bottom habitat used by wildlife.

An upgraded canoe launch and other developments at the Gulf Coast Visitor Center would result in long-term, minor, adverse impacts on wildlife, mostly associated with an increase in human presence and sensory-based impacts. Eight new chickees in the backcountry areas of the park would result in short-term, local, minor, adverse impacts associated with construction-related noise in undeveloped areas of the Gulf Coast. Additionally, there would be localized, long-term, minor, adverse impacts from the increased presence and activity of humans in these backcountry areas.

Establishing the Everglades Paddling Trail would have long-term, local, minor, beneficial impacts on wildlife in the segments zoned backcountry (paddle only) and the segments designated idle speed, no-wake because motorboat-related noise, wakes, and other habitat disturbance would be eliminated. Managing Gopher Creek as a backcountry (nonmotorized) zone would reduce noise and disturbance, so adverse impacts on wildlife and wildlife habitat from recreational boating activity would be reduced to long term, localized, and minor.

Tamiami Trail / Shark Valley

As in the no-action alternative, visitor and operational activities and facilities near Shark Valley and Tamiami Trail would continue to have some disturbance and displacement effects on sensitive wildlife. These impacts would be localized, negligible to minor, and adverse.

The expanded evening activities at Shark Valley would increase the presence of and noise generated by park visitors in the evening hours, which might disturb wildlife activities at night in the areas near the Shark Valley visitor contact station. Impacts on wildlife from increased evening activities would be

expected to be long term, local, negligible to minor, and adverse.

Under this alternative, increased ranger patrols near Shark Valley and Tamiami Trail would increase visitor awareness of the fragility of the Everglades ecosystem. The presence of officers would presumably lead to reduced illegal wildlife feedings, harassment, and other direct human interactions with wildlife. The impacts on wildlife would be long term, negligible to minor, and beneficial.

Adaptive Management. Under alternative 4, the park would implement adaptive management, as described for the NPS preferred alternative. If monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. These actions could include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on wildlife could be short or long term and range from negligible to minor, depending on the actions taken. If necessary, such actions would be subject to additional NEPA planning and compliance.

Alternative 4 would have short- and long-term, to minor to moderate, adverse impacts, and short- and long-term, minor to moderate, beneficial impacts.

Cumulative Impacts. The impacts of other past, present, and anticipated projects on wildlife and habitats, through habitat restoration and enhancement, would be as described for the no-action alternative—long term, minor to moderate, and beneficial. Such projects/plans include the Modified Water Deliveries project and the Tamiami Trail modification projects, several individual elements of the *Comprehensive Everglades Restoration Plan*, restoration of previously disturbed areas, and reduction of invasive nonnative plants and wildlife. The impacts from alternative 4 would be short and long term, negligible to moderate, and adverse because of sensory-based disturbance and

other effects of visitor use, and short and long term, minor to moderate, and beneficial because of improved management of visitor use throughout the park. The impacts of other actions combined with the impacts of alternative 2 would be long term, minor to moderate, and beneficial cumulative impacts. This alternative would have a small contribution to the total cumulative impacts.

Conclusion. Alternative 4 would have short- and long-term, minor to moderate, adverse impacts, and short- and long-term, minor to moderate, beneficial impacts. The impacts of alternative 4, combined with other past, present, and reasonably foreseeable actions, would result in long-term, minor to moderate, and beneficial cumulative impacts.

FISHERIES

Freshwater Fishes

There would be no notable new adverse impacts on freshwater fishes under alternative 4. The only notable change in visitor access to freshwater resources would be the elimination of commercial airboat operations. Recovery of wetland vegetation and cessation of periodic disturbance from airboat operations would result in long-term, localized, and minor benefits to fish and fish habitat. Areas currently occupied by commercial airboat infrastructure would be converted to other uses for park visitors, such as picnic areas, paddle access, and wildlife viewing. Depending on the ultimate use, the conversion process would require varying degrees of construction activities that would require soil disturbance and, therefore, might disturb water quality and fish. Impacts would be short term, localized, minor, and adverse. Proper use of construction best management practices would limit or eliminate such impacts.

Estuarine and Marine Fishes

Adverse impacts on estuarine and marine fishes would arise from construction projects and increased visitor access to and operation of watercraft. Under alternative 4, construction projects include installation of four additional chickees in Florida Bay and eight additional chickees in the Gulf Coast / Ten Thousand Islands area. Turbidity during installation at these sites would create short-term, localized, minor, and adverse impacts on fish.

Additional access for carry-in boats would be provided by a new boat access point along the main park road to Flamingo and at Long Sound (along the 18-mile stretch of U.S. 1) in Florida Bay. Impacts from increased visitor access to Florida Bay and the additional chickees along the Wilderness Waterway would be long term, localized, negligible to minor, and adverse.

The new Gulf Coast Visitor Center and improve boat launch would likely slightly increase visitor use of that area. Those impacts would be assumed to be long term, localized, negligible to minor, and adverse. Impacts during construction would be short term, localized, minor, and adverse. An Everglades Paddling Trail would be established under alternative 4; several segments would be zoned backcountry (paddle only), and several segments would be designated as idle speed, no-wake. To the extent that these restrictions decrease fishing pressure, impacts would be long term, localized, minor, and beneficial.

Changes in the management of Florida Bay under alternative 4 would be similar to those proposed under the NPS preferred alternative, although pole/troll zones would be more expansive compared to the NPS preferred alternative. Impacts would be similar to those for the NPS preferred alternative—long term, baywide, moderate, and beneficial—because of improved habitat. Like the NPS preferred alternative, the impact of these restrictions on fishing pressure is uncertain. The idle speed, no-wake

designation along the Florida Bay shoreline between Middle Cape and East Cape would decrease the intensity of disturbance to fishes and help protect bottom habitat compared to the no-action alternative, a long-term, localized minor benefit.

Little Madeira Bay, Joe Bay, and adjacent smaller water bodies would be managed as a special protection zone and remain closed to public use, i.e., no change from current management in terms of impacts on fish, and therefore there would be no new impacts.

The proposed boater education/permit program would presumably support and perhaps accelerate the adjustment of boaters to the new Florida Bay operating environment. The program would also likely decrease accidental groundings and inappropriate uses by boaters less familiar with the bay. The comprehensive seagrass restoration program would also help seagrass beds recover from past impacts. As degraded seagrass habitat recovers, there would long-term, moderate, beneficial impacts on fish habitat.

Adaptive Management. As described for the NPS preferred alternative, under alternative 4 the park would implement an adaptive management approach to resource conservation. If monitoring reveals that desired resource conditions are not being achieved, corrective actions would be implemented. These actions could include increased visitor education, access restrictions, area closure to allow natural recovery, or area closure with active restoration. The potential benefits of these actions on fish and fish habitat could be short or long term and range from negligible to minor, depending on the actions taken. If necessary, such actions would be subject to additional NEPA planning and compliance.

Overall, under alternative 4, most adverse impacts on fish and fish habitat would be short and long term, localized, and negligible to minor, mostly from continued visitor activities and during construction.

Cumulative Impacts. As described under the no-action alternative, impacts from past, present, and reasonably foreseeable actions would be long-term, parkwide, minor, and adverse overall, with the bulk of adverse effects resulting from ongoing fishing practices. Past, present, and reasonably foreseeable future projects and plans that would contribute to impacts to park fisheries include (1) Everglades restoration plans that involve changes in water structures and management intended to reestablish a more natural water regime in the park; (2) activities intended to reduce the nutrient content of waters flowing into the park; (3) implementation of a pilot pole/troll zone for Snake Bight in Florida Bay; (4) restoration activities in areas disturbed by prior land uses (e.g., agriculture, airstrips, roadbeds); and (5) the park's strategic management plan and resource stewardship strategy. Most of the impacts on Everglades fish and fish habitat arise from changes to the natural hydro-pattern in the Everglades—that is, the amount, timing, and distribution of water and related changes in water quality. In combination with the minor to moderate beneficial impacts of alternative 4, overall cumulative effects would be long term, parkwide, minor to moderate, and beneficial. The contribution of alternative 4 to this cumulative effect would be modest.

Conclusion. Under alternative 4, some adverse impacts on fish and fish habitat would be short and long term, localized, and negligible to minor; however, the implementation of alternative 4 would have long-term, moderate benefits for the fisheries in the park due to increased refuge (reduced fishing pressure), more informed/responsible behavior by boaters, and the recovery and restoration of damaged seagrass beds resulting from the establishment of pole/troll zones. Impacts from past, present, and reasonably foreseeable actions would be long-term, parkwide, minor, and adverse overall, with the bulk of adverse effects resulting from ongoing fishing. The effect of alternative 4 combined with other past, present, and reasonably foreseeable actions by others would be long

term, parkwide, minor to moderate, and beneficial cumulative effects.

Essential Fish Habitat

In alternative 4, implementation of large areas of pole/troll zone, the boater education/permit program, additional idle speed, no-wake areas, and seagrass restoration projects would result in substantial improvements to the health and functioning of benthic habitat. Existing adverse impacts on essential fish habitat in estuarine and benthic substrates (mud, sand, shell, and rock) and on associated biological communities (including submerged vegetation such as seagrasses and algae, marshes and mangroves, and oyster shell reefs/banks) from boat groundings and propeller scarring would be reduced as large shallow-water areas are protected. Implementing alternative 4 would result in long-term, moderate, beneficial impacts on shallow-water habitats.

Cumulative Impacts. Ongoing park efforts to remove nonnative vegetation and conduct passive and active restoration of infested mangrove habitats would improve essential fish habitat, resulting in an overall, long-term, minor to moderate benefit. Seeding, planting, and/or use of soil amendments to actively restore treated areas within the park would have short-term, negligible to minor, adverse effects on essential fish habitats from the transport of sediments or nutrients that affect water quality. Nonnative vegetation treatments and large-scale restoration actions in Everglades National Park that occur adjacent to areas of essential fish habitat could result in the transport of sediments that would temporarily degrade the water quality and habitat. With implementation of mitigation measures, the short-term effects would be negligible to minor. Overall cumulative effects would be short- and long-term, minor, adverse and beneficial impacts to essential fish habitat. Alternative 4 would constitute the majority of the beneficial cumulative impacts.

Conclusion. Implementing alternative 4 would result in long-term, moderate, beneficial impacts on shallow-water habitats. Other sections in this chapter include more details on specific effects on resources. As described previously, essential fish habitat has specific criteria and categories of impacts. Based on those criteria and categories, there would be no adverse effects on essential fish habitat under this alternative.

FEDERAL SPECIAL STATUS SPECIES

Florida Panther

Like the NPS preferred alternative, alternative 4 would constrain private airboat use to designated routes in the frontcountry zone within the East Everglades Addition. Commercial airboat operations would be discontinued altogether. Thus, over the long term, Florida panthers and their habitat in this area would be less disturbed by airboat activity than under the no-action alternative (current management). This would have localized, long-term, beneficial impacts on Florida panther habitat in the park. Visitor access to tree islands for camping and other recreational purposes would continue to locally diminish the attractiveness of habitat to panthers; however, seasonal or year-round closures of certain tree islands or areas for resource protection reasons would provide short- or long-term and localized impacts. Increased visitor use of frontcountry areas would have no detectable effects on panther populations compared to the no-action alternative because panthers would likely continue to avoid areas where high levels of human activities were occurring.

Impacts on panthers from implementing alternative 4 would be short and long term, minor, and both beneficial and adverse.

Cumulative Impacts. Regional impacts on Florida panther populations would be the same as described under the no-action alternative. Threats to Florida panthers are their health problems, mostly related to poor

habitat conditions, genetic defects from inbreeding, and continuing loss of habitat. Protection efforts by the National Park Service and U.S. Fish and Wildlife Service (area wildlife refuges) and state conservation efforts have resulted in an increase in the panther population, which provides long-term, moderate, benefits to the panther population. However, continued habitat fragmentation and loss outside these areas and increasing vehicle traffic resulting in increasing panther deaths (collisions with vehicles continue to be a leading cause of panther mortality) would continue to limit these benefits. The minor beneficial and adverse impacts of alternative 4, combined with the beneficial impacts of other actions that occur at the regional level, would have negligible beneficial cumulative effects on the Florida panther. Alternative 4's contribution to this cumulative effect would be small.

Conclusion. Alternative 4 would result in long-term, minor, beneficial impacts on panthers and their habitat as a result of constraining private airboat use to designated routes within the frontcountry zone in the East Everglades Addition and from discontinuing commercial airboat operations. Continued visitor activities in habitat used by panthers would have short-term, adverse, effects on panther behavior, namely denning and foraging; however, this impact would not rise to the level of a measurable effect. Cumulative effects would be negligible and beneficial.

Key Largo Woodrat and Key Largo Cotton Mouse

Under alternative 4, effects on the woodrat and cotton mouse would be similar to those described under the no-action alternative. A potential visitor information facility and NPS replacement housing would be developed on already disturbed lands. Placement of a visitor kiosk at the Key Largo ranger station developed area would have no appreciable effect on woodrats or cotton mice. Overall,

alternative 4 would result in continuing, negligible, adverse impacts on these species.

