



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 (NEPA) 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. Implementation of these projects would result in long-term major beneficial impacts to the Everglades hydrology, soils, vegetation, 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 and 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 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 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, manmade 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; Comprehensive Everglades Restoration Plan 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; Comprehensive Everglades Restoration Plan 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 (1905–1912), construction of Tamiami Trail (1915–1928), 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 conver-

sation 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, man-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 measurable 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

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 current 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). Back-country 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. Impacts on visitor 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”). Management guidance and zoning established under the management plan is expected to attract more visitor use under all of the action alternatives, compared to the no-action alternative, with alternative 4 resulting in the lowest, with the NPS preferred alternative being the highest. Actual visitor use over time will exhibit temporary and multiyear variations due to factors such as a regional or national economic recession.

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.

Joe Bay, Little Madeira Bay, and adjacent smaller water bodies (also known as the Crocodile Sanctuary) 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 plan 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.

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 2001a). 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. 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 from boat and propeller strikes and habitat. 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 2009). 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 2009). 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 and Roseate Tern

The piping plover and roseate tern 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 (Florida Natural Areas Inventory 2001); no critical habitat has been designated for roseate terns. Among the greatest threats to these species are habitat alteration and destruction and predation (USFWS 2003f). 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 or plovers from preferred areas (which could increase energy expenditure or temporarily disrupt behavior (USFWS 2003f) 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. Little Madeira Bay and Joe Bay (also known as the Crocodile Sanctuary) would remain closed to public access and only open to authorized research activities, providing

localized benefits to plovers and terns using tidal flats and other suitable shoreline habitat.

Overall, current management would continue to benefit the piping plover and roseate tern, 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 and insignificant.

Cumulative Impacts. The piping plover and roseate tern 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 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 and roseate tern. 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, and critical habitat for 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.

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 Joe Bay and Little Madeira Bay (also known as the Crocodile Sanctuary) 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 alligators 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.

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. 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). These impacts are expected to be minor.

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. 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 no-action alternative would have a slight beneficial contribution to the overall cumulative effects.

Conclusion. The no-action alternative would benefit sea turtles through habitat protection and it would also result in some continued long-term, minor, adverse effects from human activities (primarily motorboating). Cumulative effects would be moderate and adverse.

Smalltooth Sawfish

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. In fact, 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 fish is underway. Boating activity would continue to disturb habitat (especially seagrass) and any nearby sawfish. However, any adverse impacts would be minor and insignificant.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch and habitat loss and degradation, including poor water quality and altered water deliver and salinity (National Marine Fisheries Service 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, minor, adverse effects on the smalltooth sawfish. 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 night-time 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 untrammelled 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, channels have been prop-dredged through submerged marine wilderness, and these channels 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 markers, sign posts, 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. In the short term, the construction work associated with these projects would have minor to moderate, adverse impacts on the untrammelled quality 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 Independent Traditional Seminole Nation of Florida, 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 (SFCMC) 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 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 mid-day 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 1.0707 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 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 approximately \$12 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.

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 no action, 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 82,000 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 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 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 mitigative 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 where airboat use is concentrated (e.g., the northern portion of the Addition). However, that area is smaller than under the no-action alternative because of the size of the front-country zone, which 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.

Formal 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 zones would be established on nearly 125,000 acres throughout the bay (see “NPS Preferred Alternative” maps). 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. Long Sound would be managed as the backcountry (paddle only) 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, 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 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 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 backcountry zone would eliminate motorboats, 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.

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 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 Alternative Wilderness Waterway 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 eliminated. Managing the western portion of Gopher Creek as a pole/troll 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

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 at 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 more than offset by its management as a backcountry (paddle only) zone. This would represent an increase in resource protection, a long-term, localized, and minor benefit.

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 Alternative Wilderness Waterway would be established under this alternative, and a few segments would be zoned 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

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 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 zones, the boater education/permit program, extensive 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), 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 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 manatee, 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.

Managing Long Sound as a backcountry zone would eliminate motorboats and benefit manatee habitat. Similar to the no-action alternative, Little Madeira Bay and Joe Bay would be a special protection zone and would only be open for research-related activities. The conditions in the special protection zone would have localized, long-term benefits for manatee habitat.

