

## Chapter 3

# Affected Environment and Environmental Consequences



*Photo courtesy of: Everglades National Park Photo*

**EVERGLADES NATIONAL PARK**  
**DRAFT**

**FLAMINGO COMMERCIAL SERVICES PLAN/ENVIRONMENTAL ASSESSMENT**



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# AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

## INTRODUCTION

This chapter of the environmental assessment describes existing environmental conditions in the areas potentially affected by the alternatives and the impacts to those environmental conditions as a result of implementation of the alternatives. This section addresses the following resource areas: geologic resources/soils, air quality, wildlife, vegetation, threatened and endangered species, other species of special concern, archeological and historical resources, ethnographic resources, cultural landscapes, visitor use and experience, soundscapes, night sky, wilderness, socioeconomics, energy management, and park management and operations.

For each resource area listed above, the existing condition, or “affected environment”, is first provided. This is followed by the “environmental consequences”, or potential impacts, of each of the alternatives to each of the resources or values (i.e., impact topics). This section analyzes both beneficial and adverse impacts that would result from the implementation of any of the alternatives considered. The section also summarizes the laws and policies relevant to each impact topic and explains the general methodology used to analyze impacts, including definitions of impact thresholds for measuring the intensity of impacts. In addition, an assessment of cumulative impacts is included for each topic. An assessment of whether or not impairment of a resource could occur is provided for natural and cultural resources.

## GENERAL METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS BY RESOURCE

The general approach for measuring the effects of the alternatives on each resource category includes general analysis methods as described in guiding regulations, basic assumptions, thresholds used to define the level of impact resulting from each alternative, methods used to evaluate the cumulative effects, and the methods and thresholds used to determine if impairment would occur for those applicable resource areas. The analysis of impacts follows Council on Environmental Quality (CEQ) guidelines and Director’s Order #12 procedures (NPS 2001).

## GENERAL ANALYSIS METHODS

Potential impacts of all alternatives are described in terms of type (Are the effects beneficial or adverse?); context (Are the effects site-specific, local, or regional?); duration (Are the effects short-term or long-term?); and intensity (Are the effects negligible, minor, moderate, or major?). Because definitions of intensity vary by impact topic, or resource area, intensity definitions are provided separately for each impact topic analyzed in this document.

Each alternative is compared to a baseline to determine the context, duration, and intensity of the resource impacts. For purposes of the impact analysis, the baseline is the existing concessions and services at Flamingo today, including projects currently funded to address hurricane recovery (see Chapter 2: Alternatives for a complete description of alternative A). In the absence of quantitative data, best professional judgment was used to determine impacts. In general, impacts were determined using existing literature, federal and state standards, and consultation with subject matter experts and park staff and other agencies.

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

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

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

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

**Duration:** The duration of the impact varies according to the resource area evaluated. However, for the purposes of this analysis, the following assumptions are used for all impact topics except cultural resources:

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

*Long-term impacts:* Those impacts occurring after plan implementation, through the next 10 years; for natural systems (vegetation, wildlife, wetlands), recovery would take more than one year; and

Because most cultural resources are non-renewable, impacts to most cultural resources are considered long-term, except those for the natural elements of cultural landscapes that can renew such as vegetation; effects would be short-term (three to five years) until natural components are replaced (e.g., new vegetation grows).

**Intensity:** Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed.

## ASSUMPTIONS

**Area of Analysis:** The area of analysis for all topics is described under each topic and may include either the primary Flamingo area (figure 1-8) or the expanded Flamingo area (figure 1-10). The study area for socioeconomics extends to the counties immediately surrounding the park entrance and road to Flamingo, since visitation and construction at Flamingo could influence the surrounding area businesses and work force.

**Period of Analysis:** The period of time for the analysis extends through the life of this plan, as incorporated into the General Management Plan, which is estimated at approximately 20 years. The baseline condition, as described in alternative A, is the current post-hurricane condition of the Flamingo area. For analysis of cumulative impacts, it is assumed the analysis begins following the establishment of Flamingo in the 1960s.

**Future Trends:** For all topics, the future trend in visitation was derived from the economic research conducted for this EA. For alternative A, it was assumed that visitation would remain at about existing levels, because the concessions area would not return to full prior capacity and there would be no overnight accommodations except for recreational vehicle (RV) and tent camping. Increases in visitation over the life of the plan would be tied to regional population and tourist growth (estimated to capture about 1.2 percent of total Florida tourists park-wide), some limited reinstatement of services, and gradual increases over the years. Under alternative B, the availability of more services and lodging would mean that the Flamingo area would see increased use by local tourists and area residents. Visitation was assumed to be higher, with an initial increase of 5 percent as a result of spurred interest over the re-opening of Flamingo and a stabilized 1.5 percent capture of Florida tourists park-wide. Under alternative C, it was assumed that the wide range of accommodations and services would appeal to a broader audience, and that an increase in visitation would occur (even slightly over that of alternative B).

## CUMULATIVE IMPACTS

National Environmental Policy Act (NEPA) regulations require an assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7).

As stated in the CEQ Handbook (1997), “Considering Cumulative Effects,” cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful. Cumulative impacts are considered for all alternatives, including the no action alternative, and are presented at the end of each impact topic discussion analysis.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify the other past, present, and reasonably foreseeable future actions that have the potential to impact resources evaluated in this environmental assessment.

Cumulative impacts at Flamingo include the cumulative effects of various projects and development that have occurred at the Flamingo area over the years, such as construction of the marina, visitor center, lodge, cottages, and campground facilities, as well as roads, trails, and parking. All of these have included vegetation clearing and use of fill materials. Maintenance activities have included and may continue to include:

- Exotic Plant Control. EPA-registered herbicides were used in the past for cattail control around Eco Pond; weed control is performed on a limited basis and only where mechanical methods are problematic.
- Mosquito Control. The park sprays with an approved insecticide between May and November, using a trailer mounted sprayer, around the housing and maintenance areas only. The park is currently evaluating mosquito spraying and its impacts on the environment.
- Fire Management. The plan is for full suppression of all fires. There was a small wildfire (0.2 acres) in the campground in 2005 that was suppressed. Prescribed burns were done in 2004 and 2006 to burn dead and downed material remaining from herbicide applications, but there are no plans to do any more of this at this time.
- Landscape Management. The park does not irrigate, fertilize, or do regular weed control; areas around the facilities are mowed on a regular basis.
- Road and Trail Maintenance.
- Regular Facility Maintenance and Repairs.

Cumulative impacts also result from the use of the area by visitors, and visitation over the years has increased until the recent hurricane events. Several RV campgrounds and park facilities near Everglades National Park have recently closed. In addition, local public boat launches have been lost due to private sector acquisition and development in the region. This may also contribute to cumulative impacts at Flamingo, if people are displaced to Flamingo.

Proposed future projects scheduled for the Flamingo area that are defined enough to be considered in cumulative impacts include removal of underground storage tanks at the marina (includes removal, replacement, soil and groundwater sampling), and the resurfacing of the roads and parking facilities, scheduled for 2011-2012.

In addition, other related plans, policies, and actions that are described in Chapter 1: Purpose of and Need for Action of this EA should also be considered if they would result in implementing actions that would

contribute to the cumulative effects of the project. The following list was derived by examining these actions and selecting those that may contribute to cumulative impacts for at least one of the impact topics discussed in detail.

- Long-range Interpretive Plan. Addresses park interpretation efforts throughout the park including Flamingo and started in 2007.
- Fire Management Plan. Designates Flamingo as a full suppression zone.
- Flamingo Potable Water System Improvement. Installation of new water system within the Flamingo area.
- Flamingo Wastewater Treatment Plant. Construction of new plant within the Flamingo area.
- National Register of Historic Places—Mission 66 Designation. Development in the Flamingo area may affect or be affected by the proposal to list facilities on the site on the National Register of Historic Places because of its Mission 66 design.
- Wayside Exhibit Plan. Includes wayside exhibits for the Flamingo area.
- Mosquito Control Program. Regional planning efforts may affect surrounding areas, including Flamingo.
- South Florida and Caribbean Parks Exotic Plant Management Plan. Includes actions in Everglades National Park, and could possibly include Flamingo.
- Comprehensive Everglades Restoration Plan (includes Manatee Management Plan).

Finally, some of the regional transportation related projects previously mentioned that may indirectly contribute to cumulative visitation-related impacts at the park include:

- Biscayne-Everglades Greenway;
- Florida Circumnavigation Saltwater Paddling Trail; and
- Miami-Dade Busway Extension.

## IMPAIRMENT ANALYSIS

The NPS *Management Policies 2006* requires an analysis of potential effects to determine whether or not actions would impact park resources, but it also must determine whether those actions would impair park resources. The fundamental purpose of the national park system, as established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. These laws give the NPS the managerial discretion to allow park resources and values to be impacted when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values.

The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question, and other impacts. An impact to any park resource or value may constitute impairment, but an impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents as being of significance.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park.

An impairment determination is included in the conclusion statement for all impact topics related to Everglades National Park natural and cultural resources. Impairment determinations are not made for health and safety or park operations and management because impairment findings relate back to park resources and values, and these impact areas are not generally considered to be park resources or values. Impairment determinations are not made for visitor use and experience because, according to the Organic Act, enjoyment cannot be impaired in the same way an action can impair park resources and values.

## **GEOLOGY, TOPOGRAPHY, AND SOILS**

### **AFFECTED ENVIRONMENT**

#### **GEOLOGIC AND TOPOGRAPHIC CONDITIONS**

Everglades National Park is located on the southern tip of the Florida peninsula—an area of very low, flat topography. No point in the Everglades is more than 7 feet (2 meters) above sea level. The area bedrock is limestone. Limestone is relatively soft, permeable and prone to erosion and dissolution from exposure to groundwater and precipitation. The action of roots and chemical byproducts of decomposition also contribute to limestone dissolution. However, limestone exposed to the atmosphere hardens as a result of the reprecipitation of calcite dissolved by rain water, creating highly variable surface roughness (Bacher 1997). A hard limestone substrate, commonly called cap rock, is typically located 10 to 40 inches below the soil surface. The limestone also outcrops at the land surface, particularly within hardwood hammocks (Bacher 1997).

#### **SOILS**

Throughout the park, marl, peat, sand, and rock outcroppings are the four most common soils and substrate types. Marls are the most widespread soil type within the park. Marls are mixtures of calcium-bearing fine sediments with calcite particles, sand, and/or shell fragments. These soils were formed in shallow waters with a relatively short period of flooding and, therefore, have high rates of microbial activity and decomposition of organic matter (NPS 2006).

Peat is formed under anaerobic conditions during long periods of flooding, where the volume of decaying plant material exceeds the ability of microbes to decompose it. Peat deposits lie beneath the surface soils across the low-lying reaches of the park (NPS 2006). Peat soils are identified by major vegetation categories of sawgrass and mangroves. The eastern boundaries of the park have intermittent, thin, sandy deposits that are likely derived from ancient shorelines. These types of soil are highly permeable and moderately to well-drained (NPS 2006).

Within the developed portions of the Flamingo area, including the visitor area as well as the maintenance and housing areas, the soils are mostly fill material. Fill material is used as structural fill or back fill in many commercial, industrial, and residential construction projects when the native soils on-site are not suitable for development.

Soil conditions of non-fill material within the Flamingo area are being degraded (e.g., soil compaction, disturbance, and the associated erosion) as a result of visitor movement outside of designated visitor use areas including park trails, and the camping and day-use areas. Portions of the shoreline in the Flamingo area not protected by seawalls or mangroves are experiencing an unnatural accelerated rate of erosion caused by increased wave action from both recreational and commercial boating. Shoreline erosion is a natural process caused by the interaction of currents, waves, and tidal forces on the shoreline. This natural process can be accelerated by increased wave action caused by boat wakes. The amount of shoreline erosion caused by the wake of a boat depends on the stability of the shoreline itself, and the wave energy created by boat traffic. Wave energy is related to the depth of the water, the size and speed of the boat, and the distance from shore the boat is operating. Shoreline erosion can result in habitat destruction, the loss of useable land, an increase in sedimentation and turbidity of the water, and the release of nutrients.

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

NPS *Management Policies 2006* (Sect. 4.8) states that the NPS will protect geologic features from the unacceptable impacts of human activity, while allowing natural processes to continue. The term “geologic features” describes the products and physical components of geologic processes. Examples of geologic features include rocks, soils, and minerals; geysers and hot springs in geothermal systems; cave and karst systems; canyons and arches in erosional landscapes; sand dunes, moraines, and terraces in depositional landscapes; dramatic or unusual rock outcrops and formations; and paleontological and paleoecological resources such as fossilized plants or animals, or their traces.

### ASSUMPTIONS, METHODOLOGY AND IMPACT THRESHOLDS

Potential impacts to soils are assessed based on the extent of disturbance to natural undisturbed soils, the potential for soil erosion resulting from disturbance, and limitations associated with the soils. Analysis of possible impacts to soil resources was based on on-site inspection of the resource within the project area, review of existing literature and maps, and information provided by the NPS and other agencies.

The following thresholds were used to determine the magnitude of impacts on soils and geologic features:

- Negligible:* Soils and geologic features would not be affected, or effects would not be measurable. Any soil erosion, effects on soil productivity, or the ability of the soil to support native vegetation would be slight, and would occur in a relatively small area.
- Minor:* Effects on soils or geologic features (soil erosion, effects on soil productivity or the ability of the soil to support native vegetation) would be detectable, but only a small area would be affected. If mitigation was needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.
- Moderate:* Effects on soils or geologic features (soil erosion, effects on soil productivity or the ability of the soil to support native vegetation) would be readily apparent, and would occur over a relatively large area. Mitigation would probably be necessary to offset adverse effects and would likely be successful.
- Major:* Effects on soils or geologic features (soil erosion, effects on soil productivity or the ability of the soil to support native vegetation) would be readily apparent, and would substantially change the soil or geologic characteristics over a large area. Extensive mitigation would be needed to offset adverse effects, and its success would not be assured.
- Duration:* Short-term impacts occur during all or part of alternative implementation; long-term impacts extend beyond implementation of the alternative.
- Analysis area:* The focus of this analysis is the primary Flamingo area that could be directly affected by the proposed actions; however, impacts to soils in the expanded area of analysis from boaters or hikers originating at Flamingo are also discussed.