Cumulative Impacts. Widespread effects on the woodrat and cotton mice would be as described for the no-action alternative. These species would continue to be threatened by habitat degradation caused by development, pollution, and human intrusion on hardwood hammocks across the animals' ranges. The effects of implementing alternative 4 would be negligible, and when combined with the adverse effects of other actions that occur at the regional level, would result in moderate adverse cumulative effects on the Key Largo woodrat and Key Largo cotton mouse. Alternative 4 would contribute very slightly to the overall cumulative effects.

Conclusion. Under alternative 4 some continuing, negligible, adverse impacts on woodrats and cotton mice may occur. Since Key Largo woodrat populations would be sensitive to any loss in habitat, special attention would be paid to even small habitat losses. Cumulative effects would be moderate and adverse.

Manatee

The manatee and critical habitat for manatees would benefit from alternative 4 through implementation of extensive pole/ troll zones in Florida Bay, the parkwide boater education/permit system, and increased law enforcement patrols. The comprehensive seagrass restoration program would improve forage areas damaged by propeller scarring and boat groundings. Slower speeds and designated routes in the bay would likely reduce boat impacts with manatees, reduce the incidence of injury and death, decrease underwater noise generated by motorboats, and improve conditions in designated critical habitat. The national park's manatee protection plan would eventually lead to long-term benefits to manatees by reducing disturbance to critical habitat and strikes by boats. These changes would have moderate benefits to manatees.

Similar to the no-action alternative, Little Madeira Bay and Joe Bay would be a special protection zone and would only be open only for research-related activities. These conditions would result in continued localized benefits for manatees and their habitat.

Designating some segments of the newly established Everglades Paddling Trail as backcountry (nonmotorized) zones and other segments as idle speed, no-wake areas would reduce the risk of injury or death.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees could lead to increased use in certain areas. Actions taken under alternative 4 would reduce the potential for boat strikes and other human disturbances to manatees in most areas of the park waters, but might increase those risks in other areas, a long-term, adverse, effect that would be reduced to minor.

Overall, alternative 4 would have long-term, moderate benefits and continuing minor adverse effects on the manatees and designated critical habitat in Florida Bay and in Ten Thousand Islands.

Cumulative Impacts. Regional cumulative impacts on the manatee from past hunting and poaching, from injuries from boats and their propellers, from injuries in water control structures, from critical habitat loss, from salinity changes, and from water quality changes would be widespread and long-term adverse impacts. The beneficial impacts of alternative 4, combined with the long-term, moderate, adverse impacts of actions by others, would have moderate, adverse, cumulative effects on manatee and critical habitat for manatee. Alternative 4 would make a modest beneficial contribution to these cumulative effects.

Conclusion. Motorboat activity and visitor access in the park's marine waters would result in continued, long-term, minor, adverse effects on the manatee and critical habitat for

manatees from boat and propeller strikes and habitat degradation. Changes to the management of recreational boating in Florida Bay (pole/troll zones, restricted motorboat access in places, etc.), combined with manatee management plan, improved boater education, increased on-the-water law enforcement, seagrass restoration, and boating restrictions along the newly established Everglades Paddling Trail, would result in reduced boat strikes, decreased underwater noise from motorboats, improved habitat, and moderate benefits to both the manatee population and designated critical habitat for manatee. Cumulative effects would be moderate and adverse.

Bottlenose Dolphin

Under alternative 4 bottlenose dolphins would benefit from the establishment of pole/troll zones in Florida Bay, backcountry zones and idle speed, no-wake areas along the Everglades Paddling Trail, the parkwide boater education and permit system, and increased law enforcement. Slower boat speeds and designated routes in the bay would decrease underwater noise and reduce the risk of human disturbance to dolphins. The improved conditions in the mud flats and seagrass habitat from the comprehensive seagrass restoration program would benefit food sources for the bottlenose dolphin. These changes would result in long-term benefits to bottlenose dolphins using Florida Bay.

Similar to the no-action alternative, Little Madeira Bay and Joe Bay would only be open to research-related activities. This special protection zone likely would benefit fish habitat and in turn would benefit forage for the bottlenose dolphins, which would result in localized and long-term benefits.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees would increase boat access and

visitation near these locations, which could cause dolphins to abandon the area.

Overall, actions taken under alternative 4 would reduce the potential for human disturbance of bottlenose dolphins and provide a long-term beneficial impact on habitat and foraging dolphins.

Cumulative Impacts. Bottlenose dolphins are threatened by commercial fishing and habitat destruction. These threats are global and represent both direct injury to and mortality of bottlenose dolphins in addition to a loss habitat. These past, present, and reasonably foreseeable conditions result in long-term impacts on the bottlenose dolphins in Everglades National Park. When combined with the minor beneficial impacts of alternative 4, the cumulative effects of all actions would be minor to moderate and adverse. The contribution of alternative 4 would be modest and beneficial.

Conclusion. Alternative 4 would reduce impacts on bottlenose dolphins, resulting in long-term, minor, beneficial impacts. Cumulative effects would be minor to moderate and adverse.

Wood Stork

Within the East Everglades Addition, reduced disturbance from constraining private airboats to designated routes within the frontcountry zone and elimination of commercial airboat operations would provide benefits to wood storks and may support expansion of the wood stork colonies. Reduced speed areas along the Everglades Paddling Trail would likely continue to benefit roosting storks. The 300-foot idle speed, no-wake area on the northern shoreline of Florida Bay (between Middle Cape and East Cape) and pole/troll zones would reduce noise and boat wake disturbance to foraging storks in the area. The eight additional chickees in the Gulf Coast / Ten Thousand Islands area would be sited to avoid known nesting or foraging areas.

Actions taken under alternative 4 would result in localized and long-term, minor to moderate, beneficial impacts to wood storks.

Cumulative Impacts. The regional benefits on wood stork populations would be the same as described for the no-action alternative—long term, moderate, and beneficial. According to the U.S. Fish and Wildlife Service, the wood stork is increasing and expanding its range and appears to have adapted to some degree to changes in habitat in south Florida; nesting has increased since its listing as an endangered species (USFWS 2007c). Although individual colonies are declining in size, the overall number of colonies is increasing, and the U.S. Fish and Wildlife Service is considering changing the status of the species from endangered to threatened to recognize regional increases in nesting wood storks resulting from protection and adaptation. Overall cumulative impacts would be moderate and beneficial, with alternative 4 making a modest beneficial contribution.

Conclusion. Alternative 4 would have long-term, minor to moderate, beneficial effects on wood storks from reduced potential for human disturbance on roosting, nesting, and foraging habitat. The cumulative effect would be moderate and beneficial.

Piping Plover, Roseate Tern, and Red Knot

Under alternative 4 piping plovers, roseate terns, and red knots would benefit from establishment of pole/troll zones in Florida Bay and the shoreline idle speed, no-wake area between Middle Cape and East Cape. Any disturbance to these species from noise and human activity in estuary habitats and keys would be reduced as a result of these actions. The impacts on piping plover, roseate terns, and red knots in Crocodile Sanctuary (Little Madeira Bay and numerous other connected ponds and creeks) from management as a special protection zone would be localized, minor, and beneficial.

Overall, this alternative would result in localized minor to moderate benefits to these species. The no-wake and pole/troll zones in this alternative would also have moderate beneficial effects to designated piping plover critical habitat through reduced impacts to natural processes that affect shoreline development, such as boat wakes and propeller damage to mud banks and seagrass beds, and reduced human disturbance.

Cumulative Impacts. The piping plover, roseate tern, and red knot continue to be threatened across their ranges by coastal habitat loss from development, predation, poor water quality, and unnatural water delivery and salinity. These threats have resulted in widespread and long-term, moderate adverse effects on populations despite the habitat protection provided by Everglades National Park. The minor to moderate beneficial effects of the alternative 4 actions, combined with the effects of other actions that occur at the regional level, would result in moderate adverse cumulative impacts on the piping plover, roseate tern, red knot, and piping plover critical habitat. Alternative 4 would make a slight beneficial contribution to these cumulative effects.

Conclusion. Overall alternative 4 would benefit the piping plover, roseate tern, red knot, and critical habitat for the piping plover, with limited minor to moderate benefits compared to continuing current management. Cumulative effects would be moderate and adverse.

Everglade Snail Kite

Under alternative 4, constraining private airboats to designated routes within the frontcountry zone and discontinuing commercial airboat operations altogether would reduce noise and activity, providing localized, long-term benefits for the snail kite in the park. Designating certain tree islands for recreation and establishing campsites in the East Everglades Addition would probably not adversely affect snail kites because known

snail kite habitat would be avoided. Ground-disturbing activities around the Gulf Coast Visitor Center would not be in the snail kite's preferred habitat and therefore no effects would be likely. Overall, alternative 4 would be expected to have long-term beneficial impacts.

Additionally, because the designated critical habitat for the Everglade snail kite lies outside East Everglades, there are no proposed actions in alternative 4 that would affect designated critical habitat.

Cumulative Impacts. The decline of Everglade snail kite populations is attributed to hydrologic fluctuations affecting its food source, in addition to habitat degradation caused by natural and human-induced hydrologic changes. In addition to habitat loss, the lack of recruitment of new breeders into the population and the lack of fledging successes have negative effects on the Everglade snail kite population. These threats have resulted in widespread and long-term effects on snail kites despite habitat protection measures by Everglades National Park. Alternative 4 actions would provide a localized and long-term benefit for snail kite populations, as a result of changes in airboat use in the East Everglades Addition. The minor impacts of alternative 4, combined with adverse effects of other actions that occur at the regional level, would have a moderate adverse cumulative effect on the snail kite. Alternative 4 would contribute a slight beneficial increment to these cumulative effects on this species.

Conclusion. Alternative 4 would have long-term beneficial effects on Everglade snail kite from changes in airboat use in the East Everglades Addition. Cumulative effects would be moderate and adverse.

Eastern Indigo Snake

Within the East Everglades Addition, reduced disturbance from constraining private airboats to designated routes within the frontcountry

zone and discontinuing commercial airboat operations altogether would increase habitat protection for the eastern indigo snake by reducing the exposure of snakes to motorized visitor activities. This would provide localized, long-term benefits for the eastern indigo snake and its habitat. Continued intermittent use of tree islands for recreational use in the East Everglades Addition could temporarily displace snakes or disturb their activities, resulting in continued, short-term, minor, adverse effects. Ground-disturbing activities would not take place in the snake's preferred habitat, and therefore would not be expected to impact the eastern indigo snake.

Development of campsites on tree islands in the East Everglades Addition could disturb burrowing snakes if small-scale excavation is required. However, the park would implement their standard eastern indigo snake protection and education plan for all construction personnel to follow in compliance with the park's conservation and protection plan for the snake. Construction activities would result in short-term and localized impacts on the eastern indigo snake.

Alternative 4 would have localized long-term moderate beneficial effects on the eastern indigo snake populations, primarily as a result of changes in private airboat use and discontinuation of commercial airboat use in the East Everglades Addition. Continued visitor activities in habitat used by the eastern indigo snake and proposed construction activities would have short-term, minor, adverse effects on the indigo snake habitat.

Cumulative Impacts. The decline in eastern indigo snake populations is attributed to loss of habitat to agriculture and to collecting for the pet trade. The species has also suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection. These regional effects on the snake would continue to have long-term, moderate, adverse impacts on eastern indigo snake populations. Alternative 4 overall would provide a long-term moderate benefit for snake populations, primarily as a result of changes in private airboat use and

discontinuation of commercial airboat operations in the East Everglades Addition. These benefits would not offset the regional adverse effects from collection and degradation of habitat on a large scale. The benefits for the snake by implementing alternative 4, combined with the long-term, major, adverse effects of past, present, and reasonably foreseeable actions by others, would have moderate cumulative impacts on the eastern indigo snake population. Alternative 4 would contribute a modest increment to these adverse cumulative effects on this species.

Conclusion. Alternative 4 would have long-term, moderate beneficial effects on eastern indigo snake populations, primarily as a result of changes in private airboat use and discontinuation of commercial airboat use in the East Everglades Addition. Continued visitor activities in habitat used by the eastern indigo snake and proposed construction activities would have short-term minor, adverse effects on the snake and its habitat. Cumulative effects would be widespread, long-term, moderate, and adverse.

American Alligator

Within the East Everglades Addition, reduced disturbance from constraining private airboats to designated routes within the frontcountry zone and from discontinuing commercial airboat use altogether would result in long-term minor benefits. Facility upgrades and new shade structures at Shark Valley would occur within the existing developed footprint. New ground-disturbing activities would include construction of a new administrative facility outside the park near the East Everglades Addition. Resident alligators would likely leave the vicinity during construction at each of these sites, but they would otherwise not be harmed and would return once construction is completed—a short-term, localized, minor, adverse effect. Although alligators are sometimes found in brackish water, no additional impacts would be anticipated from establishment of the

Everglades Paddling Trail and installation of eight additional chickees in the Gulf Coast / Ten Thousand Islands area.

Under alternative 4, individual American alligators would be better protected as a result of improved habitat protection and increased ranger patrols but would continue to be at some risk from human activities. Overall, the short- and long-term, minor, adverse effects would be discountable.