Designating a few segments of the newly established Alternative Wilderness Waterway as backcountry (nonmotorized) zones and a portion of the Gopher Creek area as a pole/troll zone 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 habitat. This would result in a *may affect, not likely to adversely affect* finding 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 from boat and propeller strikes and habitat degradation. Changes to the management of recreational boating in Florida Bay (more pole/troll 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 *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. 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 zones in Florida Bay, the parkwide boater education and permit system, implementation of a detailed channel marking and management 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, Read and Engleby 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 backcountry (nonmotorized) zone would eliminate motorboats and benefit dolphins by reducing underwater noise and impacts on their food source. Similar to the no-action alternative, Little Madeira Bay and Joe 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 zones and idle speed, no-wake areas 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 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 and Roseate Tern

Under the NPS preferred alternative, piping plovers and roseate terns would benefit from establishment of pole/troll zones and idle speed, no-wake areas that would be implemented along the shoreline of Florida Bay and near the Florida Bay keys. Long Sound would be zoned backcountry (nonmotorized). 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 and roseate terns in Little Madeira Bay and Joe Bay (also known as the Crocodile Sanctuary) from management as a special protection zone would be localized, minor, and beneficial.

Overall, this alternative would result in localized minor 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.

Cumulative Impacts. The piping plover and roseate tern 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 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 and roseate tern. The NPS preferred alternative would make a very slight beneficial contribution to these cumulative effects.

Conclusion. Overall, the NPS preferred alternative would benefit the piping plover, roseate tern, and piping plover critical habitat with limited, localized, minor benefits compared to continued current management. This would result in a *may affect, not likely to adversely affect* finding for the piping plover and roseate tern 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.

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 Alternative Wilderness Waterway 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 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 backcountry zone would eliminate motorboats and potentially benefit American crocodiles. Little Madeira Bay and Joe 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.

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 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.

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 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 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. 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. Cumulative effects would be minor and beneficial.

Sea Turtles

Sea turtles would benefit from the NPS preferred alternative through establishment

of pole/troll 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 backcountry (nonmotorized) zone would eliminate motorboats and benefit sea turtles. 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 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.

Overall, actions taken under the NPS preferred alternative would reduce the potential for adverse effects on sea turtles. Any adverse effects would be minor and insignificant or discountable, resulting in a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act.

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. The minor 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. Actions under the NPS preferred alternative would make a modest beneficial contribution to these effects.

Conclusion. The NPS preferred alternative would reduce impacts to sea turtles and their habitats, resulting in long-term, minor benefits and a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act. 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. These changes, coupled with the active seagrass restoration program, could result in decreased degradation of seagrass habitat. The NPS preferred alternative would also 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.

Actions taken under the NPS preferred alternative would reduce the potential for injury to fish and habitat degradation in the bay, resulting in long-term, minor benefits. This would result in a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch and habitat loss and degradation, including poor water quality and altered water deliver and salinity (National Marine Fisheries Service 2006). These widespread threats have resulted in a reduced species distribution and reduced population levels. The 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. The NPS preferred alternative would have a modest beneficial contribution to the overall cumulative effects.

Conclusion. The NPS preferred alternative would result in long-term, minor, beneficial effects to the smalltooth sawfish—a *may affect, not likely to adversely affect* finding under section 7 of the Endangered Species Act.

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 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, Joe Bay, and adjacent smaller water bodies (also known as the Crocodile Sanctuary) 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. Long Sound would be managed as backcountry (paddle only). This 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 Alternative Wilderness Waterway would probably have little impact on natural soundscapes, except along the few segments zoned 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 in the first (easternmost) mile, but a new pole/troll zone would be established in the western section of the creek. This would have a localized, long-term, minor, beneficial impact on the natural soundscape because of reduced motor noise.

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 80,100 acres within the East Everglades Addition would be proposed for wilderness designation, and about 9,900 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 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/animal 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 formal 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.

Natural

Main Portion of the Park (all but East Everglades Addition). The NPS preferred alternative would establish a formal 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.