### IMPACTS OF ALTERNATIVE A - NO ACTION ON GEOLOGIC RESOURCES/SOILS

**Analysis.** Under alternative A, the current management of the Flamingo area would remain essentially unchanged. Actions would be taken to clean up the areas damaged after two consecutive hurricanes (Hurricane Wilma and Hurricane Katrina) in 2005. The lodge, cottages, and any other structures damaged beyond repair would be demolished and removed. The foundations of these structures would be removed, the soil replaced and restored to the original grade, and vegetation would be allowed to return naturally. The total area restored would be approximately 27 acres. The public use facilities provided within the

Flamingo area, including the camping and day-use area and trails system, would be managed and maintained as they were prior to the hurricanes.

Because of Flamingo's flat topography, only minor leveling, grading, and excavation would be required to restore those areas where structures would be removed and not replaced, resulting in long-term negligible adverse impacts to the geologic or topographic conditions of the site.

Under alternative A, new construction within the Flamingo area would be limited to the replacement of the amphitheater, employee housing, concessioner housing, and the maintenance facility. In areas where buildings would be removed or replaced, heavy machinery would be used to demolish the damaged structures and haul debris from the site. Heavy equipment would also be used for construction of the replacement facilities. As a result, soils within and adjacent to these sites would likely be disturbed and compacted. Soils exposed from disturbance would have a greater potential for erosion during a storm event. However, erosion at the site would be minimized through implementation of mitigation measures such as silt fencing and sediment traps to contain sediment onsite and by covering disturbed soil with plastic sheeting or other suitable cover material.

Soil compaction would occur from construction equipment working onsite. Compacted soils reduce root growth and the ability for rainfall to infiltrate the soil, which can increase runoff. To minimize the damage to the soils, the use of vehicles would be limited to times when the areas are not too wet and able to support the weight of the vehicles. After construction is completed, areas where soil is disturbed or compacted would be rehabilitated by tilling or aerating the soil and possibly replanting the areas impacted if regrowth would not occur naturally. Because the entire site is built on non-native fill materials, the overall adverse impacts to soils resulting from the actions proposed under this alternative would be short-term, localized, and minor. Long-term minor indirect beneficial impacts to soils would occur by allowing those areas where structures were removed to revegetate naturally and return to more natural conditions.

Within and immediately adjacent to park trails, camping/lodging areas, and day-use areas, visitors often stray outside the boundaries of the designated trail system, or follow the social trails scattered throughout the developed areas of Flamingo. Social trails could also occur where boaters originating at Flamingo land and possibly explore the shorelines along the northern shore of Florida Bay (the keys within the project area near Flamingo are all closed to public access). Social trails often route visitors towards areas not designated for visitor use, or are used as short-cuts between designated trails or other destinations. Hiking outside designated trails can compact soils, reducing porosity and the water-holding capacity of soil. In addition, compacted soils reduce water infiltration rates, allowing for greater runoff and increased potential for erosion. Compacted soils can inhibit seed germination and plant growth, which, over the long-term, decreases the amount of organic material within the soils and decreases overall soil productivity. As a result, long-term minor adverse impacts on soils would continue to occur as a result of trampling and soil hardening and the associated erosion caused by visitor movement.

Shoreline erosion caused by the wakes of recreational and tour boats traveling beyond the Flamingo area would continue. In an effort to slow this shoreline erosion in the immediate vicinity of the park, the park would continue to enforce a "No Wake" zone within the Flamingo area's freshwater and saltwater boat basins. In addition, the park may plant mangroves in areas along the shoreline to help protect the shoreline and rehabilitate areas of lost habitat. Despite these measures, the shoreline within the Flamingo area and along other areas frequented by motorized boats and boat tours would likely continue to erode at an accelerated rate, resulting in long-term minor adverse impacts.

**Cumulative Impacts.** Other actions within the Flamingo area have impacted or would continue to impact soils. A small fire that occurred in the Flamingo campground and other prescribed burns have had very localized, short-term minor adverse impacts on soils. Construction of the new water system and wastewater treatment plant impacted soils in a very limited area and to a negligible extent. The proposed removal of underground storage tanks near the marina and resurfacing the roads and parking facilities would involve ground disturbing activities that would have short-term minor adverse impacts to soils

within the area. These impacts, in combination with the long- and short-term minor adverse and long-term minor beneficial impacts to soils and long-term negligible adverse impacts to geology or topography resulting from the no action alternative, would result in long-term minor adverse cumulative impacts to soils and long-term negligible adverse impacts to geology and topography.

**Conclusion.** Continuing operations at Flamingo would result in long-term negligible adverse impacts to the geologic and topographic conditions of the site. Both long- and short-term minor adverse impacts to soils would occur as a result of activities associated with the demolition of several of the park's structures, construction of new facilities in already disturbed areas, continued recreational activities, and continued shoreline erosion. Long-term minor beneficial impacts to soils would occur by the reduction in the developed footprint, allowing those areas where structures were removed to revegetate naturally and return to more natural conditions.

Alternative A would not produce major adverse impacts on geologic resources or soils whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's general management plan or other National Park Service planning documents. Consequently, there would be no impairment of geologic resources or soils as a result of the implementation of alternative A.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON GEOLOGIC RESOURCES/SOILS**

**Analysis.** Under alternative B, the developed areas within Flamingo area would be rebuilt. Like the no action alternative, the current lodge and cottages on site would be demolished, but these facilities would be rebuilt in a more concentrated configuration within their respective recreational nodes than what is there today. This new configuration would decrease the overall developed footprint within Flamingo, increasing the amount of open space. Structures proposed for construction under this alternative include a new lodge (approximately 19,000 square feet) and 18 cottages (14 that are approximately 1200 square feet each, and 4 at approximately 1500 square feet each). In addition, new construction within the Flamingo area would include the replacement of the amphitheater, employee housing, concessioner housing, and the maintenance facility, as in alternative A. Sites where structures would be demolished and not replaced would have their foundations removed, the soil would be replaced, and the area would be allowed to revegetate naturally. In addition, the B and C Loops of the campground would be removed and restored to natural conditions. The total area restored would be approximately 50 acres. It is assumed that the amount of trenching for utilities would be minimized, as existing underground utilities would be used where possible.

Like alternative A, alternative B would result in long-term negligible adverse impact to the geologic or topographic conditions of the site because the area's flat topography would require only minor leveling, grading, and excavation to prepare the sites for construction.

This alternative would involve disturbing several acres of soil within the proposed project area. Similar to the no action alternative, heavy machinery would be used to demolish the damaged structures, prepare the site for construction, and haul construction materials to and from the site. As a result, soils within and adjacent to the construction sites would be disturbed and compacted. Disturbed soils left exposed to the elements are highly susceptible to erosion from wind and stormwater runoff. The longer these soils are left exposed, the more the soils would ultimately be eroded. Compacted soils reduce root growth and the ability for rainfall to infiltrate the soil, which can increase runoff from the site and the potential for erosion. Soil productivity would decline in disturbed and compacted areas and would be completely eliminated from those areas within the footprint of paved or other hardened areas and new structures.

To minimize the damage to soils, construction/demolition activities would be limited to times when the areas are not too wet and able to support the weight of the vehicles and other construction equipment. Erosion on the site would be minimized through implementation of mitigation measures such as silt fencing and sediment traps to contain sediment onsite and by covering disturbed soil with plastic sheeting or other

suitable cover material. After construction has been completed, those areas where soil is disturbed or compacted would be rehabilitated by tilling or aerating the soil and allowing the areas impacted to revegetate naturally. The footprints of the structures removed and not replaced would be rehabilitated by removing the foundation of the old structures, placing clean fill material on the site, and allowing the site to revegetate naturally. Overall adverse impacts to soils from demolition and construction activities would be short-term and minor, given that mitigations measures would be enacted to minimize impacts, the potentially impacted soils are non-native fill material, and the construction/demolition sites comprise a relatively small area compared to the entire Flamingo area. Long-term minor beneficial impacts to soils would occur by allowing those previously disturbed areas to revegetate naturally and return to more natural conditions.

Like alternative A, alternative B would continue to have long-term minor adverse impacts on soils from trampling and soil hardening caused by visitor movement and other activities (e.g., camping, biking) within and immediately adjacent to park trails, along social trails, camping/lodging areas, and day-use areas. Social trails could also occur where boaters originating at Flamingo land along the northern shore of Florida Bay (the keys within the project area near Flamingo are all closed to public access and posted as “No Landing” areas). However, because visitor use is expected to increase under this alternative, these impacts would be greater and cover a larger area than alternative A.

Shoreline erosion caused by the wakes of recreational and tour boats traveling beyond the Flamingo area would continue, and boat traffic would be expected to increase under alternative B. In an effort to slow this shoreline erosion, the park would continue to enforce a “No Wake” zone within the Flamingo area’s freshwater and saltwater boat basins. In addition, the park would plant mangroves in areas along the shoreline damaged by the hurricanes to help to protect the shoreline and rehabilitate some of the lost habitat. Despite these measures, much of the shoreline within the Flamingo area and along other areas frequented by motorized boats and boat tours would continue to experience erosion at an accelerated rate, resulting in long-term minor adverse impacts.

**Cumulative Impacts.** Cumulative impacts would be very similar to those described for alternative A. Impacts of other actions that could affect soils, in combination with the long- and short-term minor adverse and long-term minor beneficial impacts to soils and long-term negligible adverse impacts to geology or topography resulting from alternative B, would result in long-term minor adverse cumulative impacts to soils and long-term negligible adverse impacts to geology and topography.

**Conclusion.** Implementation of alternative B would result in long-term negligible adverse impacts to the geologic and topographic conditions of the site. Both long- and short-term minor adverse impacts to soils would occur as a result of activities associated with the construction/demolition activities, the continuation of recreational activities, and the continued shoreline erosion. Long-term minor beneficial impacts to soils would occur by the reduction in the developed footprint, allowing those previously disturbed areas to revegetate naturally and return to a more natural condition.

Alternative B would not produce major adverse impacts on geological or soil resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park Service planning documents. Consequently, there would be no impairment of geologic resources or soils as a result of the implementation of alternative B.

### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON GEOLOGIC RESOURCES/SOILS**

**Analysis.** Under alternative C, while there would be a wider mix of commercial services and accommodations provided to meet a wider range of user preferences and needs, the total amount of developed area within Flamingo would be reduced. The emphasis of this alternative would be to develop eco-friendly concepts with more rustic services while providing for a higher level of visitation. The

overall developed footprint of Flamingo would be reduced and reconfigured in a more compact developed area. Structures proposed for construction under this alternative include a new lodge, approximately 14,250 square feet; 12 cottages, each approximately 1,000 square feet; and 40 eco-tents (approximately 256 square feet each) with a nearby canoe/kayak launch area. More connecting paths and trails would be created within these areas. In addition, new construction within the Flamingo area would include the replacement of the amphitheater, employee housing, concessioner housing, and the maintenance facility, as in alternative A. At sites where structures would be demolished and not replaced the foundations would be removed, soil would be replaced, and the area would be allowed to revegetate naturally. In addition, the B, C, and T Loops of the campground would be restored to natural conditions. The total area restored would be approximately 87 acres. It is assumed that the amount of trenching for utilities would be minimized as existing underground utilities would be utilized whenever possible, and the RVs would be located close to the visitor center where utility connections already exist.

Like the other alternatives, because of the area's flat topography, only minor leveling, grading, and excavation would be required to prepare the sites for construction, which would result in long-term negligible adverse impact to the geologic or topographic conditions of the site.

Impacts to soils resulting from the activities associated with this alternative would be similar to those described in alternative B, except more area would be affected by construction, with the construction of the 40 ecotents and a paddling launch area in the previous group and walk-in camping area. There would be short-term minor adverse impacts to soils during the demolition and reconstruction of structures proposed under this alternative as a result of soil disturbance, compaction, and the increased potential for erosion. Mitigation measures would be utilized in the same manner as described in alternative B to minimize impacts to soils during these activities. Also, with the proposed site reconfiguration, the overall developed footprint within Flamingo would be reduced, and beneficial impacts would occur as a result of the proposed restoration of 87 acres and allowing previously disturbed areas to revegetate naturally. These beneficial impacts would occur over a greater area than those seen in alternative B because more areas are proposed for restoration, resulting in long-term moderate beneficial impacts on soils.

Alternative C would have long-term minor adverse impacts on soils from trampling and soil hardening caused by visitor movement and other activities within and immediately adjacent to park trails, along social trails, camping/lodging areas, and day-use areas in the developed area. Social trails could also occur where boaters originating at Flamingo land along the northern shore of Florida Bay (the keys within the project area near Flamingo are all closed to public access and posted as "No Landing" areas). However, while visitor use is expected to increase, the overall impacts to soils are expected to be less than those described under alternative B. By developing more connecting paths and trails within the developed areas, park visitors would be less likely to develop social trails across Flamingo's vegetated areas to reach their destinations. Also, many of the trails constructed in and around the ecotents may be elevated on boardwalks. This would result in an overall decrease in the amount of land adversely impacted by visitor movements. In areas where boardwalks are used, long-term minor beneficial impacts to soils would be seen, since the use of boardwalks would more actively restrict visitor movement and result in less damage to the native soils adjacent to trails.

Shoreline erosion caused by recreational and tour boat wakes would continue and may increase with the increase number of tours emanating from Flamingo. The park would continue to enforce a "No Wake" zone within the Flamingo area's freshwater and saltwater boat basins. In addition, the NPS would plant mangroves in areas along the shoreline damaged by the hurricanes to help to protect the shoreline and rehabilitate some of the lost habitat. Despite these measures, however, much of the shoreline within the Flamingo area and in surrounding areas accessed from Flamingo would likely continue to erode at an accelerated rate, resulting in long-term minor adverse impacts.

**Cumulative Impacts.** The cumulative impacts from alternative C would be similar to these described for alternative B. Future projects that would involve some level of ground disturbance, combined with the

beneficial and adverse impacts of alternative C, would result in long-term minor adverse cumulative impacts to soils and long-term negligible adverse impacts to geology and topography. These impacts, however, would be less than those of alternative B, because less area would be developed and more area would be restored under this alternative.

**Conclusion.** Implementation of alternative C would result in long-term negligible adverse impacts to the geologic and the topographic conditions of the site. Both long- and short-term minor adverse impacts to soils would occur as a result of activities associated with the construction/demolition activities, the continuation of recreational activities, and the continued shoreline erosion. Long-term moderate beneficial impacts to soils would occur by reducing the developed footprint and restoring a relatively large area to a more natural condition.

Alternative C would not produce major adverse impacts on geological or soil resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of geologic resources or soils as a result of the implementation of alternative C.

## AIR QUALITY

### AFFECTED ENVIRONMENT

Everglades National Park is a designated Class I area. These areas are given the highest degree of air quality protection, with little allowance for deterioration of air quality. Class I areas apply to international parks, national wilderness areas or national memorial parks larger than 5,000 acres, or national parks larger than 6,000 acres, that were in existence on August 7, 1977.