Cumulative Impacts. Although the alligator once existed in far greater numbers in the Everglades, the alligator population has recovered nicely (a long-term benefit) and it is no longer classified as an endangered species. However, degradation of and development in alligator habitat outside the park continues to cause concern for the long-term well-being of the species. Impacts of alternative 4, combined with the long-term adverse and beneficial effects of past, present, and reasonably foreseeable actions by others, would have minor adverse and beneficial cumulative impacts on American alligators. Alternative 4 would contribute a small measurable amount to the recovery of this species by protecting habitat from development and degradation.

Conclusion. Overall, alternative 4 actions would improve protection of American alligators and their habitat. Visitor and management activities in alligator habitat under the alternative 4 would have short- and long-term minor adverse effects. There would be minor adverse and beneficial cumulative impacts on American alligators.

American Crocodile

The American crocodile would potentially benefit from alternative 4 through implementation of pole/troll zones and the 300-foot shoreline idle speed, no-wake designation in Florida Bay (between Middle Cape and East Cape), a parkwide boater education/permit requirement, and increased law enforcement. Slower speeds in estuaries and along the

coastline would reduce disturbance in critical habitat. These changes could result in reduced disturbance to crocodiles and their habitat.

Little Madeira Bay and Joe Bay would be a special protection zone and would be open only to permitted research-related activities, continuing the protection of this species and habitat. This would be a continued long-term benefit on crocodiles in these areas.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can be accomplished) and the installation of new chickees would distribute visitor use and increase boat use in some areas.

Overall, actions taken under alternative 4 would reduce the potential for adverse effects on the American crocodile and designated critical habitat for American crocodile. However, visitor access to and activities in and around habitat used by the American crocodile under alternative 4 would have long-term, negligible, adverse effects and long-term minor benefits.

Cumulative Impacts. Predation, degraded hydrologic conditions, and habitat loss are the most important factors influencing the status of crocodiles in the park and south Florida. Crocodile hatchlings have a high mortality rate and are preyed upon by other wildlife including raccoons, birds, and crabs. Alteration of salinity and water levels in Florida Bay resulting from extensive engineering of the Everglades also are a factor. Crocodile nests that are too wet or too dry result in egg mortality. Suitable year-round crocodile habitat was also lost because of development activities in the upper Florida Keys. These activities have resulted in widespread impacts on the crocodile population and habitat. However, the status of the Florida population has been changed to threatened because of a recent sustained increase in numbers, particularly nesting females. The nesting population continues to slowly increase, both in abundance and nesting range since effective protection of

wildlife and nesting habitat was established. Within the park, crocodiles have access to relatively undisturbed habitat, which has allowed their local population to increase—resulting in long-term, parkwide, minor to moderate benefits to the crocodile.

The negligible adverse and minor beneficial impacts of alternative 4 actions, combined with the beneficial impacts of other actions that occur at the regional level, would result in minor to moderate beneficial cumulative effects on the crocodiles and designated critical habitat for the American crocodile. Alternative 4 would make a small contribution to the cumulative effects.

Conclusion. Overall, the park would continue to protect American crocodiles and designated critical habitat for the American crocodile. However, visitor access to and activities in habitat used by the American crocodile under alternative 4 would have long-term, negligible, adverse effects and long-term minor benefits. Cumulative effects would be minor to moderate and beneficial.

Sea Turtles

Sea turtles would benefit from the alternative 4 through establishment of pole/troll zones in Florida Bay, the parkwide boater education and permit system, and increased ranger patrols. Slower speeds and use of designated routes in the bay would reduce the risk of boat strikes and improve conditions in seagrass habitat; in addition, active seagrass restoration would be implemented. These changes would result in long-term benefits to sea turtles using Florida Bay.

Little Madeira Bay and Joe Bay would be managed as a special protection zone and would remain closed to public use. These conditions would result in continued localized, long-term benefits.

Additional put-in locations for nonmotorized boats in Long Sound, the Gulf Coast, and possibly in other locations (assuming this can

be accomplished) along with installation of new chickees would increase boat access and visitation to near these locations, but any effects on sea turtles would be discountable.

However, direct effects on sea turtles could include capture by recreational anglers using hook-and-line methods that could lead to injury and, in some instances, eventual death. These impacts are expected to be long term, adverse, and moderate.

Overall, actions taken under alternative 4 would reduce the potential for adverse effects, but would still result in moderate (mostly continuing) adverse impacts to sea turtles.

Many of the ongoing minor adverse effects to proposed loggerhead critical habitats resulting from boating and recreational use would continue. The proposed no-wake zone and pole/troll zones along lower Cape Sable will provide beneficial effects to the portion of critical habitat on Cape Sable south of Middle Cape. In addition, a boater education program and boating resource protection planning will result in minor beneficial effects throughout both NOAA and USFWS proposed loggerhead critical habitats.

Cumulative Impacts. Sea turtles are threatened by commercial fishing and habitat destruction. These threats are global in nature and result in both direct injury to and mortality of turtles and loss of nesting habitat due to shoreline development (e.g., coastal runoff, marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, increased underwater noise, and boat traffic). These combine to produce long-term, moderate to major, adverse effects on sea turtle populations. The moderate impacts of alternative 4, combined with the impacts of other actions, would result in moderate adverse cumulative effects on sea turtles and their habitat. The beneficial and adverse contributions of alternative 4 to the overall adverse cumulative effects would be slight.

Conclusion. Alternative 4 would reduce impacts to sea turtles, their habitats, and proposed loggerhead sea turtle critical habitats, producing localized, long-term, minor benefits. However, alternative 4 would also result in some continued, long-term, moderate and adverse impacts to sea turtles from human activities (primarily motorboating and recreational fishing). This alternative would result in a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act for sea turtles. The alternative would result in minor beneficial impacts and a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for NOAA and USFWS proposed critical habitat for the loggerhead sea turtle. Overall cumulative effects would be moderate and adverse to sea turtles and minor and beneficial to proposed loggerhead sea turtle critical habitat.

Smalltooth Sawfish

Implementing the boater education/permit system, the boating safety and resource protection plan, and increased ranger patrols would add to boater knowledge and understanding of park resources, including sawfish and sawfish habitat. Alternative 4 would implement pole/troll zones and additional idle speed, no-wake designations in Florida Bay, slowing motorboats and further reducing the risk of injury to sawfish. Alternative 4 would also implement some backcountry zones and additional idle speed, no-wake designations along the Everglades Paddling Trail (Ten Thousand Islands / Gulf Coast Area). All of these actions would benefit the sawfish and smalltooth sawfish designated critical habitat either by improving habitat or by reducing motorboat speeds (and thereby risk of injury to sawfish).

However, visitor and administrative uses (primarily boating and recreational fishing) would have the potential to affect the smalltooth sawfish under alternative 4. In particular, smalltooth sawfish may be adversely affected by recreational fishing

activity within the park, through incidental hooking, entanglement, or digestion of actively fished or discarded fishing line.

Some actions taken under the alternative 4 would reduce the potential for injury to fish and habitat degradation in the bay, resulting in localized, long-term, minor benefits. Adverse impacts would be long term, moderate, and adverse for the smalltooth sawfish and be minor and insignificant for its designated critical habitat.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch and habitat loss and degradation, including poor water quality and altered water delivery and salinity (NMFS 2006). These widespread threats have resulted in a reduced species distribution and reduced population levels. The effects of the alternative 4, combined with the adverse impacts of other actions that occur at the regional level, would result in moderate adverse cumulative impacts on the smalltooth sawfish. The beneficial and adverse contribution of alternative 4 to the overall adverse cumulative impacts would be slight.

Conclusion. Alternative 4 would result in both long-term, moderate, adverse and long-term, minor, beneficial effects on the smalltooth sawfish from human activities (primarily recreational fishing), a *may affect, likely to adversely affect* finding under section 7 of the Endangered Species Act. The alternative would result in minor, beneficial impacts and a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act for designated critical habitat for the smalltooth sawfish.

NATURAL SOUNDSCAPES

Noise levels across the park would be expected to remain relatively similar to present-day levels, and natural sounds would continue to predominate. Human-generated noise in the park would continue to stem primarily from vehicular traffic, aircraft overflights, and administrative activities

involving airboat and/or aircraft use. Areas most affected by human-generated noise would be developed areas, popular boating (and airboating) areas, campgrounds, and areas near major roads. Some areas of the park would have reduced noise from motorboats or airboats because of changes related to management zoning and elimination of commercial airboat tours. If alternative transportation to various park areas is successfully implemented, noise levels could be locally decreased by the reduction in numbers of individual passenger vehicles.

East Everglades Addition

Airboating would continue in the East Everglades Addition within the frontcountry zone (see “Alternative 4” map). Noise from private airboats is more common on weekends, when more airboats are on the water. Park staff also use airboats for maintenance, research, law enforcement, and fire/vegetation management. As described in the no-action alternative, airboat-generated peak instantaneous noise levels measured between 95 dB(A) and 110 dB(A) at 50 feet and at maximum operating conditions (Glegg et al. 2005). Private airboating (by eligible individuals) in the East Everglades would be confined to the frontcountry zone on designated routes, a long-term, localized, negligible to minor, beneficial impact compared to the no-action alternative. Noise from commercial airboating would be eliminated because commercial airboating operations would end altogether in this alternative. Airboat use in the East Everglades Addition would still have a long-term, localized, moderate, adverse impact on the natural soundscape, but the area within which private airboating would occur would be smaller (i.e., only the frontcountry zone). Overall, the restrictions on private airboating and the elimination of commercial airboating would have a long-term, regional, moderate, beneficial impact on the soundscape of the East Everglades Addition.

Natural soundscapes of the Addition would continue to be affected by administrative use of helicopters and airboats under alternative 4. The East Everglades Addition wilderness proposal in this alternative would have little effect on the natural soundscape because the National Park Service already uses the wilderness minimum requirement process (which is designed to protect wilderness values such as natural quiet) in this wilderness-eligible area. Thus, impacts on the natural soundscape would remain long-term, localized, moderate, and adverse.

The Tamiami Trail borders the East Everglades Addition on the north side, and the heavy traffic along the highway would continue to cause long-term, localized, moderate, adverse impacts on the soundscape in areas near the road.

Headquarters / Pine Island / Royal Palm / Main Park Road

Much of the Pine Island District along the main park road is a developed area that is popular with visitors and is a focus of administrative activities by park staff. This area is generally busy, especially during the peak winter season. Therefore, the natural soundscape is impacted locally by a variety of noises associated with humans, including vehicle sounds (automobiles, buses, motorcycles, park operations involving machinery and heavy equipment, facility sounds such as air-conditioners and blowers, and human voices. Human-generated noise would likely continue to be higher during the day and during the peak winter season when the area receives more visitors. As in the no-action alternative, there would continue to be noise associated with recreational vehicle generators at the Long Pine Key campground (except during night-time quiet hours. The effects on the natural soundscape at Pine Island under alternative 4 would be similar to those under the no-action alternative—long term, local, minor, and adverse.

Florida Bay

Alternative 4 would allow recreational access to the same keys and chickees in Florida Bay as the no-action alternative. However, this alternative would add four additional chickees in Florida Bay, which would be additional localized areas of increased human activity. These new recreational and camping sites in Florida Bay would have localized, long-term, minor, adverse effects on the natural soundscape.

Alternative 4 would establish substantial pole/troll zones in Florida Bay, where operating gasoline-powered motorboat engines would not be permitted, and these pole/troll zones would be more expansive than in the NPS preferred alternative. This would result in long-term, localized, moderate beneficial impacts on the natural soundscape. Additionally, a 300-foot-wide, idle speed, no-wake area would be established along the northern shoreline of Florida Bay from Middle Cape to East Cape. This would slow motorboats operating in this area and reduce motorboat noise, a long-term, localized, moderate, beneficial impact on the natural soundscape.

Little Madeira Bay, Joe Bay, and adjacent smaller water bodies would be managed as a special protection zone and would remain closed to the public. As under the no-action alternative, this area would generally be free from human-generated noise, and localized, minor, beneficial impacts on the natural soundscape would continue.

Gulf Coast / Ten Thousand Islands / Everglades City

Alternative 4 would add eight backcountry chickees to the Gulf Coast / Ten Thousand Islands area of the park, and these would be additional localized areas of increased human activity. Impacts on the natural soundscape would be long term, minor, and adverse. Construction of developments to the Gulf Coast area would result in short-term,

localized minor adverse impacts to the soundscape.

The new Everglades Paddling Trail would probably benefit natural soundscapes by eliminating motorboat noise in the segments zone backcountry (nonmotorized) and reducing it in the segments designated idle speed, no wake. Impacts would be localized, long-term, minor, and beneficial.

Gopher Creek would be managed as a backcountry (paddle only) zone. Ending motorboat use along this creek would have long-term, localized, moderate, beneficial impacts on natural soundscapes.

Tamiami Trail / Shark Valley

At Shark Valley, the impacts of the alternative 4 would be the same as for the no-action alternative—long term, local, minor to moderate, and adverse—from various noises associated with vehicle sounds, park operational activities, facilities (e.g., air-conditioners), and human voices; there would also be short-term, localized, moderate, adverse impacts from construction activities associated with new and upgraded facilities.