This alternative would establish pole/troll zones and designate some idle speed-no-wake areas 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 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 Alternative Wilderness Waterway 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 80,100 acres as wilderness, and the eventual designation of another 9,900 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, 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 Alternative Wilderness Waterway 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, 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 zones as well, because pole/troll 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 80,100 acres in the Addition for wilderness designation and an additional 9,900 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 backcountry zone at Long Sound, the idle speed, no-wake area along the northern Florida Bay shoreline, and segments of the Alternative Wilderness Waterway zoned backcountry (nonmotorized) 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 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 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 80,100 acres of proposed designated wilderness and about 9,900 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 9,900 acres of proposed potential wilderness until private airboat use (a life-long right for eligible individuals) ends. Given the extent of new 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 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: long-term, 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 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 Miccosukee 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 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 (80,100 acres) and potential wilderness (9,900 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 help 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 no historic 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 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 undertaken in accordance with the *Secretary of 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 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 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 the most acreage in the East Everglades Addition for wilderness designation (80,100 acres) and potential wilderness (9,900 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 (SFCMC) 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, implementation of pole/troll 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 the boater education requirements and pole/troll 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. However, the requirement should not deter use by local motorboat owners, sport fishers, outfitters, and others who visit for longer periods, and in fact this requirement may encourage new users to visit the park. 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 zones could encourage more use by smaller watercraft. Development of a paddle access site on Long Sound 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 lower 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 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-type 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. Net changes on the order of 66,000 visitors per year might reasonably be expected over time. 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 zones) would result in short- and long-term changes in boating use, including the type and distribution and potentially the level of use. Establishing concession arrangements 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 NPS preferred alternative would comprise a relatively 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. 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 80,100 acres of wilderness and propose 9,900 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.

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 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 the visitor experience.

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. In Florida Bay, this alternative would implement pole/troll zones on more than 130,000 acres, which includes a backcountry (paddle-only) zone in Long Sound, and idle speed, no-wake areas 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 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, 63% of the bay would remain open to boating under park regulations for Florida Bay. For visitors who prize unrestricted motorboat access to Florida Bay, the pole/troll zones would have a long-term, adverse impact on their experience. However, 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 (77.5%) of pole/troll zones, visitors would need to pole or troll 0.5 mile or less. Less than 20% of the pole/troll zones would require visitors to pole or troll between 0.5 to 1.0 mile, and less than 1% of pole/troll areas would be more than 1.5 miles away 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, this alternative would have long term and

minor adverse impacts on boaters experiences.

Zoning Long Sound as backcountry (paddle only) 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 Long Sound, 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.

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).

The NPS preferred alternative would enhance paddling opportunities to park waters, including improvements for persons with disabilities, by improving carry-in boat launch sites along the main park road and seeking to establish a new site along the 18-mile stretch. The park would also pursue partnership opportunities for additional public boating access (both motorized and nonmotorized) onto Florida Bay. These would all have long-term, moderate, beneficial impacts on the visitor 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—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, 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 ADA 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 Alternative Wilderness Waterway, intended primarily for those seeking a wilder, more remote route. Some segments of the Alternative Wilderness Waterway would be zoned boat access (motorized and nonmotorized boats allowed). A few segments (e.g., Wood River and a segment just north of Whitewater Bay) would be zoned back-country (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 Alternative Wilderness Waterway would have negligible to minor, adverse impacts on the visitor experience.

The first (easternmost) mile of Gopher Creek would be managed the same as in the no-action alternative (idle speed/no wake area). The western section of the creek would be managed as a pole/troll zone to better protect the area's natural values. Paddlers might enjoy the additional quiet provided by the pole/troll zone. Motorboaters might view the pole/troll zone unfavorably. Impacts would be long-term, localized minor, beneficial or adverse, depending on one's point of view.

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 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.

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, none of the projects represent major expansions in visitor use opportunities or facility capacity, and most new opportunities would be focused on dispersed and backcountry recreation use. Implementation of boating management in Florida Bay would affect recreational and sport fishing use patterns in the bay, potentially resulting in a minor shift in 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.

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-type spending would accompany the increased 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. 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 the 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.

The 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.

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 the implementation of programs and management would support increased staffing levels over time. Direct staffing requirements associated with full implementation of the NPS preferred alternative are estimated at approximately

20% 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 terms.

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.

The 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 scarrings 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 scarrings.

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 80,100 acres of wilderness and propose 9,900 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.

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 re-suspension).