The Flamingo portion of the park lies in Monroe County, which is in attainment for all criteria air pollutants. Much of the park experiences very little air pollution due to its remote wilderness nature. Visibility is occasionally diminished by high humidity and salt mist in the coastal areas. Local sources of pollution are generated by vehicle and motorboat emissions, as the Flamingo project area is developed and receives approximately 250,000 to 300,000 visitors annually. Flamingo performed prescribed burning in 2004 and 2006, but has no plans for future prescribed burns at this point in time.

The park participates in several air quality monitoring programs, including the National Atmospheric Deposition Program/National Trends Network, Clean Air Status/Trends Network (CASTNet), and the Interagency Monitoring of Protected Visual Environments (IMPROVE) network. The air quality monitoring stations associated with the programs record a variety of parameters, from wet and dry deposition of sulfate, nitrate, and ammonium, to ozone, mercury, and visibility. To date, no exceedances of prescribed Class I air quality criteria under the ambient air quality standards have occurred.

Everglades National Park has identified air quality-related values considered most sensitive. These include aquatic resources, fauna/wildlife (specifically those susceptible to mercury within the park), night skies, vegetation, and visibility.

### ENVIRONMENTAL CONSEQUENCES

#### GUIDING REGULATIONS AND POLICIES

The primary regulation related to air quality is the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAAA). In compliance with the Act, the U.S. Environmental Protection Agency (EPA) has promulgated ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the EPA has issued NAAQS for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), particles with a diameter less than or equal to a nominal 10 micrometers (PM<sub>10</sub>), particles with a diameter less than or equal to a nominal 2.5 micrometers (PM<sub>2.5</sub>), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), and lead (Pb). Under the NAAQS, primary and secondary standards are designated for each pollutant. Primary standards are designed to protect sensitive populations within the public, such as children and the elderly, from adverse health effects due to exposure to the pollutant. Secondary standards are designed to protect the environment, both natural and manmade, from known adverse effects from a pollutant.

Areas that do not meet NAAQS are called non-attainment areas, indicating that the pollutant has reached levels determined to have adverse effects on human health. When a state is in non-attainment for a pollutant, the state must create a State Implementation Plan (SIP) that regulates how the state plans to come into attainment.

In addition to federal regulations, Florida is responsible for monitoring air quality. The state is currently in attainment for all air quality standards set forth by the EPA (FDEP 2007).

## ASSUMPTIONS, METHODOLOGY AND IMPACT THRESHOLDS

Impacts to air quality were qualitatively assessed using current air quality information obtained through a review of the literature and pertinent laws, guidance and regulations, professional judgment, and experience with comparable actions.

To regulate the emission levels resulting from a project, federal actions located in non-attainment areas are required to demonstrate compliance with the general conformity guidelines established in 40 CFR Part 93 Determining Conformity of Federal Actions to State or Federal Implementation Plans (the Rule). Flamingo is located within an area designated by the EPA as in attainment for all criteria pollutants; therefore, a General Conformity Rule applicability analysis is not warranted. To provide a basis for comparison for what would be considered a major impact, projects in a non-attainment zone are allowed to emit 25 to 100 tons per year of any given pollutant, depending on the severity of non-attainment, and still be in conformity.

During operation, impacts to air quality usually come from the heating and daily use of new facilities. For this EA, it is assumed that no heating will be required and that hot water will be provided by electrical and/or solar power. Additional operations-related emissions will come from personal generator use and vehicle and boat use.

Thresholds of impact are defined below:

- Negligible:* Changes in air quality would not be measurable.
- Minor:* Effects would result in a measurable change in air quality, although the changes would be small and the impacts would be localized.
- Moderate:* Effects on air quality would be readily measurable and widespread.
- Major:* Effects would be readily measurable on a regional scale, and air quality standards would be exceeded.
- Analysis area:* The area of analysis for air quality is the expanded area of analysis, including the areas beyond Flamingo that could be affected by emissions from Flamingo and that could be accessed by motorized boats originating at Flamingo.

## IMPACTS OF ALTERNATIVE A - NO ACTION ON AIR QUALITY

**Analysis.** Under alternative A, the no action alternative, the commercial services provided at Flamingo would continue as currently managed, with some reinstatement of boat tours and rental services. The existing lodge and cottages would be demolished; the amphitheater and several other facilities damaged by past hurricanes would be reconstructed or replaced. Air quality impacts during demolition and construction include the impacts resulting from construction activities and equipment use. The impacts are varied, based on the project construction schedule, amount and type of construction activity and equipment, and construction plans and phases. Air pollutants from construction would contain mobile source emissions from construction equipment and worker and delivery vehicles; including the related CO, PM10 or PM2.5, nitrogen oxides (NO<sub>x</sub>), VOCs), and fugitive dust. Examples of fugitive dust include windborne particulate matter from earth-moving and material handling during construction activities. These impacts would be minimized through implementation of BMPs during construction activities and environmental compliance critical to mitigate potential air impacts. Such mitigation measures include utilizing water or appropriate liquids for dust control during demolition, land clearing, grading, and other activities as well as covering open-body trucks when transporting materials. With implementation of these measures, impacts to air quality from construction or demolition would be short-term, minor, and adverse.

Since the site is located in a subtropical climate, no heating utilities would be necessary for the new facilities. As previously stated, all operations-related building needs, such as hot water, are expected to be

provided electrically and therefore will not impact air quality in Flamingo. Facility operations would have long-term negligible adverse impacts to air quality.

Visitors to the Flamingo area would continue to arrive by boats and cars, and boat tours would continue to operate. Motorized boats would access various locations within the expanded Flamingo study area, including the new chickees. Internal combustion engines on both cars and boats emit CO, NO<sub>x</sub>, and VOCs, which will dissipate from the point of origin, based on prevailing wind speed and direction. Depending on the level of visitation use, impacts to air quality would be long-term, negligible to minor and adverse, and very seasonal.

Impacts on air quality within Flamingo would also continue as the result of RV generator usage within the park. There are currently no RV sites with electric hook-ups. Emissions from generators include CO, PM2.5, NO<sub>x</sub>, VOCs and SO<sub>2</sub>. Under alternative A, generators would continue to be necessary at the RV sites. Assuming full capacity year round, the maximum expected emissions from these generators would result in long-term minor adverse impacts to local air quality. The impacts from these emissions could vary based on number of RVs utilizing generators, the total hours of generator use, and prevailing wind conditions.

**Cumulative Impacts.** Under alternative A, cumulative impacts on air quality would result from the planned construction activities related to the removal of a storage tank, park building repairs and construction, and routine maintenance. Routine maintenance includes the resurfacing of park roads; park, commercial, and recreational vehicle use; and trail clearing. Natural and prescribed fires could also add to possible air pollution, although no additional prescribed burns are planned at this point in time. Future increases in visitation over the years would bring more visitors and more vehicles into the Flamingo area. As a result of these activities, cumulative impacts on air quality in the park are expected to be mostly short term, because emissions would not all occur at the same time and would be readily dissipated by prevailing winds, and range from negligible to minor adverse. Air quality would be expected to stay within state and federal standards.

**Conclusion.** Continuing operations at Flamingo would result in localized, long- to short-term, negligible to minor, adverse impacts on air quality within the analysis area. Air quality would remain within state and federal standards.

Alternative A would not produce major adverse impacts on air resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of air quality as a result of the implementation of alternative A.

### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON AIR QUALITY**

**Analysis.** Under alternative B, the park would rebuild what services and structures were lost as a result of the 2005 hurricanes at Flamingo. Construction impacts would be similar to alternative A in terms of the equipment used for the demolition of the existing lodge and cottages and construction of the other facilities. Additional impacts would occur in the immediate Flamingo area from grading activities related to the associated parking lot construction and at the chickee locations from mechanized equipment and the construction barge. Approximately 50 acres would be restored at the campground to natural conditions, which would involve grading of those areas to historic elevations and create a source of fugitive dust and emissions from earth-moving equipment. Adverse impacts related to construction or demolition activities would be short-term and minor.

Similar to alternative A, no heating utilities would be necessary for the new facilities, and facility operations would have long-term negligible adverse impacts to air quality.

Improvements would include converting 22 of the 65 existing RV sites to include electric hook-ups, potentially decreasing the use of generators and their associated emissions. Generator emissions for alternative B are expected to result in long-term minor adverse impacts to air quality.

Alternative B assumes that visitor use would increase, over the numbers expected for alternative A, creating more vehicle traffic and boat use within Flamingo and additional boat use in the expanded study area. A tram would run from Flamingo to the Snake Bight area, and 6 houseboats would be available to rent. Vehicles are mobile sources of air emissions, that vary based on vehicle type, model year, type of fuel, and miles traveled. The exact emissions from cars within Flamingo would vary based on the total number of miles driven by visitors. For example, if there were an additional of 150,000 visitors per year and each visitor drove 30 miles, for a total of 4.5 million miles driven within the park in one year, those vehicles would produce a combined emission of 4.96 tons per year of CO, the main criteria pollutant emitted from passenger vehicles. Given these numbers, adverse impacts to air quality from the increase in vehicle emissions would be long-term, minor, and adverse. Similarly, impacts from the internal combustion boat engines used in the study area would be long-term, but seasonal and minor given the relatively low level of emissions and dispersion that would occur throughout the area.

**Cumulative Impacts.** Under alternative B, Flamingo would offer additional services similar to the services offered prior to the 2005 hurricane season. Additional operations at Flamingo would result in localized, mostly intermittent or short term, negligible to minor, adverse impacts on air quality within the analysis area. Cumulative impacts from the operation of services at Flamingo; routine park operations; park, commercial, and recreational vehicle uses; and other emissions sources outside the park are expected to result in short term, negligible to minor, adverse impacts on air quality throughout the park, and air quality would remain within state and federal standards.

**Conclusion.** Under alternative B, additional operations at Flamingo would result in localized, mostly intermittent or short term, negligible to minor, adverse impacts on air quality within the analysis area. Air quality would remain within state and federal standards.

Alternative B would not produce major adverse impacts on air resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of air quality as a result of the implementation of alternative B.

### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON AIR QUALITY**

**Analysis.** Alternative C includes the construction of 12 cottages and the lodge, with additional construction for ecotents and a new RV facility, as well as replacement construction that is common to all alternatives. Approximately 50 acres would be restored to natural conditions, which would involve grading to historic elevations, creating a source of fugitive dust and emissions from earth-moving equipment. These and other construction-related impacts to air quality would be similar to those of alternative B, but would extend for a longer period of time and over a larger area, although these would not occur at one time. All impacts related to construction or demolition activities would be short-term, minor, and adverse.

Impacts from generator usage in alternative C differ from the impacts in alternatives A and B. Alternative C provides all RV sites with electric hook-ups, preferably solar-powered, so that impacts to air quality from the use of generators would be eliminated.

Alternative C includes the operation of 6 house boats and a floating fish camp, as well as the operation of an internal circulator shuttle and a “Yellow Bike” system, reducing the need to use individual motor vehicles within the Flamingo area. Power for the shuttle service would likely use clean fuel technology, further minimizing air quality impacts. The houseboats and floating camp would be docked in Flamingo

and then cruise into Florida Bay for several days at a time. The boats would produce additional diesel emissions in the region, but emissions would be intermittent and seasonal, and relatively quickly dispersed given the prevailing winds of the area. Overall, air impacts associated with mobile sources for alternative C would be long-term, minor, and adverse.

**Cumulative Impacts.** Under alternative C, Flamingo additional operations at Flamingo would result in localized, mostly intermittent or short term, minor, adverse impacts on air quality within the analysis area. Cumulative impacts from the operation of increased services at Flamingo; routine park operations; park, commercial, and recreational vehicle uses; and other emissions sources outside the park are expected to result in short term, negligible to minor, adverse impacts on air quality throughout the park, and air quality would remain within state and federal standards.

**Conclusion.** Under alternative C, Flamingo would increase the range of services available to visitors. Additional operations at Flamingo would result in localized, mostly intermittent or short term, negligible to minor, adverse impacts on air quality within the analysis area, and the use of an internal shuttle and “Yellow Bike” system would serve to reduce emissions from motor vehicles. Air quality would remain within state and federal standards.

Alternative C would not produce major adverse impacts on air resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park Service planning documents. Consequently, there would be no impairment of air quality as a result of the implementation of alternative C.

## SOUNDSCAPES

### AFFECTED ENVIRONMENT

A soundscape refers to the total acoustic environment of an area. Park natural soundscape resources encompass all the natural sounds that occur in parks, absent human-caused sound, including the physical capacity for transmitting those natural sounds and the interrelationships among park natural sounds of different frequencies and volumes. Natural sounds occur within and beyond the range of sounds that humans can perceive, and they can be transmitted through air, water, or solid materials. Some natural sounds in the natural soundscape are also part of the biological or other physical resource components of the park (NPS 2006). Natural sounds within our national parks are an important natural resource and a critical component of the ecological communities that parks seek to preserve. Soundscapes are different in developed areas than in wilderness areas.

Natural sound and the opportunity to experience solitude are valued resources in Everglades National Park. Because the development of commercial services would affect noise levels in the park, the actions of the proposed alternatives are evaluated to determine impacts on the noise level in the park.

Primary sources of human-caused noise in national parks are cars, buses, and other motorized vehicles; airplanes and helicopters; motorized boats; and park operations, such as generators. Individual sounds do not have to be loud, frequent, or otherwise dominant to be intrusive.

To date, noise monitoring has not been conducted at the park. The urban influences of Miami-Dade County to the northeast and the Florida Keys to the south have created sources of noise, primarily airport-related, that could be carried into the Flamingo area. Homestead Air Reserve Base, located 25 miles south of Miami, conducts combat training exercises that could cause noise to permeate into the Everglades backcountry. The park and some of its cooperators conduct overflights for scientific and natural resource management monitoring in the Flamingo and surrounding areas. However, no commercial air services or overflight services exist at or are planned for Flamingo.

The developed area of Flamingo has noise-generating activities associated with the visitor center, marina, services, and accommodations. Currently, the services at Flamingo are fewer than those before the hurricanes of 2005. However, many visitors suggest Flamingo is a place to camp and enjoy the quiet away from urban areas. The wilderness qualities of a backcountry experience within the southern portion of the park and within the surrounding bay waters include the ability of visitors to enjoy uninterrupted solitude and natural sounds.