Alternative 4 would have long-term, local, minor to moderate, adverse as well as minor to moderate, beneficial impacts on the natural soundscape at Everglades National Park.

Cumulative Impacts. The impacts of other plans and projects on the natural soundscape would be the same as those discussed for the no-action alternative—local, long-term, minor to moderate, and adverse, depending on the location and the source. Most unnatural sounds would continue to be from localized human activity, motorboats, vehicle traffic, aircraft, and airboats. Some projects are planned or underway that would add to such noise by generating localized, short-term noise impacts from construction and restoration activities. Examples of such plans include the Modified Water Deliveries project, *Comprehensive Everglades Restoration Plan*, wetland and disturbed area restoration

plans, the Tamiami Trail modifications, the main park road resurfacing, the replacement of the marine bulkheads at Flamingo, and Flamingo improvements. External sources would continue to affect the natural soundscape of the park, similar to the no-action alternative, with long-term, minor, adverse effects on the park. The effects of alternative 4 would be long term, local, minor to moderate, and adverse as well as minor to moderate and beneficial, depending on the location and the source; the greatest sources of noise would be motorboat use in marine areas, airboat use in the East Everglades, and human activity in developed areas of the park, such as Shark Valley. Under alternative 4, impacts on the natural soundscape would continue to be mostly confined to developed areas, popular boating (and airboating) areas, campgrounds, and along major roads. The effects from other park plans, projects, operations, and external sources, combined with the impacts of alternative 4 on natural soundscapes, would be long term, negligible to minor, adverse, cumulative impacts. Alternative 4 would contribute a substantial beneficial increment to the total cumulative impacts.

Conclusion. Alternative 4 would have long-term, local, minor to moderate, adverse as well as minor to moderate, beneficial impacts on the natural soundscape at Everglades National Park resulting from noise associated with human activities and vehicle operations (e.g., automobiles, buses, motorboats, airboats, and aircraft). The effects of alternative 4, combined with other park plans, projects, operations, and external sources would have long-term, negligible to minor, adverse, cumulative effects on the overall soundscape of the park. Alternative 4 would contribute a substantial beneficial increment to the total cumulative impacts.

WILDERNESS CHARACTER

Nearly 1.3 million acres of Everglades National Park would continue to be managed as designated wilderness, as it has been since

1978. This includes approximately 530,000 acres of submerged marine wilderness. An additional 82,000 acres would continue to be managed as potential wilderness, as it has been since 1978. Alternative 4 would expand the park's wilderness. About 42,700 acres within the East Everglades Addition would be proposed for wilderness designation, and an additional 59,400 acres would be proposed as potential wilderness. Potential wilderness would be converted to designated wilderness once nonconforming uses (primarily private airboat use) ended.

Untrammelled

Under alternative 4, the park would continue to manage natural resources in all areas of the park from an ecosystem perspective (e.g., wetland restoration, nonnative plant/wildlife management, and fire management efforts), which would have a long-term, minor, adverse impact on the untrammelled quality of the park's wilderness. The East Everglades Addition would remain an area of specific focus for these activities.

Like the NPS preferred alternative, alternative 4 would establish a comprehensive seagrass restoration program in Florida Bay for submerged marine wilderness areas damaged by boat groundings and propeller scarring. These efforts would have short-term, localized, minor to moderate, adverse impacts on the untrammelled quality of submerged wilderness areas that undergo restoration efforts.

Main Portion of the Park (all but East Everglades Addition). Alternative 4 would establish a comprehensive seagrass restoration program in Florida Bay for sites and areas damaged by boat grounding and propeller scarring. This would have a long-term, local, minor to moderate, beneficial impact on the natural quality of the submerged wilderness.

Alternative 4 would establish the most extensive pole/troll area of any alternative and designate some idle speed, no-wake areas.

This alternative would also establish a mandatory boater education program/permit system. These actions would help protect the natural resources of the park and help reduce new boat groundings and propeller scarring. These actions also would help scarred areas recover over time. Consequently, these actions would have a long-term, regional, moderate to major, beneficial impact on the natural quality of submerged marine wilderness.

Under alternative 4, the park would continue to manage the network of backcountry and wilderness campsites and chickees while adding chickees (four in Florida Bay and eight in the Gulf Coast / Ten Thousand Islands area). Such facilities diminish the naturalness of a locale, both in terms of scenery and in relation to the natural soundscape. This would locally reduce naturalness, a minor, long-term, adverse effect. The proposed Everglades Paddling Trail would be minimally marked to preserve scenery and minimize maintenance requirements, so it would have a negligible adverse effect on naturalness.

East Everglades Addition. The proposed designation of 42,700 acres as wilderness, and the eventual designation of another 59,400 acres of potential wilderness, would ensure that most of the area would be permanently protected and managed to preserve its natural quality from an ecosystem perspective. Because of the large area that would be designated as wilderness in perpetuity, this would have a major, long-term, beneficial impact on the area's natural quality.

Within the East Everglades Addition, alternative 4 would limit private airboating to designated routes in the frontcountry zone. Commercial airboating would be discontinued altogether. This would end the creation of new airboat trails (which are apparent because they damage or destroy vegetation) and allow airboat trails outside the frontcountry zone to recover to natural conditions over time. This increase in naturalness would have a long-term, regional,

moderate, beneficial impact on the natural quality of wilderness.

Undeveloped

Main Portion of the Park (all but East Everglades Addition). Under alternative 4, the park would continue to manage the network of backcountry and wilderness campsites and chickees and would add eight chickees in the Gulf Coast / Ten Thousand Islands area. These actions would have a long-term, localized, minor, adverse effect on the undeveloped quality of land-based wilderness. The proposed Everglades Paddling Trail would be minimally marked to preserve scenery and minimize maintenance requirements, so it would have a long-term, negligible, adverse effect on the undeveloped quality of the main park area.

In Florida Bay, four new chickees would impact the undeveloped quality of the submerged wilderness because their pilings are embedded into the submerged (marine wilderness) bottom. This would be true as well of boundary markers, channel/access route markers, and navigational aids (all improved in the alternative 4, but the minimum necessary to provide direction while preserving scenery). Based on the extensive pole/troll zones and the fact that they would be well marked, there would be a substantial number of posts for marking pole/troll zones. There would be long-term, minor, adverse impacts on the undeveloped quality of submerged wilderness where new pilings or posts for marking are driven into the submerged bottom.

East Everglades Addition. Most of the wilderness-eligible portion of the East Everglades Addition lacks human developments. Alternative 4 would propose 42,700 acres in the Addition for wilderness designation and an additional 59,400 acres as potential wilderness. With wilderness designation, the area would be permanently protected from future development, except as required for resource protection or visitor

safety, per NPS management policies. Unless they are determined to be historic, structures such as hunting cabins, airboat docks, road traces, and canals within these areas would eventually be removed, and the areas would be restored to natural conditions. Impacts on the undeveloped quality of wilderness within the East Everglades Addition would be long-term (in perpetuity), regional, minor to moderate, and beneficial.

The designation of wilderness would also affect the undeveloped quality by eventually eliminating the use of private airboats and limiting administrative use of airboats in this area. This would give the perception that this is an undeveloped area, compared to the no-action alternative, and would be a major, long-term, beneficial effect on this quality.

Opportunities for Solitude or Primitive and Unconfined Recreation

Main Portion of the Park (all but East Everglades Addition). The sense of solitude for visitors in wilderness areas would be affected primarily by motorized craft. These effects might be from spillover motorboat noise from nearby marine waters (e.g., into beach areas used by visitors), noise from nearby roads, and noise/sightings of airplanes and helicopters. Establishment of pole/troll zones in Florida Bay, the idle speed, no-wake area between Middle Cape and East Cape along the northern Florida Bay shoreline, and segments of the Everglades Paddling Trail zoned backcountry (nonmotorized) or designated as idle speed, no-wake would substantially reduce motorboat noise spilling into adjacent wilderness compared to the no-action alternative. However, there are relatively few areas of visitor use within wilderness where this effect would be detected (e.g., at beaches and campsites along the coast and on four Florida Bay keys). The beneficial effect on the opportunity for solitude would be long term, localized, and minor.

The pole/troll zones and required education program/permit system would adversely affect the sense of a primitive, unconfined experience for the Florida Bay submerged wilderness. This would detract from visitors sense of options to go where they want without restriction, and would be a moderate, long-term, adverse impact on this quality.

East Everglades Addition. The 42,700 acres of proposed designated wilderness and 59,400 acres of proposed potential wilderness areas in the East Everglades would protect opportunities for solitude and primitive and unconfined recreation. Private airboats would be confined to areas zoned frontcountry. Thus, in most of the Addition visitors would be assured of outstanding opportunities for solitude. The solitude benefits would not be fully realized in the 59,400 acres of proposed potential wilderness until private airboat use (a life-long right for eligible individuals) ends. In the East Everglades Addition, impacts on opportunities for solitude and primitive, unconfined recreation would be long term (in perpetuity), regional, major, and beneficial compared to existing conditions (alternative 1).

Considering all four qualities of wilderness character, the management actions and the wilderness proposal for the East Everglades in alternative 4 would have a variety of impacts on wilderness character. Compared to the no-action alternative, for the existing designated wilderness under alternative 4 there would be a minor, long-term, adverse impact due to the development and use of several new chickees. In the Florida Bay submerged wilderness there would be a moderate, long-term, beneficial impact to wilderness character due to the reduction in spillover motorboat noise and bottom scarring due to the pole/troll zones and the mandatory boat education program/permit system. (This impact level considers both the beneficial effect on the natural quality and the adverse effect on the primitive, unconfined recreation quality.) In the East Everglades Addition, alternative 4 would have a major, long-term (in perpetuity), beneficial impact on wilderness character,

primarily due to the designation of a large area as wilderness, and the eventual elimination of private airboats in the area, benefiting the naturalness, undeveloped, and solitude, qualities of wilderness character over a large area.

Cumulative Impacts. The impacts from other plans, projects, and activities would be the same as described in the no-action alternative. During the period of ecological restoration work in the main wilderness and East Everglades Addition, which would include the use of motorized and mechanical equipment, there would be minor to moderate adverse impacts in various areas on the undeveloped, untrammelled, and solitude qualities of wilderness character. But in the long term, there would be moderate, beneficial impacts on the wilderness character of the terrestrial portion of the main wilderness and East Everglades Addition proposed and potential wilderness, and a long-term, minor to moderate, localized, beneficial impact on the existing Florida Bay submerged wilderness. Sources of these long-term beneficial impacts would include various ecosystem and site restoration projects, the Snake Bight (Florida Bay) pilot pole/troll zone project, and implementation of vegetation and wildlife management plans, and the activity of the Miccosukees along Tamiami Trail.

Impacts of alternative 4, combined with the impacts of other past, present, and reasonably foreseeable future projects and activities, would have a long-term, moderate, beneficial, cumulative impact on wilderness character in the terrestrial portion of the main wilderness, a long-term, major, beneficial impact on the East Everglades Addition, and a long-term, moderate, beneficial, cumulative impact on the submerged wilderness in Florida Bay. The contribution of this alternative to the overall cumulative impacts would be modest for the main terrestrial portion of the existing wilderness area, but the alternative would be responsible for most of the overall beneficial cumulative impacts for both the East Everglades Addition and the Florida Bay submerged wilderness area.

Conclusions. Under alternative 4, management actions and the wilderness proposal for the East Everglades Addition would have a variety of impacts on wilderness character. For the main portion of the wilderness, excluding Florida Bay, the alternative would have a minor, long-term, adverse impact due to the addition and use of several chickees. In the Florida Bay submerged wilderness, the preferred alternative would have a moderate, long-term, beneficial impact to wilderness character due to the pole/troll zones and the mandatory boat education program/permit system. In the East Everglades Addition, alternative 4 would have a major, long-term (in perpetuity), beneficial impact on wilderness character, primarily due to the designation of wilderness and potential wilderness over a large area and eventually eliminating private airboats in the area. When past, present, and likely future actions are added to the effects of the no-action alternative there would be a moderate, long-term, beneficial, cumulative effect on wilderness character for the terrestrial portion of the existing main wilderness and the Florida Bay submerged wilderness, and a long-term, major, beneficial cumulative impact on the East Everglades Addition. Alternative 4 would add a small increment to the overall beneficial cumulative impact for the main terrestrial portion of the existing wilderness area, but the alternative would contribute the greatest portion of the overall beneficial cumulative impacts for both the East Everglades Addition and Florida Bay submerged wilderness areas.

ARCHEOLOGICAL RESOURCES

New construction is proposed at various park locations under alternative 4, including Gulf Coast site improvements at Everglades City; the South Florida Collections Management Center (built near the Daniel Beard Center); improvements to NPS facilities at Key Largo; and primitive campsites on East Everglades Addition tree islands. As appropriate, archeological surveys and/or monitoring would precede and accompany any ground-

disturbing activity. Because previously disturbed areas would be selected as feasible for new construction and archeological sites would be avoided to the extent possible, few if any adverse impacts would be expected as a result of such construction. Any adverse impacts would be of negligible to minor intensity and permanent.