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 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 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 formal 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 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 exotic 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 local vicinities, 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 formal 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 Alternative Wilderness Waterway, 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 animals. 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 Alternative Wilderness Waterway 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 foreseeable 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 front-country 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. Alternative 2's contribution 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 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 a 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 habitat degradation under alternative 2.

Overall, alternative 2 would have long-term, minor benefits and continuing moderate adverse effects on the manatee.

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. 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 the manatee. 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 the 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. Cumulative effects would be moderate and adverse. The beneficial effects of this alternative would not be large enough to offset the 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 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 dolphin and their food sources. The continued relatively unrestricted boat access in the park's marine waters would continue hazards to bottlenose dolphins' 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 formal 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 and Roseate Tern

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 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 or plovers from preferred areas (which could increase energy expenditure or temporarily disrupt behavior (USFWS 2003f) would likely have minor adverse effects. 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 would likely be minor and adverse but insignificant.

Cumulative Impacts. Widespread effects on the piping plover and roseate tern would be as described for the no-action alternative—long-term, moderate, and adverse. The piping plover and roseate tern 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 and roseate tern. 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, 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.

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 Alternative Wilderness Waterway route 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.

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 animals 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. 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 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 formal 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.

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 minor (mostly continuing) adverse effects on sea turtles.

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. 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. Alternative 2 would have a slight beneficial contribution to the overall cumulative effects.

Conclusion. Alternative 2 would benefit sea turtles through habitat protection, and it would also result in some continued, long-term, minor, adverse effects from human activities (primarily motorboating). Overall cumulative effects would be moderate and adverse.

Smalltooth Sawfish

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 alternative 2. 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 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, could result in some measure of reduced degradation of seagrass and associated habitat used by the smalltooth sawfish.

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 fish is underway. Boating activity would continue to disturb habitat (especially seagrass) and any nearby sawfish. However, any adverse impacts would be minor and insignificant.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch, habitat loss and degradation, and disturbance of natural behavior from human activities (National Marine Fisheries Service 2006). These widespread threats have resulted in a large reduction in their population size. Alternative 2 actions would result in minor 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. Alternative 2 would not contribute measurably to these effects.

Conclusion. Alternative 2 would result in long-term, minor, adverse and beneficial impacts on the smalltooth sawfish and its habitat. 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 run 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 the 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 the 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 Alternative Wilderness Waterway 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/ animal 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 (II but East Everglades Addition). Similar to the NPS preferred alternative, alternative 2 would establish a formal 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 channels that have been prop-dredged through submerged marine wilderness would remain, the boater education/ permit requirement, increased patrols and enforcement, and the formal 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 Alternative Wilderness Waterway 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 Alternative Wilderness Waterway 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 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—long-term, 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 impacts would include various ecosystem restoration projects, the Snake Bight pilot pole/troll zone project, the implementation of vegetation and fire management plans, the activity of the Miccosukee along Tamaki 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 upon 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 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 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 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 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 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.

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 (SFCMC) 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. Boating use in Florida Bay would remain similar to current trends and patterns.

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 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 concession arrangements 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 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-type 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 guides and commercial tours available in Florida Bay and the park. This would have continuing, long-term, negligible to minor, beneficial impacts.

Alternative 2 would improve national park boundary markings, channel 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, 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 ADA 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 Alternative Wilderness Waterway, intended primarily for those seeking a wilder, more remote route. Nearly the entire Alternative Wilderness Waterway 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 Alternative Wilderness Waterway.

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. 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. Ecotour 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.

The 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.

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.

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 terms.

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 scarrings 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 scarrings.

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.

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 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 formal 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 Tamaki Trail and Kreme 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.

Formal 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 acres to 10 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 exotic 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 formal 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 Alternative Wilderness Waterway 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 animals. 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 Alternative Wilderness Waterway 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 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 formal 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 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 Alternative Wilderness Waterway 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 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 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. 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 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 Alternative Wilderness Waterway, would result in reduced boat strikes, decreased underwater noise from motorboats, improved habitat, and moderate benefits. 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 Alternative Wilderness Waterway, 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 formal 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 vacate 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 Alternative Wilderness Waterway 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 and Roseate Tern

Under alternative 4 piping plovers and roseate terns 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 and roseate terns in Little Madeira Bay and Joe Bay (also known as the Crocodile Sanctuary) from management as a special protection zone would be localized, minor, and beneficial.