Natural soundscapes are also important to many wildlife species. For example, nocturnal wetland amphibians, such as frogs, depend on quiet to communicate. Small mammals, such as bats and mice, need quiet to find prey and avoid predators. Migrating birds that navigate by flyways can be disturbed by artificial noise. Large cats tend to avoid noisy areas. Some wildlife species move further and further from main roads to avoid the sound of buses, cars, and other vehicles. All of these species exist or travel within the study area for Flamingo, and noise impacts are addressed in the wildlife section of this EA.

### ENVIRONMENTAL CONSEQUENCES

#### GUIDING REGULATIONS AND POLICIES

**NPS Management Policies 2006.** Chapter 4.0 Natural Resources Management, Section 4.9 Soundscape Management states that the National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. The Service will take action to prevent or minimize all noise that through

frequency, magnitude, or duration adversely affects the natural soundscape or other park resource or values, or that exceeds levels that have been identified through monitoring as being acceptable to or appropriate for visitor uses at the sites being monitored.

**Wilderness Act.** Section 4(b) of the Wilderness Act of 1964 states that agencies “. . . 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.” Section 4(c) provides clear direction about human imprints upon wilderness, that is, they should be substantially unnoticeable, and activities exclude mechanical and motorized equipment. Although this section does offer room for exceptions, such as the use of a helicopter in an emergency situation, it directly mandates that wilderness be managed in a way that excludes such human influences. This would include noise pollution and management of human-created soundscape.

**Federal Noise Control Act.** The Federal Noise Control Act directs that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.

### **ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS**

Sound levels in the park were assessed through consultation with Everglades National Park staff. Alternatives were evaluated based on estimated current sound levels and information gathered from current literature reviews.

Sound is measured in terms of amplitude and frequency. Amplitude is the relative strength of a sound wave and is described in decibels (dB). Amplitude is related to what we commonly call loudness or volume. “Frequency” is related to the pitch of a sound. It is defined as the number of times per second that the wave of sound repeats itself and is expressed in terms of hertz (Hz). Sound levels are often adjusted (“weighted”) to match the hearing abilities of a given animal. Humans with normal hearing can hear sounds between 20 Hz and 20,000 Hz, and as low as 0 dB at 1,000 Hz (NPS 2007a). The U.S. Department of Interior has published comparisons of natural and human-induced sound levels in an EIS in Broward County, Florida. They range from near permanent hearing damage from large caliber rifles at 140 to 160 dB, to very loud near heavy equipment and garbage trucks at 80 to 100 dB, to various types of RV generators at 66 to 71 dB, to a quiet house at midnight or leaves rustling at 20 dB (DOI n.d.). Sound levels above 90 dB at close range are considered intolerable for conducting human conversation. Average sound levels in a typical suburban area range from 50 to 60 dB. These levels do not take into consideration the attenuation (flattening, muffling, or blocking) of sound waves by vegetation.

Sound levels in national parks can be very low. For example, in Grand Canyon National Park along some remote trails, minimum sound levels measure between 10 and 20 dBA. In Big Thicket National Preserve, noise levels were measured in the 35-41 dB range on trails within 1-3 miles of parking/picnic areas (NPS 2005). In contrast, sound levels in a typical suburban area are between 50 and 60 dBA. An increase of 10 dBA represents a perceived (to human hearing) doubling of sound pressure level; that means 50 dBA would be perceived as 16 times louder than 10 dBA (NPS 2007a).

Thresholds for impacts to wildlife vary as to species. The threshold tends to be the point the noise levels become an environmental stressor.

Thresholds of impact are defined as:

- Negligible:* Effects would not be perceptible in the park unit.
- Minor:* Effects would result in a detectable change in noise levels in localized areas.
- Moderate:* Effects would result in a readily detectable, widespread change in noise levels. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
- Major:* Effects would result in a change in noise would be readily apparent and be substantial. The changes would be noticeable to park staff and visitors and be markedly different from existing noise levels. Mitigation measures would be necessary to offset adverse effects, and their success could not be guaranteed.

*Analysis area:* The area of analysis for soundscapes is the expanded area of analysis, including the areas beyond Flamingo that boats and visitors originating in Flamingo can access.

### **IMPACTS OF ALTERNATIVE A – NO ACTION ON THE SOUNDSCAPE**

**Analysis.** Implementation of alternative A would not impact the soundscape in the immediate Flamingo area measurably above the current conditions except during the construction of the hurricane-damaged facilities. Visitor and staff activities would remain essentially as they are, with some reinstatement of boat tours and rental services. Tent camping, public restrooms, showers and gathering areas would create noise levels similar to what they are now; the marina store and other facilities would have approximately the same impacts as current conditions. Resumption of limited outfitter services, additional boat tours, and provision of the two new chickees in proximity to Rankin and Johnson Keys would contribute to increased ambient noise above current levels in the adjacent bay and backcountry.

Demolition, construction, and reclamation activities at Flamingo would involve multiple pieces of heavy equipment for grading and fill removal. Best management practices (BMPs) for noise, such as using mufflers on heavy equipment and noise-muffling construction materials, would be implemented at Flamingo, resulting in short-term minor impacts to soundscapes. Reconstruction of the amphitheater, replacement of the housing and maintenance facilities, and demolition and grading of the old lodge and cottage sites would result in short-term minor impacts in the vicinity of these actions. Assuming that heavy equipment operates at 80 to 90 dB, and that sound levels decrease approximately 6 dB with the doubling of distance (Harmon 2006), it can be estimated that natural attenuation would decrease the noise from these activities to no greater than 32 to 42 dB at a distance of about 1,500 feet from the work area; noise would continue to dissipate with increased distances from the area. In addition, not all of the facilities would be completed at the same time, so impacts would be localized and would not be continuous or occur during evening hours. After construction and restoration, vegetation would help muffle sounds in the localized developed areas.

Visitor use, including use of generators, vehicles, and boats, would also contribute to long-term (although very seasonal) noise in the Flamingo area. Assuming the average noise level in Flamingo during the busy season is similar to that of a typical suburban area—50 to 60 dB—and that sound levels decrease approximately 6 dB with the doubling of distance (Harmon 2006), noise from visitor use would be no greater than 2 to 12 dB at about 1,500 feet from the edge of the Flamingo developed area.. Noise from an outboard boat engine could reach 100 dB, and diesel engine noise can approach 130 dB (Quiet Solution 2004; Pacific Fishing 2002), boat noise would likewise dissipate with distance from the source (decrease of 6 dB for each doubling of distance), with additional muffling provided by intervening vegetation. The impact from this source would vary greatly, depending on type and size of engine, distance from the source, and intervening landscape.

At the location of the new chickees, background noise levels would be very low, with no non-natural sources of ambient noise. Construction of the pilings and platforms would require the use of pile drivers and hand-operated power tools such as saws and drills. Construction would require about four days to install the pilings and one to four months to complete all work. Impacts to soundscapes from construction would be short-term and minor, and last only for the duration of construction. Use of the chickees would include long-term but intermittent noise from visitors and their boats, although most would be backcountry campers who would be interested in maintaining the natural quiet around them. Use of the chickees is expected to result in short-term but continuing negligible to minor adverse and very localized impacts.

**Cumulative Effects.** Park maintenance and minor construction actions, such as resurfacing of the roads and parking facilities, trails maintenance, replacement of underground storage tanks, and landscaping would cause short-term minor adverse impacts because of mechanized and heavy equipment noise. Additional visitors would be expected if other RV campgrounds in the region remain closed. Cumulatively, these reasonably foreseeable actions, in combination with the no action alternative, would have short-term and long-term minor adverse impacts on soundscapes at Flamingo if BMPs for noise mitigation are followed.

**Conclusion.** Alternative A would have primarily long-term negligible to minor adverse impacts on soundscapes in the area of analysis, with short-term minor impacts during construction and demolition of facilities, plus grading and fill removal of unused or restored areas.

Alternative A would not produce major adverse impacts on soundscapes whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of soundscapes as a result of the implementation of alternative A.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON THE SOUNDSCAPE**

**Analysis.** Under alternative B, use of modernized overnight accommodations and other visitor use, including use of generators, vehicles, and boats, would also contribute to long-term (although very seasonal) noise in the Flamingo area, similar to alternative A. These noises could intrude into the surrounding undeveloped areas. Public restrooms, showers and gathering areas would be augmented with stand-alone restrooms and a board game room, increasing the noise level in those areas. More active recreation, such as a swimming pool, would concentrate and increase noise levels in the developed area. Additional boat tours and a boat transfer service would add to the noise at the marina and in areas boats access. More livery and tour services would increase the number of visitors to the backcountry. Visitor use would result in long-term, but seasonal, minor adverse impacts to soundscapes.

There would be short-term minor noise impacts in the immediate Flamingo area from demolition, construction, and restoration, since more equipment would be involved with the rebuilding of the lodge and cottages and the grading of lands to be restored, in addition to the construction of the housing and maintenance facilities. Assuming that heavy equipment operates at 80 to 90 dB, and sound levels decrease approximately 6 dB with the doubling of distance (Harmon 2006), it can be estimated that natural attenuation would decrease the noise from these activities to no greater than 32 to 42 dB at the edge of a 1,500-foot distance from the developed areas. After construction and restoration, there would be long-term minor beneficial impacts from reclamation of the B and C Loops in the campground, especially for campers in the western end of the area. After restoration, vegetation would help muffle sounds in the localized developed areas.

Noise impacts at the location of the new chickees would be the same as alternative A (short-term and minor) for construction, and similar for use as well, although more visitors would access this area under alternative B with the increased number of visitors expected to visit backcountry area with their boats or with rentals. Use of the chickees would include long-term but intermittent noise from visitors and their boats, although most would be backcountry campers who would be interested in maintaining the natural quiet around them. Use of the chickees is expected to result in short-term but continuing negligible to minor adverse and localized impacts.

**Cumulative Effects.** Cumulative impacts would be similar to those described for alternative A, with the addition of higher visitation levels and associated noise, especially near the more developed areas and gathering spots. Cumulatively, the reasonably foreseeable projects, in combination with alternative B, would have short-term and long-term minor adverse impacts on soundscapes at Flamingo if BMPs for noise mitigation are followed.

**Conclusion.** Alternative B would have primarily long-term but seasonal minor adverse impacts on soundscapes in the area of analysis, with short-term minor impacts during construction and demolition of facilities, plus grading and fill removal of unused or restored areas. There would be long-term minor beneficial impacts from the restoration of the campground areas.

Alternative B would not produce major adverse impacts on soundscapes whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of soundscapes as a result of the implementation of alternative B.

#### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON THE SOUNDSCAPE**

**Analysis.** Under alternative C, use of overnight accommodations and other visitor use, including vehicles and boats, would contribute to long-term (although very seasonal) noise in the Flamingo area, similar to alternative B. These noises could intrude into the surrounding undeveloped areas. Under alternative C, additional overnight accommodations, such as the addition of the ecotents, would contribute to the noise levels of the developed area and over a larger portion of the area compared to alternative B. Public restrooms, showers, and gathering areas would be augmented with stand-alone restrooms, semi-permanent bath houses, and indoor meeting spaces; and a board game room would increase the noise levels in those areas. Additional boat tours and a boat transfer service would add to the noise at the marina and in backcountry areas that these boats access. However, some uses would be geared to more primitive experiences, like the ecotents and chickees. In addition, other features of this alternative, like the internal shuttle bus and the “Yellow Bike” system, would serve to decrease noise of individual vehicles. RVs would be located in an area closer to the main areas of activity, and electric hookups would be provided, eliminating generator noise. Although noise levels in and around the Flamingo area and adjacent waterways may increase with the additional visitors expected, this would be offset by other features under alternative C that would serve to decrease noise. Overall, visitor use would result in long-term, but mostly seasonal, minor adverse impacts to soundscapes.

Similar to alternative B, there would be short-term minor noise impacts from demolition, construction, and restoration. There would be more construction activity and related noise under this alternative, given the additional facilities and reclamation proposed, but this would occur over an extended period of time (not all at one time). After construction and restoration, there would be long-term minor to moderate beneficial impacts from reclamation of the campground area and the Eco Pond area, especially for campers in the western end of the area that would be focused on a more primitive visitor experience. After restoration, vegetation would help muffle sounds in the localized developed areas.

Noise impacts at the location of the new chickees would be the same as alternative B (short-term and minor) for construction, and similar for use as well, although more visitors would access these areas under alternative C with the increased number of visitors expected to visit backcountry areas. Use of the chickees would include long-term but intermittent noise from visitors and their boats, although most would be backcountry campers who would be interested in maintaining the natural quiet around them. Use of the chickees is expected to result in short-term but continuing negligible to minor adverse and localized impacts.

**Cumulative Effects.** Cumulative impacts would be very similar to alternative B, with more contribution to noise from the increased use at Flamingo and more benefits due to the added buffering provided by the restored areas and other noise-reducing features. Cumulatively, reasonably foreseeable projects, in combination with alternative C, would have short-term and long-term negligible to minor adverse impacts on soundscapes at Flamingo if BMPs for noise mitigation are followed.

**Conclusion.** Alternative C would have primarily long-term but seasonal minor adverse impacts on soundscapes in the area of analysis, with short-term minor impacts during construction and demolition of facilities, plus grading and fill removal of unused or restored areas. There would be long-term minor to moderate beneficial impacts from the restoration of the campground areas and Eco Pond area.

Alternative C would not produce major adverse impacts on soundscapes whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of soundscapes as a result of the implementation of alternative C.

## WATER RESOURCES

### AFFECTED ENVIRONMENT

#### WATER QUALITY

The Flamingo study area is at the southernmost end of the “river of grass” that makes up the Everglades ecosystem. It is located between the outlets of two major watersheds of the park: Shark River Slough and Taylor Slough. Shark River Slough flows from its origin in the northeast portion of the park and empties into the Gulf of Mexico to the west of Flamingo, while Taylor Slough drains a smaller watershed along the eastern portion of the park and flows into northeastern Florida Bay (NPS 2003). The developed area at Flamingo is at or near elevations ranging from 4 to 7 feet above sea level and, given its location in relation to the sloughs, is not subject to the overland flow that defines the park’s regional water system. The area has largely been filled to accommodate the existing development, and this has interfered with the natural water flow and hydrological regime of the project area (NPS 2003).

Surface waters located in or adjacent to Flamingo include Florida Bay, which borders the Flamingo area to the south; Buttonwood Canal, which connects Florida Bay and the Flamingo marina area to Whitewater Bay to the north; and Eco Pond, a 10 acre artificial pond that was originally constructed to discharge treated wastewater effluent into the groundwater via percolation (see Figure 3-1). Given the surface elevation at Flamingo and the nature of the Everglades hydrology, these surface waters are intrinsically connected to groundwater, which lies in unconfined aquifers just below the surface. Water availability in the park is very seasonal, which creates an interplay between the surface and ground waters. During the summer rainy season, increased precipitation recharges aquifers near the surface, while during drier winter months, the near surface aquifers provide water to the surface water bodies (NPS 2006).