The park would establish a comprehensive cultural resource management program to improve and expand efforts to inventory, document, and protect all cultural resources. As part of the program, archeological sites would be regularly monitored to assess resource conditions and inform treatment strategies. As in the NPS preferred alternative, sites would be actively protected and stabilized as necessary to reduce or avoid possible impacts from erosion, visitor use, or other factors. Some tree islands could be closed to public use to protect sensitive archeological sites, and a site stewardship program would be implemented to provide further site protection. Implementing the comprehensive cultural resource management program would have a long-term beneficial impact on the park's archeological resources.

Archeological sites adjacent to or easily accessible in visitor use areas would continue to be vulnerable to inadvertent damage and vandalism. Alternative 4 proposes slightly more acreage (42,700 acres) in the East Everglades Addition for wilderness designation than the NPS preferred alternative, although 59,400 acres are proposed as potential wilderness. Commercial airboat operations would cease in this alternative, although private airboat use would continue in the frontcountry zone. Potential adverse impacts on archeological resources resulting from visitor use activities could be reduced as private airboat use by eligible individuals is eliminated over time and the numbers of visitors accessing tree islands by airboats declines. These adverse impacts would be negligible to minor and permanent.

Ongoing archeological investigations would continue, such as the long-term study of prehistoric shell works sites in the Ten Thousand Islands area. Although test excavations conducted as part of these investigations would have permanent, minor, adverse impacts on portions of identified sites, the investigations would expand and contribute to the park's archeological database.

Cumulative Impacts. The park's archeological resources are subject to a variety of disturbances, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; nonnative plants such as Brazilian pepper whose deep roots can disturb buried sites; ground-disturbing construction activities; inadvertent visitor use impacts; and artifact looting. These factors could contribute to permanent, minor to moderate, adverse impacts on archeological resources as sites face risks from storm damage, erosion, and possible human-caused disturbance.

Foreseeable projects such as increased efforts to restore disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring natural topography and removing nonhistoric structures and nonnative vegetation) could have permanent, minor to moderate, adverse impacts on archeological resources because of ground disturbance. The above disturbances could adversely affect the integrity of archeological resources because the potential of impacted sites to yield important prehistoric or historic information could be diminished. However, ongoing and future archeological research and investigations that contribute to the understanding of regional prehistory and history would have long-term beneficial impacts.

The impacts associated with implementation of alternative 4 would have long-term beneficial impacts, and permanent, negligible to minor, adverse impacts on the park's archeological resources. The adverse and beneficial impacts of this alternative, in

combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a permanent, minor to moderate, adverse cumulative impact. The adverse effects of alternative 4, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed in alternative 4 would have long-term beneficial and permanent, negligible to minor, adverse impacts on the park's prehistoric and historic archeological resources listed in or eligible for listing in the National Register of Historic Places. In conjunction with other past, present, or reasonably foreseeable actions, there would also be permanent, minor to moderate, adverse cumulative impacts on archeological resources from implementing alternative 4.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 would result in *no adverse effect* on archeological resources.

Historic Structures, Sites, and Districts

Under alternative 4 the park staff would implement a comprehensive cultural resource management program, to promote, in part, the ongoing inventory, documentation, and historic preservation planning of historic sites, structures, and districts. The surveys and research to be undertaken would be a prerequisite for understanding a resource's significance and provide the basis for informed decision making regarding how the resource should be managed. Such surveys and research would result in a long-term, beneficial impact to historic structures.

The park would continue to rehabilitate and adaptively use selected historic buildings, such as those associated with Nike Missile Base site

(HM-69), for administrative and other purposes. As in the NPS preferred alternative, interpretation of the Nike site would be increased, and site improvements would include improved vehicle access, parking, and restrooms. These improvements would be placed in unobtrusive areas or concealed by vegetation screening to minimize visual intrusions on the historic setting. In addition, structures at the Duck Camp (a former hunting camp in the East Everglades Addition) would be stabilized and possibly rehabilitated for interpretive purposes if determined eligible for listing in the national register. The rehabilitation of historic buildings and structures would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Materials removed during rehabilitation efforts would be evaluated to determine their value to the park's museum collections and/or for their comparative use in future preservation work. Because the repair and replacement of historic fabric associated with the rehabilitation of historic buildings and structures would be under-taken in accordance with the Secretary of the Interior's Standards, any adverse impacts would be permanent and of negligible to minor intensity. Implementation of proposed preservation undertakings would have overall long-term beneficial impacts on park historic buildings and structures.

Historic structures could suffer wear and tear from increased visitation, but monitoring the user capacity of historic structures could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors. Unstaffed or minimally staffed structures could be more susceptible to inadvertent impacts and vandalism. However, visitor education regarding the significance of such resources and how visitors can reduce their impacts to them would help discourage inadvertent impacts and vandalism. Adverse impacts would be negligible to minor in intensity and long term or permanent.

Under this alternative, commercial airboat operations would cease in the East Everglades Addition. Two current operation bases along the Tamiami Trail (Coopertown Airboats and the Airboat Association of Florida) have been identified as eligible for the national register. The airboat facilities and site locations could be adaptively used for other visitor use activities, and/or the sites could be restored to natural conditions, which could adversely affect historic structures. No national register listed or eligible structure would be removed without prior review by park and NPS regional cultural resource specialists and consultation with the Florida state historic preservation office. Before a national register listed or eligible structure is removed, appropriate documentation recording the structure would be prepared in accordance with section 110 (b) of the National Historic Preservation Act and the documentation submitted to the Historic American Buildings Survey (HABS) / Historic American Engineering Record (HAER) / Historic American Landscapes Survey (HALS) program. Long-term, moderate to major adverse impacts resulting from the removal of facilities or other actions would be adequately mitigated.

Cumulative Impacts. Historic structures and buildings in the park are often damaged by exposure to severe storms, hurricanes, and humid climatic conditions. Several of the NPS Mission 66 buildings at Flamingo (e.g., marina store, maintenance buildings, and lodge) were substantially damaged by recent hurricanes and were subsequently determined ineligible for the national register because of lost or diminished historical integrity. Several of these damaged buildings were demolished and removed. The damage and loss of buildings from hurricanes has resulted in a permanent moderate to major adverse impact on resources contributing to the historical integrity of the Flamingo Mission 66 developed area. All new construction at Flamingo to rehabilitate or replace facilities as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66

buildings and cultural landscape elements. The visitor center would be rehabilitated. Undertakings to preserve Flamingo's surviving buildings and site features would have overall long-term beneficial impacts. Long-term or permanent, negligible to minor, adverse impacts would also result from the repair and/or replacement of deteriorated historic building materials and fabric, and the introduction of modern structural elements to effect rehabilitation treatments.

Other foreseeable projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect historic structures. The Old Ingraham Highway and associated canals are eligible for the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the road's overall integrity because the road would continue to retain its existing configuration and character. Such construction would contribute to the park's conservation efforts. Adverse impacts would be long term and minor.

The impacts from storms and other natural processes together with ongoing or foreseeable construction activities could adversely affect the integrity of historic structures. This would result from the loss or damage of character-defining features and architectural elements. The impacts associated with implementation of alternative 4 would result in long-term beneficial impacts and minor to major adverse impacts on the park's historic structures, sites and districts. The impacts of this alternative, in combination with the beneficial and minor to major adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse, cumulative impact. The adverse effects of alternative 4, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed by alternative 4 would have long-term beneficial impacts, and long-term or permanent, minor to major, adverse impacts on the park's historic structures, sites, and districts listed in or eligible for listing in the National Register of Historic Places. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on historic structures from implementation of alternative 4.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 could result in determinations of *no adverse effect* on historic structures, sites, and districts slated for preservation, and *adverse effect* on structures and sites that may possibly be removed or substantially altered.

CULTURAL LANDSCAPES

Under alternative 4 the park would implement a comprehensive cultural resource management program to promote, in part, the ongoing inventory and documentation of cultural landscapes. The surveys and research to be undertaken are a prerequisite for understanding a landscape's significance, as well as provide the basis for informed decision making regarding how the features and patterns of the landscape should be managed. Such surveys and research would result in a long-term beneficial impact on cultural landscapes.

Significant cultural landscapes, such as those associated with the Nike Missile Base and the Ingraham Highway historic district would be preserved and possibly rehabilitated in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties (with Guidelines for the Treatment of Cultural Landscapes)*. If a cultural landscape is rehabilitated, the significant landscape

patterns and features (e.g., spatial organization, land use patterns, circulation systems, topography, vegetation, buildings and structures, cluster arrangements, small-scale features, views and vistas, and archeological sites) would be protected and maintained. Alterations or additions to the landscape could occur, and existing historic fabric that has become damaged or deteriorated would be repaired or replaced. Because the rehabilitation of cultural landscapes would be undertaken in accordance with the Secretary of the Interior's Standards, any adverse impacts would be of negligible to minor intensity and permanent.

Interpretation of the Nike Missile Base site would be increased under alternative 4, and site improvements would include improved vehicle access, parking, and restrooms. Careful design would ensure that the improved vehicle access and addition of parking areas and restrooms would minimally affect the scale and visual relationships among landscape features. Such improvements would also be placed in unobtrusive areas or concealed by vegetation screening to minimize visual intrusions on the setting. In addition, the topography and land use patterns of the landscape would remain largely unaltered. Any adverse impacts would be long term or permanent and range in intensity from negligible to minor.

Construction that occurs in significant cultural landscapes would introduce visual, audible, and atmospheric intrusions into the landscape's setting. Although the effects of such intrusions would be adverse, the impacts would be construction-related only, i.e., short term, localized, and of negligible to minor intensity. Removal of historic structures, such as those proposed for removal at existing airboat operation facilities, could have permanent, moderate to major impacts on structures contributing to cultural landscapes.

Cumulative Impacts. Cultural landscapes in the park are often at risk from damage by severe storms and hurricanes. Storm winds and surges can uproot ornamental vegetation

planted as part of designed landscapes (such as that planted at Flamingo during the 1950s) and can severely erode or obliterate other elements such as trails, roads, and small-scale features, resulting in long-term or permanent, moderate to major adverse impacts. All new construction at Flamingo to rehabilitate or replace facilities, as outlined in chapter 2 of this general management plan, would be sensitively carried out to ensure the protection and preservation of contributing Mission 66 cultural landscape elements. Undertakings to preserve the integrity of Flamingo's surviving cultural landscape features would have overall long-term beneficial impacts. Proposed actions to preserve and rehabilitate cultural landscape features would also result in long-term or permanent, negligible to minor, adverse impacts.

Other foreseeable construction projects, such as the placement of culverts under park roads to reestablish more natural water flow, could adversely affect cultural landscape features associated with historic structures. The Old Ingraham Highway and its associated canals have been determined eligible for the national register as a historic district, although the integrity of these structures has been previously altered by the removal and/or widening of some road sections, the placement of canal plugs, and other actions. Constructing culverts under the Ingraham Highway would not be expected to substantially diminish the overall integrity of cultural landscape features because the road would continue to retain its existing configuration and character. Also, these actions would contribute to the park's conservation efforts. Adverse impacts would be long term and minor.

The impacts from storms and other natural processes together with ongoing or foreseeable construction activities could adversely affect the integrity of the park's cultural landscapes. This would result from the loss or damage of character-defining features such as contributing buildings and structures, vegetation, patterns of circulation,

and small scale features. Implementation of alternative 4 would have long-term beneficial impacts, and long-term or permanent, minor to major, adverse impacts on the park's cultural landscapes. The impacts of this alternative, in combination with the beneficial and minor to major, adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, moderate, adverse cumulative impact. The adverse effects of alternative 4, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed in alternative 4 would have long-term beneficial impacts, and long-term or permanent, minor to major, adverse impacts on the park's cultural landscapes. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, moderate, adverse cumulative impacts on cultural landscapes from implementing alternative 4.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 could result in determinations of *no adverse effect* on cultural landscapes slated for preservation, and *adverse effect* on cultural landscapes that have structures and character-defining features that may be removed or substantially altered.

Ethnographic Resources

New construction is proposed at various park locations under alternative 4 (e.g., Gulf Coast site improvements at Everglades City and primitive campsites on East Everglades Addition tree islands). As appropriate, ethnographic surveys and/or monitoring would precede and accompany and ground-disturbing activity. Because previously disturbed areas would be selected where feasible for new construction, any ethnographic resources would be avoided to

the extent possible, long-term or permanent negligible to minor adverse impacts on ethnographic resources are anticipated from proposed construction.

The park would establish a comprehensive cultural resource management program to improve and expand efforts to inventory, document, and protect all cultural resources. As part of the program, investigations would be increased to identify and evaluate ethnographic resources having traditional or cultural significance to the park's associated tribes and/or other groups such as those associated with the Gladesmen culture. The park would seek to strengthen its partnership with associated tribes to cooperatively integrate education programs, and these efforts could further understanding and protection of ethnographic resources. Significant sites would be regularly monitored to assess resource conditions and inform treatment strategies. In comparison with the no-action alternative, ethnographic resources would be more actively protected and stabilized as necessary to reduce or avoid possible impacts from erosion, visitor use, or other factors. Some tree islands could be closed to public use to protect sensitive ethnographic sites, and a site stewardship program would be implemented to provide further protection. The Duck Camp in the East Everglades Addition (having possible Gladesmen associations) might be stabilized and interpreted. These actions would have long-term beneficial impacts on ethnographic resources. Any adverse impacts would be long term and negligible to minor.