Overall, this alternative would result in localized minor benefits to these species.

Cumulative Impacts. The piping plover and roseate tern 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 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 and roseate tern. Alternative 4 would make a slight beneficial contribution to these cumulative effects.

Conclusion. Overall alternative 4 would benefit the piping plover, roseate tern, and critical habitat for the piping plover, with limited minor 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.

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 Alternative Wilderness Waterway 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. 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 animals 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. Alternative 4 would make a small contribution to the cumulative effects.

Conclusion. 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. 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.

Overall, actions taken under alternative 4 would reduce the potential for adverse effects on sea turtles. Any adverse effects would be minor and insignificant or discountable.

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. The minor impacts of alternative 4, combined with the impacts of other actions, would result in moderate adverse cumulative effects on sea turtles and their habitat. Actions under alternative 4 would make a modest beneficial contribution to these effects.

Conclusion. Alternative 4 would reduce impacts to sea turtles and their habitats, producing localized, long-term, minor benefits. Overall cumulative effects would be moderate and adverse.

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. These changes, coupled with the active seagrass restoration program, could result in decreased degradation of seagrass 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 Alternative Wilderness Waterway (Ten Thousand Islands/Gulf Coast Area). All of these actions would benefit the sawfish either by

improving habitat or by reducing motorboat speeds (and thereby risk of injury to sawfish).

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.

Cumulative Impacts. The primary threats to the smalltooth sawfish are unintentional catch and habitat loss and degradation, including poor water quality and altered water deliver and salinity (National Marine Fisheries Service 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. Alternative 4 would have a modest beneficial contribution to the overall cumulative effects.

Conclusion. Alternative 4 would result in long-term, minor, beneficial effects on 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 Alternative Wilderness Waterway 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/animal 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 formal 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 formal 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 Alternative Wilderness Waterway 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 Alternative Wilderness Waterway 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 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 Alternative Wilderness Waterway 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—long-term, 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 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 Miccosukee 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 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, 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 less 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 no historic 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 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 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 Tamaki 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 HABS/HAER/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 Interior's Standards*, any adverse impacts would be of negligible to minor intensity and permanent.

Interpretation of the Nike 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, 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 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 less 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 (SFCMC) 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.

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 uncanceled 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 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. For visitors who value unrestricted motorboat access, the pole/troll zones would have long-term, adverse impacts on their experience. Alternative 4 emphasizes preservation 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 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%) 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. 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, and maximization of outdoor space for interpretive, orientation, and educational programs.

Gulf Coast site improvements would be ADA 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 Alternative Wilderness Waterway, intended primarily for those seeking a wilder, more remote route. Some segments of the Alternative Wilderness Waterway 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 Alternative Wilderness Waterway would have minor to moderate adverse impacts on the visitor experience.

Gopher Creek would be managed as a backcountry (nonmotorized) zone to enhance the wilderness experience and better protect the sensitive resources in this area. Many paddlers would enjoy the additional quiet in this area provided by the backcountry zone. Many motorboaters would probably view this zone unfavorably, as they would no longer be able to access the creek via motorboat. Impacts would be long-term, localized minor to moderate, and beneficial or adverse, depending on one's point of view.

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 recrea-

tion 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

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 use. The net effects of these actions and management directions would be projected long-term increases in visitor use across the park. However, increases 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.

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 in Florida bay, resulting in shifts in boating and fishing toward the Gulf Coast. Such a shift could affect individual establishments and outfitters, but the net impact on overall spending would be relatively limited.

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, although because of the uniqueness of this activity to the Everglades region, some of the use, and hence the spending and jobs supported, might be displaced to other locations.

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

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.

Elimination of commercial airboating in the East Everglades would have long-term adverse economic effects on owners of the real property and associated ongoing business interests. The extent of such effect is unknown at this time.

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 terms.

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.

Overall, the economic and social effects of alternative 4 include negligible to minor short- and long-term economic benefits due to the elimination of 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.

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 negligible to minor short- and long-term economic benefits due to the elimination of 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.

Florida Bay

Under alternative 4, improvements at the Key Largo ranger station and Florida Bay Interagency 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.