Surface waters in and around Flamingo are classified by the state as Outstanding Florida Waters (OFW), as are all waters within Everglades National Park. An OFW is a waterbody designated worthy of special protection because of its natural attributes, and the designation is intended to protect existing good water quality (Florida DEP 2007a). Because surface waters of the Flamingo area are of high quality, they are particularly susceptible to degradation. External sources of pollution include nutrients and contaminants contained in surface runoff and groundwater flows from the north, and nonpoint pollution from the developed area of the park. Currently, no stormwater management facilities are in place within the Flamingo area, allowing run off from boat ramps, fueling facilities, housing and landscaped areas, and parking lots to enter the surrounding surface waters without treatment. Other potential pollutant sources include dredging activities that are required for boat tours. In the past, maintenance dredging has occurred around the boat ramps at Flamingo as a result of impacts from hurricanes and other storm events. These instances are rare and not likely to occur on a regular basis in the future. Current recreational provisions at Flamingo include an area at the marina for boats to get fuel. Spill control kits are available to address potential



*Figure 3-1 – Eco Pond Observation Area, Post-Hurricane*

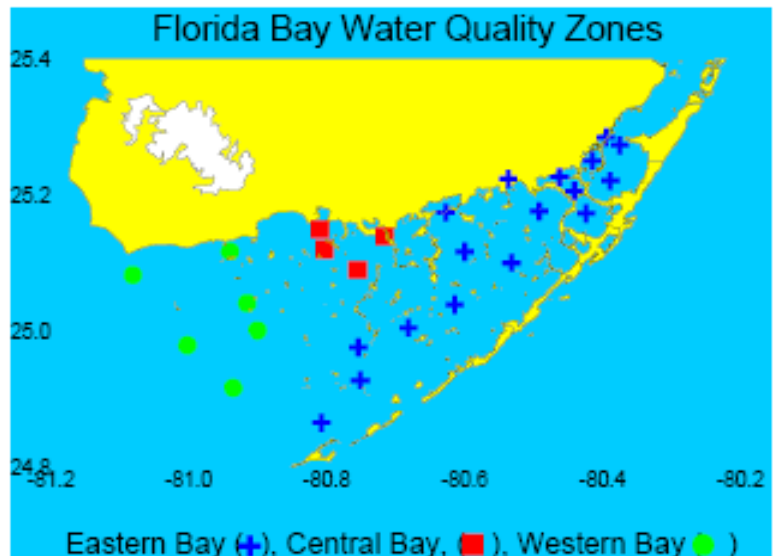
impacts to water quality. However, boat use at the site creates opportunities for an oil or gas release that impacts water quality.

Water quality monitoring data for certain parameters are available for the western portion of Florida Bay, Whitewater Bay, and Eco Pond. Whitewater Bay and Florida Bay are part of the Southeast Environmental Research Center (SERC) water quality monitoring network, which was established to address regional water quality concerns. This monitoring program, which is managed out of Florida International University (FIU), was initiated in response to public perception that the Everglades ecosystem is in danger. In the case of Florida Bay, the major impetus was the combination of seagrass die-off, increased phytoplankton abundance, sponge mortality, and a perceived decline in fisheries beginning in 1987. In response to these issues, a network of water quality monitoring stations was established in 1989 (see Figure 3-2). Several stations are located in Florida Bay and in the Whitewater Bay areas that can be accessed by boats originating from Flamingo. For this Plan/EA, focus is placed on data available for the western portion of Florida Bay adjacent to the study area, and Whitewater Bay, which is accessible along the Wilderness Waterway.

All Florida Bay stations are sampled monthly for nutrients (nitrogen and phosphorus), chlorophyll-a (an indicator of phytoplankton biomass), and various field parameters such as salinity, dissolved oxygen, temperature, and turbidity. Analyses of Florida Bay water quality have shown that the bay can be delineated into three groups of stations with similarities in water quality, or zones of similar influence. The Western Florida Bay zone, which lies south of the Flamingo area, is most influenced by the Gulf of Mexico tides and is isolated from direct overland freshwater sources (see Figure 3-3).



**Figure 3-2 – Fixed station locations for the SFWMD funded portion of the South Florida Coastal Water Quality Monitoring Network (Source: SERC 2005)**



**Figure 3-3 – Zones of Similar Water Quality in Florida Bay (Source: SERC 2005)**

The SERC monitoring program has produced a series of reports, with annual summaries. According to the latest comprehensive report available (SERC 2005), turbidity (cloudiness) has increased dramatically in both Western and Central Florida Bay since monitoring began in 1991. In general, the Eastern Bay has

the clearest water, and the turbidity in the Western Bay may be related to the loss of seagrass cover over the years, which may have destabilized the bottom so that it is more easily disturbed by winds. Regarding nutrients, total phosphorus concentrations have declined baywide over the 14 year period of record, although there have been recent significant peaks during the fall in both the Eastern and Western Bays. The Western Bay is lowest in dissolved inorganic nitrogen of all three zones, and phytoplankton in the Western Bay may be more limited by nitrogen than by phosphorus. A 2003 report also notes that the algal blooms in the Western Bay are mainly limited by nitrogen, either singly or in combination with phosphorus and/or silica (Florida Bay Science Program 2003).

Whitewater Bay is a semi-enclosed body of water with a relatively long residence time, which receives overland freshwater flow from the Everglades marsh. The long residence time may explain the low phosphorus concentrations seen (due to biological uptake), while the high evaporation rate concentrates dissolved organic matter (SERC 2006).

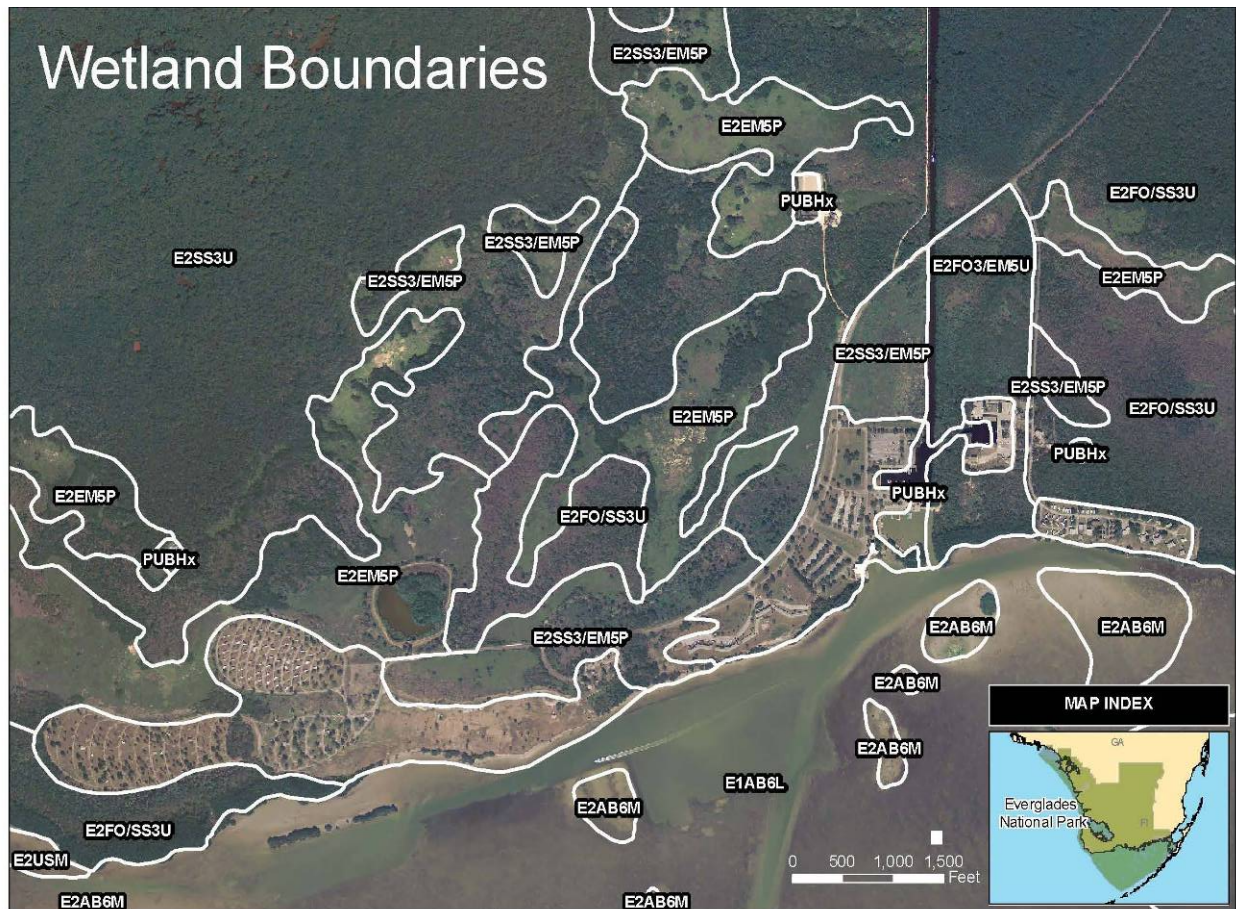
Eco Pond and its water quality are discussed in detail in the 2003 EA prepared for the Flamingo wastewater treatment improvements (NPS 2003). Eco Pond is no longer connected to the Flamingo wastewater treatment plant, which treats the wastewater generated by the users of Flamingo (90,000 gallons per day permitted by the State of Florida). Therefore, its hydrology mirrors the wet/dry season pattern of the Everglades and the presence or absence of water in the pond is rainfall-driven.

## WETLANDS

The majority of the land surrounding the Flamingo developed area is classified as wetland habitat, an integral component of the Everglades National Park landscape. The developed area itself is located on previously excavated and filled lands. Figure 3-4 shows the wetland classification of the Flamingo study area, based on NWI survey data (USFWS 2007). Wetlands closest to the developed area are all “E2” or estuarine intertidal wetlands. The “SS3” wetlands are broad-leaved evergreen scrub-shrub wetlands, consisting mainly of mangrove vegetation that has had stunted growth due to the effect of hurricanes. The “EM” wetlands consist of emergent coastal prairie and salt marsh vegetation such as saltwort and other salt-tolerant plants and marsh grasses, primarily *Spartina* species. The “Vegetation” discussion under the “Wildlife and Wildlife Habitat” Affected Environment describes these community types in more detail.

The “FO3” wetland type shown north of the marina area is broad-leaved evergreen forested wetland, typically taller mangroves that have been protected from direct hurricane and wind action. Within the study area, the marina area is classified as “PUBHx”, an excavated permanently flooded palustrine wetland with an unconsolidated bottom. The adjacent Florida Bay, including the subtidal areas near Johnson and Rankin Keys where the chickees would be constructed under any alternative, are classified as an estuarine subtidal wetland, with an aquatic bed of unknown surface characteristics. This is the bay bottom, which consists of interspersed areas of marine sediments and seagrass vegetation.

Wetlands are extremely important habitats and support a wide variety of wildlife, as discussed in the sections on “Wildlife and Wildlife Habitat” and “Species of Special Concern/ Endangered and Threatened Species.” As noted in the regulatory summary, NPS must protect wetlands from adverse impacts whenever possible (DO 77-1) and must minimize adverse effects if impacts cannot be avoided.



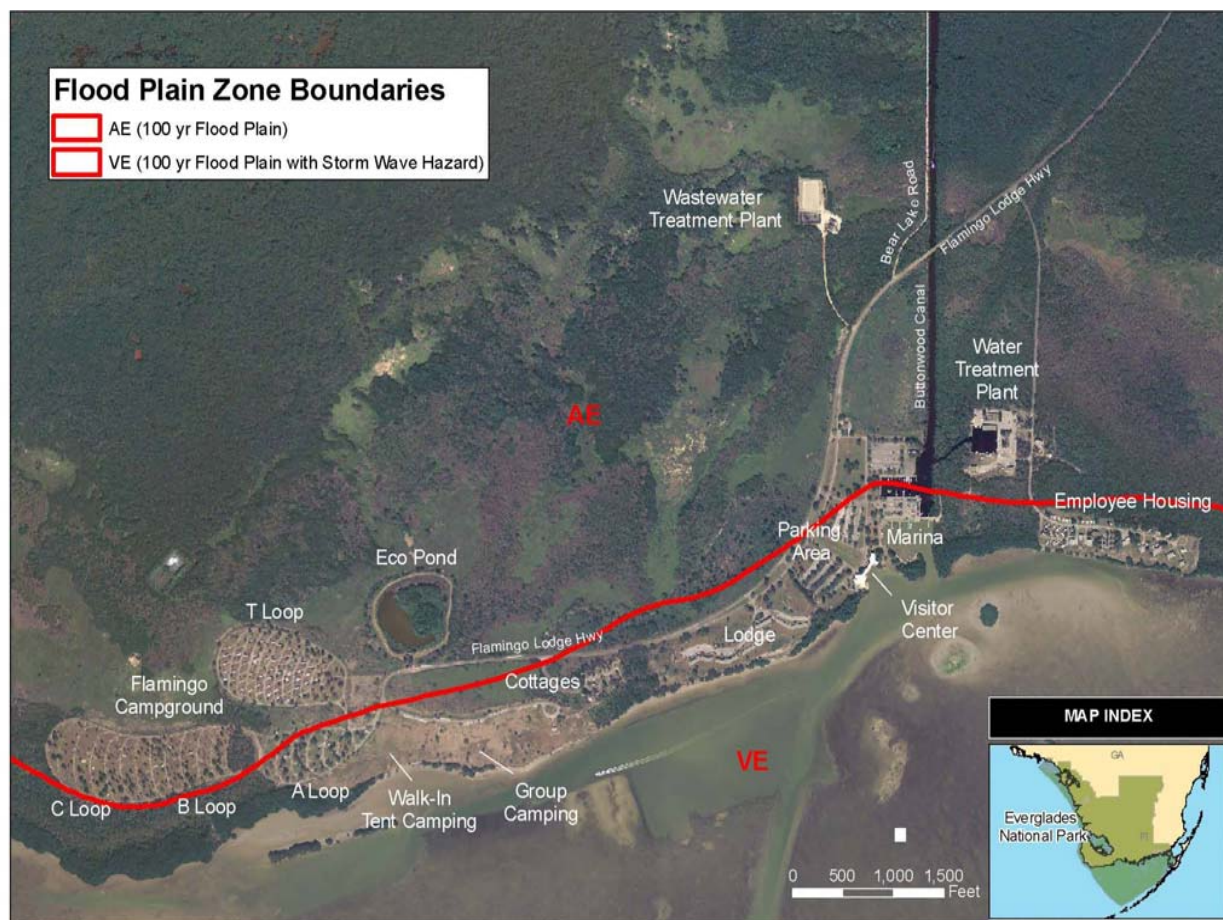
*Figure 3-4 – Wetland Classification of the Flamingo Study Area*

## FLOODPLAINS

The entire Flamingo area lies at an elevation of less than 10 feet above sea level and is relatively flat. As can be seen on Figure 3-5, FEMA's Flood Rate Insurance Map No. 12087C0675K (FEMA 2006; dated 2/18/05), the entire area is located within the 100-year floodplain and considered a high hazard zone. The A Loop, walk-in and group camping areas, former lodge and cottage sites, marina, visitor center, parking, and employee housing are in the "VE" zone of the 100-year floodplain, which means this area is also subject to storm wave action. The remainder of the study area (which includes the B, C, and T Loops, Eco Pond, the water treatment plant, and maintenance facilities) is in the "AE" 100-year floodplain zone. Facilities located in both these high hazard zones are required to meet the Monroe County floodplain management standards as well as the State of Florida Building Codes.