Ongoing investigations would continue (such as the long-term study of prehistoric shell works sites in the Ten Thousand Islands area) and ethnographic overviews and studies have been approved. Information acquired from these investigations and studies would expand the park's knowledge of important ethnographic resources, and provide the basis for appropriate resource management and preservation treatments. Although fieldwork conducted as part of these investigations could have permanent, minor, adverse

impacts on portions of identified sites, the investigations would expand and contribute to the park's ethnographic database.

In comparison with the NPS preferred alternative, alternative 4 proposes slightly more acreage (42,700 acres) in the East Everglades Addition for wilderness designation, although 59,400 acres are proposed as potential wilderness. Commercial airboat operations would cease in this alternative, although private airboat use would continue in the frontcountry zone for the foreseeable future. Potential long-term, negligible to minor, adverse impacts on ethnographic resources important to the Gladesmen culture might occur from the elimination of private airboat use by eligible individuals in wilderness and backcountry areas. Although these measures would curtail motorized access to the tree islands and former camps by airboat, Gladesmen would continue to have nonmotorized access to these places by canoes, skiffs, and other paddle boats. A long-term beneficial impact would also eventually occur to ethnographic resources important to the park's associated tribes from elimination of airboat use and the corresponding reduction in visitor numbers and associated impacts to traditionally sensitive areas.

Cumulative Impacts. A variety of factors can disturb the park's ethnographic resources and disrupt the cultural connections between resources and associated groups, including erosion and other natural processes and forces such as hurricane winds that can overturn trees and dislodge adjacent sites; ground-disturbing construction activities; inadvertent visitor use impacts; and site looting. These factors could contribute to adverse impacts on ethnographic resources as sites face risks from storm damage, erosion, and possible human-caused disturbance. Adverse impacts would be minor to moderate and long term or permanent.

Foreseeable projects such as restoration of disturbed areas in the East Everglades Addition and Pine Island (e.g., restoring

natural topography and removing nonhistoric structures and nonnative vegetation) could adversely affect ethnographic resources as a result of ground disturbance. In accordance with section 106 procedures and consultation requirements, ethnographic assessments and investigations would be completed for all proposed project areas to ensure that ethnographic resources are avoided or that adverse impacts are adequately mitigated before construction. Resulting adverse impacts would be long term and minor to moderate.

The impacts of implementing alternative 4 would have long-term beneficial impacts and long-term or permanent, negligible to minor, adverse impacts on the park's ethnographic resources. The impacts of this alternative, in combination with the predominantly minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term or permanent, minor to moderate, adverse cumulative impact. The adverse effects of alternative 4, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of actions proposed in alternative 4 would have long-term beneficial impacts and long-term or permanent, negligible to minor, adverse impacts on the park's ethnographic resources. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term or permanent, minor to moderate, adverse cumulative impacts on ethnographic resources from implementing alternative 4.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementing alternative 4 would result in *no adverse effect* on ethnographic resources.

Museum Collections

Under alternative 4, the South Florida Collections Management Center would be relocated to a new facility in the Homestead–Florida City area and possibly operated in partnership with a university. The new center would store collection items from Everglades, Biscayne, and Dry Tortugas national parks; Big Cypress National Preserve; and De Soto National Memorial. In accordance with NPS museum collections policies and guidelines and the *South Florida Park Collection Management Plan* (NPS 2007b), the new facility would be equipped with state-of-the-art environmental control and protection systems to properly store and protect the collections. The facility would be adequately staffed and include sufficient space to accommodate projected future acquisitions, staff work space, and controlled areas for researchers and the public to access and examine the collections. The NPS Southeast Archeological Center in Tallahassee, Florida, would remain the primary repository for archeological artifacts and materials collected from the various regional park units. Relocation of the South Florida Collections Management Center to a new facility in the Homestead-Florida City area would have long-term beneficial impacts on the collections. Packing and transporting the collections to the new facility could also entail short-term, negligible impacts on the collections, although special handling procedures and care would be provided to ensure that items are not damaged or misplaced during transit.

Cumulative Impacts. Because of the hot and humid environmental conditions of south Florida, proper control of humidity levels has been difficult to achieve and wide humidity fluctuations have contributed to the damage of certain collection items and archival materials. The heating, ventilation, and air conditioning system did not adequately protect against mold growth that posed risks to both staff health and the collections. Some collection items have been damaged by pest infestations. Although these problems have

been largely corrected, the current facilities lack a fire suppression system, placing the collections at risk of catastrophic loss. Previously, limited funding to adequately staff the center contributed to a backlog of items requiring accessioning and comprehensive curatorial management. Inadequate work space for staff and researchers continues to make it difficult to manage and access the collections. Museum collections at the current South Florida Collections Management Center have sustained long-term, minor to moderate, adverse impacts from inadequate environmental control systems, insufficient professional staff, limited accountability, and inadequate preventive conservation programs in the past.

The impacts associated with implementing alternative 4 would have predominantly long-term beneficial impacts on the museum collections. The impacts of this alternative, in combination with the minor to moderate adverse impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, minor to moderate, adverse, cumulative impact. Alternative 4 would not appreciably contribute to the adverse cumulative impact.

Conclusion. Implementation of actions proposed in alternative 4 would have long-term beneficial and short-term negligible impacts on museum collections. In conjunction with other past, present, or reasonably foreseeable actions, there would also be long-term, minor to moderate, adverse cumulative impacts on museum collections from implementing alternative 4.

VISITOR USE

Annual visitor use at the park under alternative 4 would be expected to be slightly higher than under the no-action alternative, but lower than under the NPS preferred alternative. The net change would result from several counterbalancing factors affecting visitor use. The key factors leading to decreasing use would include the elimination

of commercial airboating in the East Everglades Addition along with an anticipated associated reduction in use at Shark Valley and potential reductions in boating use in Florida Bay associated with the more extensive pole/troll zones.

Factors promoting higher use include the Gulf Coast site improvements; successful pursuit of visitor contact partnership opportunities outside the park, including with the Miccosukee Tribe near Shark Valley; and development of boat access (for carry-in boats) to Long Sound. The development of additional interpretation and turnouts along Tamiami Trail, although not promoting additional visitor use per se, would enhance the park's education efforts with respect to environmental, ecological, and cultural resource protection and restoration goals. Unlike the other action alternatives, long-term visitor use trends at Long Pine Key campground would not increase because there would be no campground improvements.

The increased extent of the pole/troll zones that would be implemented could increase the number of guides and users affected by the physical exertion associated with navigating across these zones, deterring some individual anglers and fishing guides from fishing in those parts of Florida Bay.

Despite the elimination of commercial airboat tours, the net effect of the management and actions under alternative 4 would be expected to be slightly higher annual visitor use compared to the no-action alternative, in which commercial airboat patrons would remain uncounted. A net increase of about 52,000 visitors per year might reasonably be expected over time. The effects of alternative 4 on visitor use would be most apparent in the northeastern quadrant of the park along Tamiami Trail, in the keys, and at Flamingo.

The timing of the changes in visitor use is difficult to predict because it would depend on when projects are funded and carried out. Also, none of the projects represent major

expansions in capacity, and most new opportunities are focused on dispersed and backcountry recreation use.

Year-round and seasonal residents of the area would be expected to account for most future visits, although the number visitors from outside the region, including international visitors, would also increase.

Overall, implementation of alternative 4 would be expected to lead to a minor to moderate increase in visitor use (numbers of visitors) over time. Alternative 4 would also likely result in some shifts in patterns or distribution of visitor use within the park.

Cumulative Impacts. Other past, present, and reasonably foreseeable projects that could result in cumulative effects on visitor use are described in chapter 1. Past actions include the development of the administration, maintenance, and visitor service facilities; roads; parking areas; exhibits; and other resources that support and host current visitor use at the park. The present and reasonably foreseeable projects with the highest potentials to affect use include Flamingo facility improvements, construction projects such as replacing the marine bulkheads at Flamingo, and resurfacing the main park road. Effects on visitor use from Flamingo improvements would be long term, beneficial, and moderate because they reestablish overnight accommodations and improve the camping experience. The other projects would primarily result in short-term inconveniences to visitors—for example travel delays during construction on the main park road. Typically, the park staff would attempt to schedule such work during off-peak periods to minimize disruptions. Once the projects are completed, visitors would be unaffected by the actions. Combined with the actions proposed under alternative 4, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial cumulative effects. Impacts of alternative 4 would comprise a relatively small portion of the overall cumulative effect.

Conclusion. Increases in visitor opportunities related to additional visitor services and recreation-oriented facilities, off-site information and education opportunities, and access under alternative 4 would have a long-term, minor, beneficial impact on visitor use. Implementation of boating management in Florida Bay would result in short-and long-term changes in boating use, including the type and distribution and potentially the level of use, with an anticipated net effect of less boating than under the no-action alternative.

Despite elimination of commercial airboat tours in the park, the net effect of alternative 4 is anticipated to be a minor to moderate increase in visitor use compared to the no-action alternative because commercial airboat patrons would remain uncouneted in the no-action alternative. To the extent that increased use could be accommodated while achieving the park's other environmental, ecological, and cultural resource protection and restoration goals, implementation of this alternative would represent a long-term, minor to moderate, beneficial impact. Combined with the actions proposed under alternative 4, the past, present, and reasonably foreseeable actions would have long-term, moderate, beneficial cumulative effects. Impacts of alternative 4 would comprise a relatively small portion of the overall cumulative effect.

Visitor Experience and Opportunities

Alternative 4 would improve access to information, interpretation, and educational opportunities at a variety of locations throughout the park, and new ways would be implemented for visitors to experience the Everglades. Visitor experience and opportunities in different areas of the park are detailed below.

East Everglades Addition. Alternative 4 would continue to allow private airboating by individuals eligible under the 1989 Expansion Act, and such use would be confined to the frontcountry zone on designated routes (see

“Alternative 4” map). Based on the size of the frontcountry zone in this alternative, this would be a long-term, negligible to minor, adverse impact on visitors’ recreational experiences. Paddlers, hikers, and other nonmotorized users might enjoy the effects of such restrictions (that is, creation of new areas in the East Everglades free of airboats), and this would be a long-term, local, negligible to minor, beneficial impact on those users.

Alternative 4 would end commercial airboat operations (tours) in the East Everglades, so this very popular and unique visitor opportunity would no longer be available. This would narrow the range of visitor opportunities available at Everglades National Park, a long-term, major, adverse impact on the visitor experience.

Chekika would continue to be open at least seasonally for day use and would become one of the park’s environmental education program venues, which could include overnight programs. This use would have long-term, local, negligible, beneficial impacts in that it would affect a small, select group of visitors.

Alternative 4 would add approximately 42,700 acres of wilderness and propose 59,400 acres for potential wilderness status within the East Everglades Addition. This would guarantee the availability of wilderness recreation opportunities in the southern half of the East Everglades Addition in perpetuity, a long-term, minor to moderate, beneficial impact for visitors seeking this kind of opportunity.

Similar to the NPS preferred alternative, recreation and education opportunities would be expanded along Tamiami Trail, SW 237th Avenue near Chekika, at some tree islands, and along the park’s eastern boundary. The East Everglades Addition would become a prime area for exploring, wildlife viewing, and learning about the area. Alternative 4 would also establish site stewardship programs to maintain and protect East Everglades Addition cultural sites while integrating Shark River Slough cultural/archeological resources

into interpretive programs. These actions would have long-term, local, moderate, beneficial impacts on visitors by providing additional opportunities closer to Miami.

Alternative 4 would establish a paddling access site along Tamiami Trail, local paddling trails, long-distance paddling routes (unmarked) to connect through the Shark River Slough to other areas of the national park, and primitive camping opportunities on tree islands within the East Everglades Addition. These actions would have a long-term, minor to moderate, beneficial impact by expanding the range of recreational opportunities in the East Everglades Addition.

Headquarters / Pine Island / Royal Palm / Main Park Road. Under alternative 4, the Ernest F. Coe Visitor Center would continue to provide information and interpretation to visitors. The park would also pursue a new interagency visitor contact station in Homestead/Florida City. An unstaffed orientation kiosk would be developed there as a short-term solution. This would have long-term, minor to moderate, beneficial impacts on visitors by improving opportunities for trip planning and pre-visit orientation.

The South Florida Collections Management Center would be moved to a new collection facility in the Homestead/Florida City area, resulting in museum collections being available for the general public to see (although this location would lack the immediate context of the park). These actions would result in long-term, minor to moderate, beneficial impacts on visitors by creating more opportunities near Miami to connect with the park, offering more trip planning and pre-visit orientation services, and providing access to the collections.