As seen by past hurricanes and other storm events, any buildings or other facilities located in this floodplain area have a high potential to be impacted by flood waters. The current disrepair of the buildings at Flamingo is a direct result of hurricanes Wilma and Katrina in 2005. These storm events resulted in the loss of use of structures and the creation of flood debris, which can contain contaminants and must be cleaned up so as not to continue to present hazards or eyesores. Although the NPS is under executive order and policy to reduce or eliminate development in the floodplain, in the Flamingo area it is not possible because the entire area falls within the 100-year floodplain. Therefore, the redevelopment of Flamingo must occur within the floodplain, but the extent of development, placement of structures, and types of structures can be selected to minimize impacts.

The Statement of Findings for Executive Order 11988 "Floodplain Management" is attached as Appendix C of this document.



**Figure 3-5 – FEMA's Flood Rate Insurance Map No. 12087c0675k** (Fema 2006; Dated 2/18/05)

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

The primary regulation relevant to this section is the Clean Water Act. The objective of this act is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” The act supports establishment and enforcement of water quality standards, which can be set by states with delegated authority.

Florida has this authority, and has delegated all waters of Everglades National Park as OFWs. Section 403.061 (27), Florida Statutes, grants the Florida Department of Environmental Protection power to: “Establish rules which provide for a special category of water bodies within the state, to be referred as “Outstanding Florida Waters,” which shall be worthy of special protection because of their natural attributes.” The state has an anti-degradation standard for such waters.

Florida’s surface water standards are found in Section 62-302 of the Florida Administrative Code (Florida DEP 2007b). These include the anti-degradation standard mentioned above as well as minimum criteria related to the presence of debris, oils, scum, color, odor, taste, and turbidity. Section 62-302.700 addresses the special protection afforded OFW.

As described in the Purpose and Need chapter, two federal executive orders, EO 11990 (Protection of Wetlands) and EO 11988 (Floodplain Management) direct federal agencies to avoid adverse impacts to floodplains and wetlands. Director’s Order #77-1 establishes policies, requirements, and standards for

implementing Executive Order 11990, while Director's Order #77-2 applies to all NPS proposed actions, including the direct and indirect support of floodplain development that could adversely affect the natural resources and functions of floodplains, including coastal floodplains, or increase flood risks. This order states that when it is not practicable to locate or relocate development or inappropriate human activities to a site outside and not affecting the floodplain, the NPS will prepare and approve a SOF, in accordance with procedures described in Procedural Manual #77-2: Floodplain Management, and take all reasonable actions to minimize the impact to the natural resources of floodplains. Due to the study area location within a floodplain, the NPS prepared an SOF in accordance with procedures described in Procedural Manual #77-2 (Appendix C).

If adverse impacts to wetlands would occur from a proposed project, a Statement of Findings is prepared, unless the actions are accepted for various reasons provided in Procedural Manual 77-1, section 4.2(A). These include actions designed for restoring wetlands and water dependent actions that have minor impacts. As described more fully below in the analysis, the rebuilding or redesigning of Flamingo's commercial services under any alternative would stay within the developed area and affect only previously disturbed or filled areas, thereby avoiding impacts to wetlands. Indirect impacts may include minor effects from use of boats in shallow areas and at launch sites; however, these are related to water dependent use and would generally result in negligible to minor and very localized effects. The chickees would be located below low low tide, out of the intertidal area, and no construction would occur on nearby islands. The restoration proposed for wetlands that had been previously filled for development would not include any new disturbance of wetlands, and it is expected that any area that would be restored to original grade would likely revert to wetland and develop an initial vegetation cover within about one year (Zimmerman, pers. comm., 2007). For these reasons, a Statement of Findings for wetlands was not required for this project.

NPS *Management Policies 2006* specifically address water quality, wetlands, and floodplains in Sections 4.6.3, 4.6.4, and 4.6.5, respectively. The policies state that NPS will "take all necessary actions to maintain or restore the quality of surface waters and ground waters within parks consistent with the Clean Water Act and all other applicable and federal, state, and local laws and regulations" and provide similar protective provisions for wetlands and floodplains that reiterate the language in the Director's Orders discussed above (NPS 2006b).

## **ASSUMPTIONS, METHODOLOGY AND IMPACT THRESHOLDS**

Information from the SERC water quality monitoring network, maps showing water resources (including NWI wetland maps and FEMA floodplain maps) within the Flamingo area, summaries from other studies completed in the Flamingo area, and communications with NPS staff were used to identify baseline conditions for the analysis.

In general, it was assumed that there would be impacts to water resources that occur from the construction/demolition phase of the alternatives, as well as post-construction use of the area by visitors and park employees. The primary steps taken in assessing impacts on water resources included determining what the likely pollutants might be from construction activities and subsequent use of the area; and whether or not any planned use, construction, or associated pollutants would directly or indirectly affect water quality, wetlands, floodplains, or marine and estuarine resources over either a short or long term period, and over what area this would occur. Mitigation measures considered in this analysis are listed in Chapter 2 and are mentioned in the analysis where appropriate.

The thresholds for the intensity of an impact are defined for the different water resources topics as follows:

**WATER QUALITY**

- Negligible:* Chemical, physical or biological effects would not be detectable, and parameters would be well below water quality standards or criteria for the designated use of the water and within historical or desired water quality conditions.
- Minor:* Chemical, physical or biological effects would be detectable, but parameters would be well below water quality standards or criteria and within historical or desired water quality conditions.
- Moderate:* Chemical, physical or biological effects would be detectable, but parameters would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions may be altered on a limited time and space basis.
- Major:* Chemical, physical or biological effects would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria may be exceeded.
- Analysis area:* The area of analysis for water quality is the expanded area of analysis, including the areas beyond Flamingo that boats and visitors originating in Flamingo can access.

**WETLANDS**

The impact thresholds for wetlands are based on the wetlands acreage permanently filled or restored, and the size, integrity, and connectivity of the wetlands affected. These indicators are defined as follows:

- **Size** – The severity of impacts to wetlands depends on the size of the wetland impacted. A small area of impact in a large wetland would be likely to have less of an effect than a large area of impact in a small wetland. The change in size of a wetland, as a result of an impact, would also influence the integrity and connectivity of the wetland and vice versa.
- **Integrity** – Highly intact wetland areas with little prior disturbance would be more susceptible to impacts from direct development than a wetland previously degraded by development or other activities. The loss of function and productivity of the higher quality wetland would be a greater loss than that of a lower quality wetland. Additionally, indirect impacts due to human trampling or a change in vegetation or hydrology would also impact the integrity of the wetland.
- **Connectivity** – The relationship of wetlands to other wetlands or other valuable natural resources is also important in determining the degree of impact. Plant communities that are isolated from each other are less productive and functional than those that are connected. Narrow, previous trail corridors that are infrequently or seasonally used would have less fragmenting effect than would a wide hard-surface roadway with high volumes of vehicular or pedestrian traffic. Establishment of buildings or other structures in wetlands areas would also create barriers to the natural dispersal of plants and animals and impact the connectivity of wetlands.

- Negligible:* No measurable or perceptible effects on size, integrity or connectivity of wetlands would occur. No U.S. Army Corps of Engineers 404 permit would be necessary.
- Minor:* The effect on wetlands would be measurable or perceptible, but small in terms of area and the nature of the impact. A small effect on size, integrity, or connectivity would occur; however, the overall viability would not be affected. If left alone, an adversely affected wetland would recover, and the impact would be reversed. A U.S. Army Corps of Engineers 404 permit would not be required.
- Moderate:* The impact would be sufficient to cause a measurable effect on one of the three parameters (size, integrity, connectivity) or would result in a permanent loss or gain in

wetland acreage, but not to large areas. Wetland functions would not be affected in the long-term. A U.S. Army Corps of Engineers 404 permit could be required.

*Major:* The impact would result in a measurable effect on all three parameters (size, integrity, connectivity) or a permanent loss or gain of large wetland areas. The impact would be substantial and highly noticeable. The character of the wetland would be changed so that the functions typically provided by the wetland would be substantially altered. A U.S. Army Corps of Engineers 404 permit would be required.

*Analysis area:* The area of analysis for wetlands is the expanded area of analysis, including wetlands bordering the water courses that can be accessed by visitors originating their trip in Flamingo.

## **FLOODPLAINS**

*Negligible:* Floodplains would not be affected; effects would either be non-detectable, or, if detected, would be considered slight, local, and would likely be short-term. A U.S. Army Corps of Engineers 404 permit would not be necessary.

*Minor:* Effects on floodplains would be measurable, although the effects would likely be small, short-term, and localized. No mitigation measures associated with water quality or hydrology would be necessary. A U.S. Army Corps of Engineers 404 permit would not be necessary.

*Moderate:* Effects on floodplains would be measurable and long-term but would be relatively localized. Mitigation could be required and if implemented, would likely be successful. A U.S. Army Corps of Engineers 404 permit could be required.

*Major:* Effects on floodplains would be readily measurable, would have substantial consequences, and would be observable over a relatively large area and likely long-term. The character of the floodplain would be changed so that the functions typically provided by the floodplain would be substantially changed. Mitigation would be required and its success could not be assured. A U.S. Army Corps of Engineers 404 permit would be required.

*Analysis area:* The focus of this analysis is the primary Flamingo area that could be directly affected by flooding; however, impacts related to flooding near Rankin or Johnson Keys in the expanded area of analysis are also addressed.

## **IMPACTS OF ALTERNATIVE A - NO ACTION ON WATER QUALITY**

**Analysis.** Impacts on water quality under the alternative A would result from the continued day use of the area and surrounding waters. This includes use by visitors (including boaters) and continued maintenance of the site by employees. The use of fuels in boat motors (minimal releases from the engines during operation), and spills of oils or gas that can occur during fueling would introduce small quantities of oil and gas components into the surface waters in and surrounding the Flamingo area, including Florida Bay out to the proposed chickee locations, west out toward Cape Sable, and north to Whitewater Bay. In most locations, any emissions would be diluted by the volume of water and water movements and would not be expected to cause more than short-term, localized, minor impacts on water quality. Boats must maintain no-wake speed in the vicinity of Flamingo, limiting the amount of engine discharge. In the marina area, there is the potential for less mixing and dilution and for localized concentration of pollutants during heavy boat use or in the case of spills. Also, the presence of underground fuel tanks at the marina has been a concern. However, these tanks are scheduled for replacement, and following that, the likelihood of any sizeable fuel spill would be negligible.

Visitors, concessioners, and maintenance workers use motorized vehicles, and these could release small amounts of oils and fuels onto the parking areas and grounds of the developed area, which could be carried by rains and runoff into surrounding surface and ground waters. In addition, use of pesticides (herbicides to control plant growth, especially exotics, and insecticides to control mosquitoes) could contribute to non-point pollution, since there is no site storm water management program under the no action alternative. However, BMPs would be implemented during application of these products, which would serve to mitigate adverse effects. These would include limiting the amounts used; use of only those products approved for application in and near water; allowing for adequate buffers between application sites and surface waters; and avoiding times when rainfall is expected. Overall, non-point pollution would continue to result in long-term, minor adverse impacts to Flamingo water quality.

Dredging activities may be required very infrequently to maintain boating channels for tour boats, and, maintenance dredging has occurred around the boat ramps at Flamingo as a result of impacts from hurricanes and other storm events. These instances are not likely to occur on a regular basis in the future, but any dredging that might be required would result in short-term, moderate adverse impacts to water quality.

In the primary study area, there is also the potential for any erosion and sedimentation during construction and demolition activities planned for the reconstruction of the amphitheater and trails, the removal of the lodge and cottages and associated fill material, and the construction of the new housing along the shoreline. The new lodging and maintenance facility would be impervious and contribute to site runoff in those areas, but the design for housing would use sustainable elements wherever possible, including porous paving for parking. Soils disturbed by earth moving activity, as well as petroleum spills from equipment, can contribute to turbidity (cloudiness) and pollution in surface waters, and construction and demolition would occur immediately adjacent to the Florida Bay shoreline. If severe, turbidity could reduce light penetration and visibility and adversely affect aquatic organisms. However, impacts would be minimized by use of pre- and post-construction erosion control BMPs, including the installation and inspection of silt fences, straw bale barriers, temporary earthen berms, sediment traps, or other equivalent measures; and the revegetation of disturbed areas. The use of spill prevention, control, and countermeasure procedures, as well as stormwater pollution prevention measures during construction or demolition, would reduce the potential for petroleum products from leaking equipment or vehicles to reach surface waters. Taking into consideration the impacts and the proposed mitigation measures, construction or demolition activities would have short-term, localized, minor, adverse impacts to water quality. Allowing the footprint of the lodges and cabins proposed for demolition to return to native conditions would restore approximately 27 acres of vegetation, reducing the amount of impervious surfaces that contribute to non-point pollution and increasing the amount of vegetated surface and soil available to filter sediments and pollutants in surface runoff. As a result, there would be long-term, localized (in the vicinity of the areas to be reclaimed), minor beneficial effects on water quality from this restoration.

Construction of the two chickees in the subtidal zone in proximity to Rankin and Johnson Keys would affect water quality in a very limited area and for a short time during construction, primarily from sediment disturbance during piling installation, which can increase turbidity, and from releases of hydrocarbons from internal combustion engines on barge/boats and equipment used in construction. Silt curtains would be used during installation of the pilings to minimize turbidity, and a no-wake zone would be imposed during construction of the chickees. Adverse impacts of construction would be short-term, very localized, and minor. Impacts relating to the use of the chickees would be limited to small amounts of hydrocarbon discharge from any motorized craft. The chickees would have a portable latrine that would be periodically maintained and emptied, so no sanitary waste would be discharged by chickee users.