Alternative 4 would enhance visitor services at Royal Palm by updating interpretive media and integrating Anhinga Trail and Royal Palm cultural resources into interpretive media/programs. This would have long-term, minor, beneficial impacts on the visitor experience.

Long Pine Key campground would continue to provide camping and day use opportunities as in the no-action alternative, with negligible benefits to visitors.

This alternative would use the Robertson Building to serve as an interpretive and educational facility for the Nike Missile Base site. This would have negligible to minor beneficial impacts on visitors by improving interpretive and day use opportunities.

Seasonal alternative transportation would be pursued under alternative 4, similar to alternative 2, but with a longer route that would extend all the way to Flamingo. This would have long-term, regional (Royal Palm to Flamingo), moderate to major, beneficial impacts on visitors because it would make this area in the heart of the park available to those who otherwise might not visit because of the lack of transportation.

Alternative 4 would improve self-directed interpretation and wayside exhibits along the main park road similar to the NPS preferred alternative, with long-term, local, minor, beneficial impacts on the visitor experience.

Alternative 4 would continue to permit bicycling along the main park road—a long-term, negligible, benefit to cyclists. There would continue to be a long-term, negligible to minor, adverse impact on motorists who have to contend with cyclists on the road. The park would also pursue increased hiking and bicycling opportunities on nonwilderness corridors between Royal Palm and Flamingo and would work with other agencies to establish regional hiking and biking routes, including a bicycle trail along the park's eastern boundary. These additions would have a long-term, moderate to major benefit for visitors because more opportunities for hiking and biking in the park would be available. This would allow visitors without a boat to experience the park in more ways.

Florida Bay. Alternative 4 would establish pole/troll zones in Florida Bay on nearly 160,000 acres (about 28,000 acres more than

in the NPS preferred alternative). It would also establish a 300-foot-wide idle speed, no-wake area along the northern shoreline of Florida Bay between Middle Cape and East Cape (see “Alternative 4” and “Florida Bay Management Zones” maps for details). This would help reduce boat groundings and better protect Florida Bay resources (seagrass, wildlife, fisheries), all of which would enhance the experience for many visitors to this part of the park. This would be a long-term, minor to moderate, beneficial impact.

Under this alternative, just over half the bay would remain open to boating under park regulations for Florida Bay. Implementation of the pole/troll zones, in conjunction with ongoing monitoring of fishing and boating activity, and potential improvement in the quality of the fishery and the overall environment would support adaptive management actions by the park to refine the location and extent of pole/troll zones. Since most fishing in Florida Bay occurs when boats are stationary or trolling at low speeds, fishing can occur while passing through a pole/troll zone or channel/access route, thereby offsetting or diminishing any potential adverse effects on fishing. The continuing availability of high speed, albeit more circuitous routes across the bay, would allow guides and related businesses to adapt their services to respond to changing conditions and avoid or minimize potential adverse economic effects. Nonetheless, for visitors who value unrestricted motorboat access, the pole/troll zones would have long-term, adverse impacts on their experience. For other users, the implementation of pole/troll zones could lead to changes in user experience and resource protection that many view as positive.

Alternative 4 emphasizes preservation and sustainability of natural resources and processes, especially preservation of shallow water habitats. These natural resource conditions were the primary determinant of the size and location of the pole/troll zones in alternative 4. The emphasis on preservation resulted in longer average poling/trolling distances when compared to those of the NPS

preferred alternative that boaters would have to pole or troll to reach desired water destinations. In some cases, these distances can exceed 5 miles. The majority of the pole/troll zones (61%) would require visitors accessing these areas to pole or troll up to 0.5 mile. Visitors accessing the next tier of these zones (23% of pole/troll areas) would have to pole or troll between 0.5 and 1.0 mile. Under this alternative, 16% of pole/troll zones would require visitors to pole or troll more than 1.01 miles from motorboat access zones, as compared to less than 2% of pole/troll zones over 1.01 miles in the NPS preferred alternative. Under alternative 4, more than half of Florida Bay would remain open to motorboat access. However, increased size and distance of pole/troll zones would have long-term, moderate, and adverse impacts on visitors who desire unrestricted motorboating experience.

Alternative 4 would implement planned and funded improvements to the inadequate Key Largo ranger station and Florida Bay Interagency Science Center. Improvements would provide a long-term, negligible to minor, beneficial impact for visitors. At this same site, this alternative would provide a new visitor information kiosk and a venue to support the boater education/permit program. These improvements would result in long-term, local, minor beneficial impacts for visitors. The park would pursue additional multiagency visitor services using facilities or opportunities in Key Largo. If successful, this would provide a long-term, minor benefit.

Alternative 4 would develop a boater education/permit program for all operators of motorboats and nonmotorized boats within the park. Initially, the system would create a burden on boaters before their visit and might decrease visitor interest in using park waters for boating; the effects would be short term, minor to moderate, and adverse. As visitors become accustomed to the permit system, the effects of the education program would be long term, moderate, and beneficial by improving the boating experience through enhanced understanding and enjoyment of

marine waters and through a lower incidence of boat groundings and user conflicts.

Alternative 4 would establish new carry-in boat launch sites along the main park road and along the 18-mile stretch for improved paddling trail accessibility and opportunities for persons with disabilities. The park would also pursue partnership opportunities for additional public boating access (both motorized and nonmotorized) onto Florida Bay. Accomplishing these actions would have long-term, moderate, beneficial impacts on the visitors wanting this kind of experience.

Public access to the keys in Florida Bay would remain the same as in the no-action alternative—all keys would be closed to the public except North Nest, Little Rabbit, Carl Ross, and Bradley keys. Also, four additional backcountry chickees would be installed. This would make the distance paddlers must travel between Florida Bay chickees more manageable; effects would be long term, minor, and beneficial for visitors wanting this kind of experience.

Under alternative 4, visitors to the park would continue to have access to the numerous guides and commercial tours available in Florida Bay and the park. This would have continuing long-term, negligible to minor, beneficial impacts.

Gulf Coast / Ten Thousand Islands / Everglades City. As in the NPS preferred alternative, Gulf Coast site improvements would be implemented to address visitor facilities' needs, including a new visitor center, restrooms, a day use area, additional parking, relocation of non-essential maintenance functions to an off-site location, and maximization of outdoor space for interpretive, orientation, and educational programs.

Gulf Coast site improvements would be ABA-compliant. Accessible parking would be added, and accessible trails for additional access and interpretive opportunities would be constructed. For visitors with disabilities,

these developments would improve access to the site and increase opportunities for connections to the natural surroundings. These site improvements would have moderate, long term, beneficial impacts on visitor experience.

Additional land-based interpretive programs and activities linking the park and neighboring communities would be provided, and a cultural/heritage interpretive water trail in the Ten Thousand Islands Archeological District would be provided. (The latter would be unmarked on the water, but the trail and waypoints would be shown on interpretive pamphlets, in guidebooks, etc.). These visitor opportunities would have long-term, minor, benefits on the visitor experience in the Gulf Coast region.

The canoe/kayak launch at the Gulf Coast Visitor Center site would be improved under this alternative and parking for paddlers would be constructed. Additionally, the park would work cooperatively with public and private interests to provide better motorboat access to the park at non-NPS sites. Assuming that latter effort is successful, these actions would increase opportunities for access and help alleviate congestion at popular launch points during busy times resulting in long-term, minor, beneficial impacts on visitors to the Gulf Coast region.

Eight additional backcountry chickees would be provided in the Gulf Coast area, increasing overnight backcountry capacity and expanding camping destinations for paddlers and motorboaters. This would have a long-term, minor to moderate, beneficial impact. This alternative would also establish a minimally marked Everglades Paddling Trail, intended primarily for those seeking a wilder, more remote route. Some segments of the Everglades Paddling Trail would be zoned boat access (motorized and nonmotorized boats allowed), several segments would be zoned backcountry (paddle only), and several segments would be designated idle speed, no wake. For visitors who desire a quieter, wilder experience but are not comfortable with

advanced wayfinding in the maze of Ten Thousand Islands, this option would provide a long-term, minor, beneficial impact. For visitors who resent motorboat restrictions and dislike route markers, the Everglades Paddling Trail would have minor to moderate adverse impacts on the visitor experience.

At Gopher Creek, the existing idle speed, no-wake designation would remain, as in alternative 1, while additional study of the Gopher Creek area is undertaken. The park is committed to better understanding the resource conditions and opportunities in the Gopher Creek area, which will be a focus of the Boater Safety and Resource Protection Plan

Tamiami Trail / Shark Valley. To address a relative lack of visitor opportunities along Tamiami Trail, NPS staff would pursue a multiagency visitor contact facility with partners to provide “one-stop shopping” for information on resources, ecosystem restoration, outdoor education, and recreation opportunities for parks and preserves throughout the Tamiami Trail corridor. If achieved, this would have a long-term, moderate to major, beneficial impact on visitor experience and opportunities; it would create a visible presence for partner agencies, including the National Park Service, in an area of high use and would improve orientation and information closer to the Miami metropolitan area.

The planned and funded facility improvements at Shark Valley would be implemented as under the no-action alternative. Alternative 4 would establish additional evening programs at Shark Valley, add two shade structures along the 15-mile Shark Valley loop road, and use current administration areas as overflow and/or bicycle parking. These changes would ease parking congestion somewhat, provide additional interpretive opportunities, and make the experience at Shark Valley a bit more comfortable. The park would seek to work with the Miccosukee Tribe on interpretive programs and to share resources,

facilities, and parking. Combined, achieving these actions would have a long-term, moderate, beneficial impact on the visitor experience.

Overall, alternative 4 would have long-term, moderate to major, adverse impacts as well as long-term, moderate to major, beneficial impacts.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable regional and NPS plans and projects would be the same as in the no-action alternative. Such plans include the park's long-range interpretive plan, Flamingo facility improvements, resurfacing the main park road, and the Snake Bight pilot pole/troll zone project. Ecosystem restoration projects would indirectly impact the visitor experience by creating a more enjoyable environment and better wildlife viewing opportunities. Collectively, these projects would have a long-term, minor to moderate, beneficial impact on the overall visitor experience at Everglades National Park.

Alternative 4 would improve access to information, interpretation, and recreational and educational opportunities at various locations throughout the park and would implement additional ways for visitors to experience the park. This alternative would also upgrade visitor-oriented park facilities and increase backcountry and wilderness opportunities. The required boater education/permit program, elimination of commercial airboat tours, and management zones that would mean changes in the way many visitors have used the park in the past would have the greatest adverse impacts on the visitor experience in this alternative. Improvements to other aspects of the visitor experience and a variety of new opportunities would outweigh some but not all of the negative impacts to the visitor experience. Alternative 4 would have long-term, negligible to major, adverse impacts as well as long-term, negligible to major, beneficial impacts. Combined with the actions of other plans and projects, alternative 4 would have a long-term, minor to moderate,

beneficial cumulative effect on the visitor experience at Everglades National Park. Alternative 4 would contribute substantially to these effects.

Conclusions. Alternative 4 would have long-term, moderate to major, adverse impacts as well as long-term, moderate to major, beneficial impacts. Alternative 4, combined with other plans and projects, would have long-term, minor to moderate, beneficial impacts on the visitor experience at the park. Alternative 4 would contribute substantially to these effects.

REGIONAL SOCIOECONOMIC ENVIRONMENT

Implementation of alternative 4 would occur against the same backdrop of economic, demographic, and social conditions described under the no-action alternative. The economic and social effects of alternative 4 would contribute to those conditions, but would not fundamentally alter the area's economic and demographic outlook.

Visitor-related Economic Impacts

Some components of long-term annual visitor use at the park under alternative 4 would be higher than under the no-action alternative. Elements of alternative 4 that would contribute to the increase in use would be the completion of the Gulf Coast Visitor Center and NPS efforts to pursue effective partnership opportunities off-site, including efforts to engage with the Miccosukee Tribe to develop parking options near Shark Valley and cooperative interpretative and education programs. Successful provision of some form of alternative transportation service from south Miami-Dade County to the park would also contribute to increased visitor use. The net effects of these actions and management directions would be projected long-term increases in visitor use throughout the park. The timing of anticipated increases in visitor use is difficult to predict because it would

depend on when projects are funded or carried out. Also, no projects proposed under alternative 4 represent major expansions in visitor use opportunities or facility capacity. Moreover, increases in visitor use associated with those actions would be more than offset by the elimination of commercial airboat tours in the East Everglades Addition, an associated reduction in visitor use to nearby Shark Valley, and reductions in visitor spending in the region. It should be noted that any decline in visitor use resulting from the elimination of commercial airboat tours would not be reflected in park visitation statistics, as these visitors are not currently counted.

Retail, lodging, and other tourism-related spending would accompany the increased use. Economic spin-offs of increased use would include somewhat higher personal income and employment than under the no-action alternative, most of the jobs being seasonal. Gains in regional employment and income related to increases in park visitation would be offset by reductions associated with the elimination of commercial airboating in the East Everglades Addition. The net impact is uncertain, but would potentially be adverse. These visitor-related impacts would be long term, but limited in scale relative to current employment and personal income in the three counties.

Under alternative 4, the level of boating use might be affected by the implementation of management zones, including pole/troll zones in Florida Bay resulting in some shift in boating and fishing use to other locations in the Keys and along the Gulf Coast. Such a shift could affect individual establishments and outfitters, but the net impact on overall spending in the region would be relatively limited.

Commercial fishing per se is not permitted in the park. Consequently, the proposed management actions under alternative 4 would have no direct effect on commercial fishing as it relates to the Florida Keys Commercial Fishermen's Association, although some of the organization's members

may be guides and outfitters that could be affected by the boating management actions.

The increased visitor expenditures described above would be more than offset by reductions in spending associated with the loss of commercial airboat tours. Based on spending patterns for all visitors to the Everglades, the commercial airboating operations directly and indirectly support more than 100 jobs in the region. Some of these jobs would be jeopardized by the elimination of airboating. Because of the uniqueness of this activity to the Everglades region, some of this use, and hence the spending and jobs supported, might be displaced to other locations.

Commercial fishing activity in the Florida Keys by members of the Florida Keys Commercial Fishermen's Association would not be affected by management actions proposed under alternative 4.

The park would collect additional entry and camping fees and revenues from the sales of various passes, and the Everglades Association would sell more merchandise at the visitor center, with portions of these receipts retained to support recreational, cultural, and educational programs in the park.

Year-round and seasonal residents of the area would be expected to account for most future visits to the park, although the number of visits by tourists to the region, including those from international destinations, would also increase.

The state and local governments would collect additional sales tax from the increases in visitor spending, although the net effect may be adverse due to the loss of public sector revenues attributable to commercial airboating.

The beneficial visitor-related economic impacts due to park visitation, other than commercial airboating, would be negligible in the short term and negligible to minor over the long term.

Economic Impacts Related to Implementation and NPS Operations

Alternative 4 would provide a sustained economic infusion to the region over the life of this plan resulting from ongoing NPS operating expenditures and future one-time costs.

The latter would include \$7.9 million for site improvements and construction of the Gulf Coast Visitor Center. Future construction would support the local construction trades industry and associated vendors and suppliers.

As under the no-action alternative, NPS maintenance staff would perform much of the work to address facility and infrastructure maintenance and preservation, restoration, and rehabilitation activities. Future construction spending would be higher than under the no-action alternative, supporting the local construction trades industry and associated vendors and suppliers.

Everglades National Park would continue to provide vitally important ecosystem services to south Florida under alternative 4. The types and levels of such services would be comparable to those under the no-action alternative. These services would be long term and beneficial.

Annual NPS payroll, operations, and maintenance expenditures would result in long-term effects on employment, business sales, taxes, and income. As many as 37 additional FTE staff could be supported in conjunction with alternative 4, with the number varying over time as implementation occurs. Staffing needs would increase over time as the implementation of specific projects, programs, and management included in this alternative proceed.

Under alternative 4, park operations would indirectly support an estimated 120 to 125 jobs, as compared to an estimated 104 jobs indirectly supported currently, which would continue under the no-action alternative. The

actual number would likely be lower than under the NPS preferred alternative.

The park would seek to recruit more volunteers to assist the park in implementing this alternative.

An increase in budgeted funds for NPS operations is assumed for alternative 4. Available resources would include base budget appropriations, concession revenues, entry and camping fees, and various nonrecurring funding for supplemental and specific project construction. Unlike alternative 2 and the NPS preferred alternative, the park would not realize increases in entry fees and concession fees associated with commercial airboat tours in alternative 4. Implementation of alternative 4 might help the park attract additional funding for ecological research and restoration.

Research, educational, and other activities sponsored by the park's partner organizations would continue to provide additional sources of economic stimulus. The timing, magnitude, and indirect economic consequences of those activities under alternative 4 are indeterminate.

The economic effects associated with the NPS operations would be beneficial but negligible to minor in the short term and minor over the long term.

Under this alternative, commercial airboat tours in the East Everglades would end after the federal government acquired these properties. This would result in short-term and long-term minor to moderate adverse impacts and short-term and long-term minor to moderate beneficial impacts, as compared to the no-action alternative. Uncertainty regarding these impacts is associated with this alternative due to the potential for some or all of these businesses to reestablish themselves outside Everglades National Park and continue providing airboat tours, albeit it not in the park, and the likelihood that some of the displaced demand would be met by other existing airboat tour operators along Tamiami

Trail and in the region. Adverse impacts would be associated with the loss of future concessions opportunities in the park in the short- and long-term. Short-term beneficial impacts would be based on the owners being compensated by the federal government for the value of their property and allowable relocation benefits. Long-term beneficial impacts may result from the successful establishment of new businesses outside the park.

Effects on Regional Population Growth

Implementing alternative 4 would have little effect on regional population growth. Increases in short-term and long-term jobs and visitor use over the life of the plan would be offset by reductions associated with the elimination of commercial airboating. The net effects would be insufficient to trigger additional job-related migration.

The effects on regional population growth under this alternative would be negligible, both in the short and long terms.

Community Services

Over time, more visitors to the park would indirectly result in added demands on community services and facilities across the region. The elimination of commercial airboating could reduce demands on some community services and facilities. The limited scale, seasonal nature, and spatial dispersion of the net change in demands across the region would likely not require facility expansions and additional staffing.

Effects on community services under this alternative are indeterminate but would likely be negligible to minor over the short and long term.

Attitudes and Lifestyles

Alternative 4 establishes future management direction for the park that reflects public input and supports the park's purpose and significance. Those valuing solitude, wilderness, and environmental protection and restoration would be more enthusiastic about the management direction set forth in alternative 4. The management direction for this alternative would result in changes to some historical uses in the park, including the elimination of commercial airboating and the implementation of pole/troll zones in Florida Bay.

The effects of alternative 4 on community attitudes and lifestyles would be indeterminate.

Cumulative Impacts. Social and economic impacts from implementation of alternative 4 would be similar to those of other past, current, and future development across the region and those under the no-action alternative. The effects of underlying development trends in the region include long-term, moderate population and economic growth; long-term increases in traffic on local roads; higher spending that bolsters community and recreation-oriented businesses in the region; and additional tax revenues to fund public services and facilities.

The generally beneficial and small economic and social effects of alternative 4, including those associated with increases in visitor and park operating expenditures, would be negligible to minor in the short and long terms. Alternative 4, combined with other past, present, and reasonably foreseeable actions by others would have minor, short and long term, and indeterminate impacts because they include effects that might be concurrently seen as beneficial or adverse. Impacts of alternative 4 would comprise a small portion of these overall cumulative effects.

Conclusion. The economic and social effects of alternative 4 include long-term adverse

economic effects on owners of the real property and business interests associated with commercial airboating. Long-term social consequences would include a negligible to minor contribution to long-term population growth and demands on community infrastructure and services. Overall, the cumulative social and economic effects associated with alternative 4 would be minor, short and long term, and indeterminate because they include effects that might be concurrently viewed as beneficial or adverse. Impacts of alternative 4 would comprise a small portion of these overall cumulative effects.

PARK OPERATIONS

Alternative 4 would establish many new park initiatives that would require new staff and investment to plan and implement, which would be addressed through staff and funding proposed in the alternative.

Parkwide

Under alternative 4, the boater education program and permitting system would help reduce the number of groundings and propeller scarring in Florida Bay and elsewhere. Boaters would become more adept at navigating park waters and would increase their awareness of boating impacts and safety. These changes would have a long-term beneficial impact on park operations. In addition, these changes would have a long-term minor to moderate impact, which would reduce the need for search and rescue and seagrass restoration.

East Everglades Addition

Under the preferred alternative, designated boat trails and management of commercial airboat contracts would be established and result in a long-term beneficial impact on park operations. Boat traffic would be kept on designated routes, which would reduce the

need for restoration due to boating impacts on the landscape, and would reduce the need for rescue patrols to find lost or stranded boaters.

Land recently acquired outside the park boundary near Chekika would be used for development of administrative and operational facilities for the East Everglades Addition. These new facilities near the area of operations would have a long-term beneficial impact by increasing operational efficiency and providing facilities needed to better manage the Addition.

Alternative 4 would add approximately 42,700 acres of wilderness and propose 59,400 acres for potential wilderness status within the East Everglades Addition. This would not increase the operational burden because park staff is already using the wilderness minimum requirement process within the wilderness-eligible area (most of the Addition).

Alternative 4 would also establish site stewardship programs to maintain and protect East Everglades Addition cultural sites and integrate Shark River Slough cultural/ archeological resources into interpretive programs. This would have short- and long-term, minor, adverse impacts on park operations by reducing staff transit time and providing additional housing space for park staff.

Headquarters / Pine Island / Royal Palm / Main Park Road

As in the NPS preferred alternative, the park would pursue a new interagency visitor contact station in Homestead/Florida City with potential partners under alternative 4. In the long term, this would have a beneficial impact by sharing the costs and staff with partner groups.

Vacated portions of the Robertson Building and Daniel Beard Center would serve interpretive/educational facility needs related to the Nike Missile Base site, while other portions would be used for other

administrative needs. This would have a long-term beneficial impact on park operations by providing needed space for these activities.

The park staff would pursue seasonal alternative transportation access to various park areas with stops along the main park road. The transportation would run from Homestead/Florida City to Flamingo. Depending on the nature of the service, this could result in long-term beneficial impacts on park operations from fewer visitor vehicles to accommodate and manage.

Gulf Coast / Ten Thousand Islands / Everglades City

Under alternative 4, all non-essential on-site maintenance functions at Everglades City would be relocated off-site to the Oasis maintenance facility at Big Cypress National Preserve. In the long term, this would have a beneficial impact by reducing costs and space needs by sharing resources and infrastructure. This action would also result in minor adverse impacts due to some added inconveniences and lost time when transporting equipment and materials to and from the maintenance site at Big Cypress National Preserve approximately 15 minutes each way.

Florida Bay

Under alternative 4, improvements at the Key Largo ranger station and Florida Bay Inter-agency Science Center would be implemented as in the NPS preferred alternative, and it would establish a visitor information kiosk and venue to support the boater education/permit requirement at the ranger station. In addition to these expansions, the park would pursue additional multiagency visitor services using existing facilities in Key Largo. These changes would have a long-term beneficial impact on park operations by reducing costs and space needs by sharing facilities with other agencies.

Motorboat restrictions would be expected to reduce propeller scarring and boat groundings, thereby reducing the resultant law enforcement and restoration work. Establishment of these restrictions would have a long-term beneficial impact on operations.

Tamiami Trail / Shark Valley

Under alternative 4, the park would seek to work with the Miccosukee Tribe on interpretive programs and explore the idea of sharing resources, facilities, and parking. If successful, this would have a long-term beneficial impact on operations at Shark Valley by expanding the number of facilities available to visitors and easing congestion without much additional cost.

SUMMARY

Overall, as elements of alternative 4 are implemented the park would be expected to function more effectively than it would under the no-action alternative. The NPS preferred alternative would result in long-term, moderate, beneficial impacts on park operations.

Cumulative Impacts. Many other projects that impact park operations have recently occurred, are occurring, or will occur in the near future. These projects can be loosely grouped into the following categories—visitor services, ecosystem and site restoration, vegetation and wildlife management, infrastructure management, and resource management. Implementation of these other plans and projects would improve park infrastructure, staff efficiency, and reduce deferred maintenance. Alternative 4, combined with other plans and projects, would have a long-term, moderate, beneficial, cumulative impact on park operations. The contribution of alternative 4 to this effect would be fairly substantial.

Conclusions. Alternative 4 would result in long-term, moderate, beneficial impacts. Combined with other plans and projects, alternative 4 would have a long-term, moderate, beneficial, cumulative impact on park operations. The contribution of the NPS preferred alternative to this effect would be fairly substantial.

Unavoidable Adverse Impacts

Unavoidable adverse impacts are those environmental consequences of an action that cannot be fully mitigated or avoided.

Under the alternative 4 some unavoidable impacts to water resources, soils, wildlife, vegetation, natural sounds, and wilderness character would result from continued motorboat use in marine areas of the national park (though impacts within Florida Bay should be greatly reduced compared to the no-action alternative); from recreation access to tree islands and certain keys; and from continuation of private and commercial airboating within the East Everglades.

Irreversible and Irretrievable Commitments of Resources

With the exception of consumption of fuels and raw materials for maintenance activities, no actions in this alternative would result in consumption of nonrenewable natural resources or use of renewable resources that would preclude other uses for a period of time.

Relationship of Short-Term Uses and Long-Term Productivity

The park would continue to be used by the public, and most areas would be protected in a natural state. The National Park Service would continue to manage the park to maintain ecological processes and native biological communities and to provide appropriate recreational opportunities consistent with preservation of cultural and natural resources. Actions would be taken with care to ensure that uses do not adversely affect the productivity of biotic communities. Under the alternative 4, with management zones within Florida Bay to help protect seagrasses, there would be no appreciable loss of long-term ecological productivity.

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



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EVERGLADES NATIONAL PARK

FINAL GENERAL MANAGEMENT PLAN/EAST EVERGLADES
WILDERNESS STUDY/ENVIRONMENTAL IMPACT STATEMENT