**Cumulative Impacts.** Water quality in and around Flamingo has been affected in the past by development of the facilities, development and discharges from upper watershed areas, and continued use of the Flamingo area by visitors and boaters. Studies of Florida Bay show changes in water quality over

the year, including an increase in turbidity in Western Florida Bay. Past, current, and future expected non-point runoff, emissions from fueling and boating, and occasional dredging all contribute minor adverse impacts to water quality. Removal of underground storage tanks at the marina is planned in the near future; this would remove a potential source of contamination near the marina, a beneficial effect. Future planned construction, such as resurfacing of the roads and parking facilities, would contribute to short-term, minor adverse impacts during the time of construction due to the potential for runoff of sediments and possibly equipment oils or fuels if spilled or leaked. The addition of the Flamingo Wastewater Treatment Plant has provided a long-term benefit to local water quality. The impacts of the no action alternative, added to the adverse and beneficial effects from other past, present, and reasonably foreseeable actions, would result in long-term, minor adverse cumulative impacts to water quality.

**Conclusion.** Construction and demolition activities under the no action alternative would have short-term, localized, minor adverse impacts on water quality. Long-term, negligible to minor adverse impacts would result from on-going visitor use, including the use of outboard engines on boats in and around the waterways of Flamingo. There would also be long-term, minor, beneficial effects from the restoration of the shoreline area along Florida Bay.

Alternative A would not produce major adverse impacts on water resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of water quality as a result of the implementation of alternative A.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON WATER QUALITY**

**Analysis.** In the vicinity of the lodge and cabins, adverse impacts relating to demolition and construction would be the same as under alternative A (short-term, minor adverse effects), although of slightly longer duration with this additional construction. Site restoration would be more extensive than under alternative A, since the B and C Loops would be restored. A total of 50 acres would be replaced over time with more natural and more heavily vegetated cover, which would serve to indirectly improve water quality by filtering water and decreasing surface runoff, a long-term, minor to moderate beneficial impact.

Continued use of Flamingo by visitors and park staff would contribute similar impacts as described for alternative A, but there would be more visitors and therefore increased boat use, more motorized vehicles using the roads and parking, and RV use, resulting in more sources for non-point runoff of oils and fuels. With the addition of the boat transfer service, boaters would be able to access both Whitewater and Florida Bays from Flamingo without having to remove their boat from the water. Dredging in the Florida Bay basin may occur, and there may be a need to dredge more often to accommodate increased boating use. Also the lodge, cottage, and recreational areas would be maintained using minimal amounts of herbicides and pesticides, and gas-powered mowers. Overall, the amount of any pollutants reaching area waters would not be expected to be large or to exceed standards, and adverse impacts related to visitor use would be long-term and minor.

The new lodge and cottages would be impervious and contribute to site runoff in those areas, but the design would use sustainable elements wherever possible, including porous pavement for parking and reduced configuration of buildings, as well as stormwater collection features. This would reduce surface runoff into Florida Bay, limiting long-term adverse impacts to negligible to minor levels. The increase in visitation would result in increased volumes of wastewater generated. However, the amounts would be limited by the use of water-saving devices in the new lodge and cottages (low flush toilets, low flow showers, automatic cut off sinks), and total volume would not exceed the permitted daily amount of effluent, so that impacts from its discharge would be long-term, negligible to minor, and adverse.

Impacts related to the two new chickees in Florida Bay would be the same for the construction phase, with slightly more visitation expected under alternative B and slightly more impacts to water quality from discharges of boats in that area.

**Cumulative Impacts.** Cumulative impacts under alternative B would be very similar to those described for alternative A, except with more long-term benefits arising from the restoration of a larger area that would help to filter runoff to surface and ground waters. Continued use of the Flamingo area by visitors and boaters would include emissions from fueling and boating, and very infrequent dredging, which would be expected to contribute more non-point pollution since visitation would be higher under alternative B. The impacts of alternative B, added to the adverse and beneficial effects from other past, present and reasonably foreseeable actions, would result in long-term, minor adverse cumulative impacts to water quality.

**Conclusion.** Construction and demolition activities under alternative B would have short-term, localized, minor adverse impacts on water quality. Increases in visitation are expected as a result of the new facilities and services provided, which would have long-term, minor adverse impacts throughout the Flamingo area. There would also be long-term, minor to moderate, beneficial effects from the reduction in the footprint and restoration of previously disturbed areas.

Alternative B would not produce major adverse impacts on water resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of water quality as a result of the implementation of alternative B.

#### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON WATER QUALITY**

**Analysis.** As with alternative B, this alternative would involve construction of a variety of new facilities, in addition to reopening trails and rebuilding the amphitheater, lodging, and maintenance facility. The impacts during demolition and construction discussed under the previous two alternatives would also occur under alternative C. However, the same mitigation measures would be applied under alternative C, and stormwater management would be in place at all times during these activities. Therefore, although impacts are likely to occur over a longer period of time and a greater area, impacts of alternative C on water quality related to demolition and construction would be short-term (for the duration of each construction activity), minor, and adverse.

Under alternative C, site restoration would be more extensive than under alternatives A or B. The B, C, and T Loops of the campground would be restored, which would return a large contiguous area to natural conditions, creating a substantial buffer along the shoreline. The removal of the road around the north side of the wetland south of Eco Pond would allow better flow of water between the pond and this area, restoring the natural hydrology. Eco Pond itself would be filled and restored to coastal prairie, so it would not continue to exist as a surface waterbody. A total of about 87 acres would be replaced over time with more natural and more heavily vegetated cover, which would serve to indirectly improve water quality by filtering water and decreasing surface runoff, a long-term moderate beneficial impact

Although camping and RV sites would be scaled back under this alternative as compared to alternative A, visitor use levels in the Flamingo area and extending into surrounding waters would likely increase over the no action alternative given the increase in other facilities and level of services that would be available. With the addition of the boat transfer service, boaters would be able to access both Whitewater and Florida Bays from Flamingo without having to remove their boat from the water. More visitors in the area and operation of the new visitor facilities would result in slightly more use of water and more areas of non-point runoff, and creation of discharges to water quality, as discussed for alternative B. However, the mitigation measures identified in alternative A (no action) would be implemented, and the facilities would include water-saving devices to offset some of the impacts. As a result, visitor use-related activities,

including operation of the new facilities, would have long-term, minor, adverse effects on water quality in the Flamingo area.

Similar to alternative B, the new facilities (lodge, cottage, ecotents) would contribute to site runoff but the design would use sustainable elements wherever possible, including porous pavement for parking and a smaller developed footprint, as well as stormwater and rainwater collection features. New structures would be raised to protect them against the forces of hurricanes, which would help reduce the surface area permanently covered with buildings. This would reduce surface runoff into Florida Bay, limiting long-term adverse impacts to minor levels. The increase in visitation would result in increased volumes of wastewater generated. However, the amounts would be limited by the use of water saving devices in the new lodge and cottages (low flush toilets, low flow showers, automatic cut off sinks), and total volume would not exceed the permitted daily amount of effluent, so that impacts from its discharge would be long-term, negligible to minor, and adverse.

Impacts related to the new chickees in Florida Bay would be the same for the construction phase, with slightly more boat tours or visitation expected under alternative C and slightly more impacts to water quality from discharges of boats in that area.

**Cumulative Impacts.** Cumulative impacts under alternative C would be very similar to those described for alternative B, except with even more long-term benefits arising from the restoration of a larger area that would help to filter runoff to surface and ground waters and restore natural hydrology in the vicinity of Eco Pond and the previous access road. Continued use of the Flamingo area by a larger number of visitors and boaters would include emissions from fueling and boating, and occasional dredging, which would be expected to contribute more non-point pollution since visitation would be higher under alternative C. The impacts of alternative C (especially the substantial benefits it provides), added to the adverse and beneficial effects from other past, present, and reasonably foreseeable actions, would result in long-term, negligible to minor adverse cumulative impacts to water quality.

**Conclusion.** Construction and demolition activities under alternative C would have short-term, localized, minor adverse impacts on water quality. Increases in visitation are expected as a result of the new facilities and services provided, which could have long-term, minor adverse impacts throughout the Flamingo area. There would also be long-term, moderate, beneficial effects from the reduction in the footprint and restoration of previously disturbed areas.

Alternative C would not produce major adverse impacts on water resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of water quality as a result of the implementation of alternative C.

## IMPACTS OF ALTERNATIVE A - NO ACTION ON WETLANDS

**Analysis.** Under alternative A, all construction proposed for Flamingo would occur in previously disturbed areas. There would be no construction or demolition in any wetland areas, and therefore no direct adverse impacts on the emergent, scrub-shrub, or forested wetlands located in and around the developed area of Flamingo. The backcountry chickees would be constructed below the intertidal zone and would not directly affect any wetland areas on the nearby keys, only submerged sediments. Grading the old lodge and cabin areas and allowing this land to return to native conditions would result in the restoration of approximately 27 acres, most of which would be expected to revert to wetland, assuming the site is restored to historic elevation. The removal of any fill materials could also reduce the potential for exotics to become established. The NPS would also allow for the natural restoration of Eco Pond, which would result in the creation of coastal prairie habitat. As a result, there would be long-term, localized (in the vicinity of the areas to be reclaimed and Eco Pond), minor beneficial effects on wetlands under the no action alternative due to the creation of wetland habitat.

Long-term, indirect, negligible to minor adverse impacts to the wetland areas bordering the Flamingo developed area and bordering waterways accessed by boats leaving the Flamingo area would continue under alternative A. These include possible off-trail use by visitors, which has the potential to trample wetland habitat and introduce non-native species. Outboard engines could directly impact the aquatic seagrass habitat in the submerged wetlands of the surrounding bays if boats run aground and cause propeller scarring or “blowouts” while trying to power off the bottom. In addition, mangrove habitat and the species it supports would be affected by pruning for boater safety. These would result in negligible to minor adverse effects in very limited areas. However, considering all demolition or construction actions would be confined to already disturbed non-wetland areas, and the benefits of the restoration of about 27 acres of wetlands, alternative A would have mostly beneficial impacts on wetlands.

**Cumulative Impacts.** Wetlands in and around the Flamingo developed area have been indirectly affected in the past by facility development and maintenance (runoff from construction sites, etc.) and continued use of the Flamingo area by visitors and boaters. Future planned construction, such as resurfacing of the roads and parking facilities, would not directly affect wetlands, since these actions would all occur within disturbed areas. The impacts of alternative A, with its restoration of 27 acres of wetlands, added to the adverse and beneficial effects from other past, present, and reasonably foreseeable actions since the development of Flamingo, would result in long-term, minor beneficial cumulative impacts to wetlands.

**Conclusion.** Construction and demolition activities in previously disturbed areas would have no direct impacts on wetlands. There would be long-term, negligible to minor adverse impacts resulting from on-going visitor use in and around the Flamingo area and surrounding waters, since all lands surrounding Flamingo are wetlands, and much recreation is water dependent. The restoration of unused lands would result in the creation of 27 acres of wetland, a minor beneficial effect, and overall alternative A would have mostly beneficial impacts on wetlands.

Alternative A would not produce major adverse impacts on wetlands whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park Service planning documents. Consequently, there would be no impairment of wetlands as a result of the implementation of alternative A.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON WETLANDS**

**Analysis.** Similar to alternative A, negligible to minor indirect adverse effects from visitor use and park maintenance activities would occur. Eco Pond would be allowed to restore to natural coastal prairie conditions, with its hydrology dependent on rainfall. Increased boat use expected under this alternative could result in higher incidents of groundings on the bay bottom or landings on shorelines, which could result in minor adverse impacts in very limited areas. Boats would provide access to wetlands surrounding the Flamingo area, which could experience indirect impacts due to noise and visitor encroachment. Any direct impacts to wetlands would be very localized, minor, and short to long term, depending on the time needed for regrowth.

Under alternative B, the area containing the lodge and cottages would be condensed and replaced on the east end of the former lodge site. This would not directly impact any wetland areas, and would allow for 22 acres of wetland to be restored. In addition, 28 acres of the B and C Loops in the campground would no longer be needed for camping, based on the demand model results, and would be restored to natural wetland conditions. This would increase the continuity of wetland over a large area that is removed from the more developed Flamingo site, and, in combination with the acres restored along the shoreline, would result in a long-term, moderate beneficial impact on wetlands under alternative B.

**Cumulative Impacts.** Cumulative impacts under alternative B would be very similar to those described for alternative A, except with more long-term benefits arising from the restoration of a larger area of wetlands including a contiguous area of 28 acres that would adjoin coastal wetlands in the vicinity of the

campground. Continued use of the Flamingo area and surrounding waters by visitors and boaters may cause negligible to minor adverse effects through off-trail use and boating (propeller damage). However, the impacts of alternative B with its restoration of 50 acres of wetlands, added to the adverse and beneficial effects from other past, present and reasonably foreseeable actions since the development of Flamingo, would result in long-term, minor to moderate beneficial cumulative impacts to wetlands.

**Conclusion.** Construction and demolition activities in previously disturbed areas would have no direct impacts on wetlands. There would be short-to-long-term, negligible to minor adverse impacts resulting from on-going visitor use in and around the developed areas, since all areas surrounding Flamingo are wetlands. The restoration of unused lands would result in the creation of 50 acres of wetland, a moderate beneficial effect, and overall alternative B would have mostly beneficial impacts on wetlands.

Alternative B would not produce major adverse impacts on wetlands whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wetlands as a result of the implementation of alternative B.

#### IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON WETLANDS

**Analysis.** Adverse impacts to wetlands under alternative C would be similar to alternative B, with a possible increase in indirect effects from visitor use and direct impacts from boating due to the expected increase in visitation and the addition of a floating camp that can access backcountry areas and shorelines along the Florida coast. However, impacts would still be very localized and minor, and under alternative C, site restoration would be more extensive than under alternatives A or B. The campground's B, C, and T Loops would be restored, returning a large contiguous area to natural wetland and creating a substantial contiguous area of wetland in a relatively undisturbed setting on the western side of the Flamingo area. The removal of the road around the north side of the marginal wetland located south of Eco Pond would allow better movement of water between the pond and this area, where natural hydrology would also be restored. Eco Pond would be filled and disturbed areas, such as berms, would be returned to natural elevation, to hasten the return of this area to its natural coastal prairie habitat. A total of 87 acres would be restored over time, resulting in a long-term, moderate beneficial impact on wetlands under alternative B.

**Cumulative Impacts.** Cumulative impacts under alternative C would be very similar to those described for alternative B, except with more long-term benefits arising from the restoration of a larger area of wetlands including a contiguous area of 50 acres that would adjoin coastal wetlands in the vicinity of the campground. Continued use of the Flamingo area and surrounding waters by visitors and boaters may cause negligible to minor adverse effects through off-trail use and boating (propeller damage). However, the impacts of the alternative C with its restoration of 87 acres of wetlands, added to the adverse and beneficial effects from other past, present, and reasonably foreseeable actions since the development of Flamingo, would result in long-term, moderate beneficial cumulative impacts to wetlands.

**Conclusion.** Construction and demolition activities in previously disturbed areas would have no direct impacts on wetlands. There would be short- to long-term, minor adverse impacts resulting from on-going visitor use in and around the developed areas, since all areas surrounding Flamingo are wetlands. The restoration of unused lands would result in the creation of 87 acres of wetland and restore natural hydrology to 16 acres of existing wetland, a moderate beneficial effect, and overall alternative C would have mostly beneficial impacts on wetlands.

Alternative C would not produce major adverse impacts on wetlands whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wetlands as a result of the implementation of alternative C.

**IMPACTS OF ALTERNATIVE A - NO ACTION ON FLOODPLAINS**

**Analysis.** Under the no action alternative, impacts on floodplains would result from the continued presence of structures, replacement of structures, and continued day use of the Flamingo area, which is all within the 100-year floodplain. Existing structures would be susceptible to flooding and damage during hurricanes or large tropical storm events, and any new facilities in the study area would be constructed within the floodplain, adding to the risk associated with hurricanes and storms. However, the new housing for both NPS and concession employees would be raised to protect them against the forces of hurricanes and be built to “hurricane-proof” standards, which would also help reduce the surface area of the floodplain that is permanently covered with buildings and reduce losses from hurricanes. The maintenance shop would be built on an elevated fill pad and meet all required building codes. The continuation of the uses and replacement of structures in the Flamingo area that are not elevated within a floodplain would result in long-term localized minor to moderate adverse impacts. However, all new structures would be elevated one way or another. Removal of the lodge buildings and cottages would eliminate the potential risk associated with their presence, and the restoration of the area where they stood would restore 27 acres of the natural floodplain of the Flamingo area, a long-term, localized, minor beneficial effect.

**Cumulative Impacts.** The 100-year floodplain in and around Flamingo developed area has been affected in the past and would continue to be affected in the future by the continued presence of structures and continued use of the Flamingo area, which is all within the 100-year floodplain. Future planned construction would include hurricane proofing, per the Hurricane Response Plan. The impacts of alternative A, with its restoration of 27 acres of wetlands, added to the adverse and beneficial effects from other past, present, and reasonably foreseeable actions, would result in long-term, minor adverse cumulative impacts to floodplains.

**Conclusion.** The continuation and replacement of the uses and structures in the Flamingo area within a floodplain would result in long-term localized minor to moderate adverse impacts on floodplains, with localized, minor beneficial effects from the removal of the lodge and cottages and restoration of that area to natural elevations and conditions.

Alternative A would not produce major adverse impacts on floodplains whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park Service planning documents. Consequently, there would be no impairment of floodplains as a result of the implementation of alternative A.

**IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON FLOODPLAINS**

**Analysis.** Impacts to floodplains would be very similar to those under alternative A with regard to the continued use and presence of buildings in the floodplain at Flamingo. Since the area would continue to be used and floodplains cannot be avoided, long-term minor to moderate adverse impacts would occur. The lodge and cottages would be replaced within the floodplain, adding to the risk associated with hurricanes and storms. However, consolidating these in one area and restoring the remainder of the old lodge and cottage sites (22 acres) would minimize adverse impacts to floodplains. All new structures (except the maintenance shop) would be raised to protect them against the forces of hurricanes and be built to “hurricane-proof” standards, which would also help reduce the surface area of the floodplain that is permanently covered with buildings and reduce losses from hurricanes. In addition, the restoration of B and C Loops in the campground to natural conditions would restore 28 acres of floodplain to natural conditions and remove hazards related to human use. Alternative B would result in substantial consolidation of structures and hurricane proof construction, and a large area of restoration, which would have a long-term, moderate beneficial impact.

**Cumulative Impacts.** Cumulative impacts under alternative B would be similar to those described for alternative A, except with more long-term benefits arising from the restoration of a larger area of

floodplain. Continued occupancy and use of the Flamingo area by visitors and employees would continue to represent a long term unavoidable adverse impact. However, the impacts of the alternative B with its restoration of 50 acres of floodplains, added to the adverse effects from other past, present, and reasonably foreseeable actions in the 100-year floodplain since the development of Flamingo, would result in long-term, minor beneficial cumulative impacts to floodplains.

**Conclusion.** The continuation and rebuilding of the uses and structures in the Flamingo area would result in long-term, localized minor to moderate adverse impacts on floodplains, but there would be long-term, moderate beneficial effects from the removal of the lodge and cottages, consolidation and elevation of structures, and restoration of a relatively large area of floodplain natural elevations and conditions.

Alternative B would not produce major adverse impacts on floodplains whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of floodplains as a result of the implementation of alternative B.

### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON FLOODPLAINS**

**Analysis.** Similar to alternative B, minor to moderate adverse impacts to floodplains would result from the continued placement of structures in the floodplain, although there would be moderate benefits by consolidating uses within the main developed area and providing for the opportunity to restore 87 acres of floodplain to natural grade and conditions. In addition, the risk of flooding would be reduced by elevating the facilities and incorporating hurricane proofing. The ecotents and possibly some of the concessioner housing would be designed to be seasonal, and would be removed during the off season and in the case of impending hurricanes. By reducing the chance for inundation and wind damage and providing for a relatively large area of floodplain restoration, there would be minor-to-moderate long-term beneficial effects on the floodplain of the Flamingo area.

**Cumulative Impacts.** Cumulative impacts under alternative C would be very similar to those described for alternative B, except with more long-term benefits arising from the restoration of a larger area of floodplain (87 acres total, including removal of structures and a portion of the access road). Continued occupancy and use of the Flamingo area by visitors and employees would continue to represent a long-term unavoidable adverse impact. However, the impacts of the alternative C with its restoration of 87 acres of floodplain and construction/design sensitive to floodplain issues, added to the adverse and beneficial effects from other past, present, and reasonably foreseeable actions, would result in long-term, minor-to-moderate beneficial cumulative impacts to floodplains.

**Conclusion.** The continuation and rebuilding of the uses and structures in the Flamingo area would result in long-term localized moderate adverse impacts on floodplains, but there would be moderate beneficial effects from the removal of the lodge and cottages, consolidation and elevation of structures, use of flood resistant design, and restoration of a large area of floodplain natural elevations and conditions. Therefore, alternative C would have long-term, minor to moderate beneficial effects on area floodplains.

Alternative C would not produce major adverse impacts on floodplains whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of floodplains as a result of the implementation of alternative C.

## WILDERNESS

Everglades National Park is one of the most unusual wilderness areas on the continent. It is the largest remaining subtropical wilderness in the United States, and its abundant wildlife includes rare and endangered species, such as the Florida panther and West Indian manatee. It has been designated an International Biosphere Reserve, a World Heritage Site, and a Wetland of International Importance, in recognition of its significance to all the peoples of the world (NPS 2004).

Approximately 1,296,500 acres (524,686 hectares) of wilderness was designated at Everglades by Congress on November 10, 1978. The park also contains approximately 81,900 acres (33,144 hectares) of potential wilderness; combined, these areas represent about 86 percent of the total park area (NPS 2006a). The East Everglades Expansion Area, a 109,600 acre addition to the northeast area of the park in 1989, is currently being evaluated for wilderness characteristics in the park's General Management Plan. Areas excluded from wilderness designation include existing developed areas, marine surface waters, and an area in the park reserved for tribal use (NPS 2006b).

The park manages its wilderness areas, including potential wilderness, in accordance with the Wilderness Act so that the areas retain their "primeval character and influence, without permanent improvements or human habitation" (16 USC § 1131). Development in the park is limited to areas of existing services, utilities, and infrastructure. Management activities occurring in wilderness are associated with fire management, exotic plant management, and research and educational activities. Visitors to the park are encouraged to follow "Leave No Trace" principles when recreating in wilderness to ensure its protection and to maximize the visitor's wilderness experience. These principles include traveling and camping on durable surfaces, disposing of waste properly, leaving wilderness resources as they are found, minimizing campfire impacts, respecting wildlife, and being considerate to other visitors (NPS 2006c).

Although the majority of the park is wilderness, very little of the primary Flamingo study area lies within wilderness (Herling, pers.comm., 2007b). On the landward (terrestrial) side, the entire developed area and a sizeable buffer surrounding the area, extending north past the wastewater plant, are excluded from designated or proposed wilderness. A 150-foot buffer of non-wilderness around Buttonwood Canal and a 300-foot buffer extending north of the centerline of the Flamingo access road, up to the Snake Bight Trail have been established. The broader area south of the access road, extending from the Snake Bight Trail on the east to the developed area on the west, is excluded from wilderness. The bottom of Florida Bay south of the Flamingo shoreline is designated as submerged wilderness, and includes the area where the two new backcountry chickees would be constructed. However, there is a 660-foot wide buffer of non-wilderness along the Florida Bay channel leading into and out of the Flamingo marina.

Visitor use and experience of the wilderness area immediately surrounding the developed Flamingo area is very limited, due to the inaccessible and/or inhospitable nature of the wilderness areas. On the landward side, the Coastal Prairie Trail extends into wilderness to the west of the developed area, but the remaining bike and walking trails, including the area around Eco Pond, are all within non-wilderness. Visitors on these trails generally do not stray off trail so far that they would enter wilderness areas. The submerged bay bottom wilderness of the waters surrounding Flamingo is generally not "experienced" by visitors, because snorkelers and divers do not frequent this area due to the presence of crocodiles, sharks, and the turbidity of the water (Herling, pers. comm., 2007b). However, Flamingo serves as the entry to the Everglades wilderness experiences in Florida Bay, Whitewater Bay, the backcountry, and up to the Ten-Thousand Islands, thus the submerged wilderness serves as a key ecological component for the health of the park's marine areas. All the keys in Florida Bay are designated wilderness areas.

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

The Wilderness Act, passed on September 3, 1964, established a National Wilderness Preservation System, “administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness” (16 USC § 1131). Lands identified as being suitable for wilderness designation, wilderness study areas, proposed wilderness, and recommended wilderness (including potential wilderness) must also be managed to preserve their wilderness character and values in the same manner as “designated wilderness” until Congress has acted on the recommendations (NPS 1999).

Wilderness regulations at the park include (NPS nd2):

- It is illegal to feed wildlife. Backcountry sites are shared with alligators, sea turtles, nesting birds and other wildlife that can be observed but not disturbed;
- All plants, animals, and artifacts are protected and should not be collected or disturbed. Cutting mangroves or other vegetation in any manner is prohibited. Unoccupied shells may be gathered, up to one quart per person;
- Pets are not permitted at backcountry campsites, beaches, or ashore anywhere in the backcountry. Pets can disrupt feeding, nesting, and mating activities of wildlife;
- All vessels must conform to Coast Guard regulations. Boaters are required to obey all posted signs regarding closures, no wake zones, etc. Caution should be used in posted manatee areas, and all travel in these areas should be at idle speed;
- Operation of generators, chain saws, and other portable motors is prohibited at wilderness sites;
- Ground fires are not permitted at ground sites and chickees. Ground fires are only allowed at beach sites (except islands in Florida Bay), where they must be below the average high tide line. Only dead *and* down wood is allowed for fires, which should be cleaned up after use. Backpacking stoves are recommended, as wood is often wet;
- Possession of weapons is prohibited;
- All keys (islands) in Florida Bay are closed to landing, except Bradley Key (open sunrise to sunset) and those designated as campsites. In Florida Bay, the mainland from Terrapin Point to U.S. 1 is closed to landing;
- All sleep-aboard vessels in the wilderness must be anchored out of sight of chickees and 1/4 mile from other occupied sites;
- State fishing licenses in fresh and salt water are required, and species and size requirements are enforced;
- Food should not be left unattended, and should be stored in a secure compartment aboard a vessel or in a hard-sided cooler (not foam); and
- *All* trash must be removed from the backcountry. Burying it or disposing of it in toilets is prohibited. Toilets should be used for human waste only where provided. International laws prohibit dumping trash at sea.

Within the NPS, Director’s Order #41 addresses wilderness issues. The purpose of Director’s Order #41 is to provide accountability, consistency, and continuity within the NPS’ wilderness management

program, and to otherwise guide Service-wide efforts in meeting the letter and spirit of the 1964 Wilderness Act. In addition, NPS *Management Policies 2006* are based on provisions of the 1916 NPS Organic Act, the 1964 Wilderness Act, and legislation establishing individual units of the national park system.

Chapter 6 of the *Management Policies 2006* addresses all aspects of wilderness management and preservation of designated wilderness in units of the National Park Service. This chapter requires that wilderness considerations be integrated into all planning documents to guide the preservation, management, and use of the park's wilderness area and ensure that wilderness is unimpaired for future use and enjoyment as such. According to section 6.1, the purpose of wilderness in the national parks includes the preservation of wilderness character and wilderness resources in an unimpaired condition and, in accordance with the Wilderness Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

### **ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS**

Section 6.2.1. of the NPS *Management Policies 2006*, dictates that NPS lands will be considered eligible for wilderness if they are at least 5,000 acres or of sufficient size to make practicable their preservation and use in an unimpaired condition, and if they possess the following characteristics (as identified in the Wilderness Act):

- The earth and its community of life are untrammeled by humans, where humans are visitors and do not remain;
- The area is undeveloped and retains its primeval character and influence without permanent improvements or human habitation;
- The area generally appears to have been affected primarily by the forces of nature, with the imprint of humans' work substantially unnoticeable;
- The area is protected and managed so as to preserve its natural conditions; and
- The area offers outstanding opportunities for solitude or a primitive and unconfined type of recreation.

Per section 6.3.4.3, in evaluating environmental impacts, this EA considers (1) wilderness characteristics and values, including the primeval character and influence of the wilderness; (2) the preservation of natural conditions (including the lack of man-made noise); and (3) assurances there will be outstanding opportunities for solitude, that the public will be provided with a primitive and unconfined type of recreational experience, and wilderness will be preserved and used in an unimpaired condition. Mitigation measures considered in this analysis are listed in Chapter 2 and are mentioned in the analysis where appropriate.

The thresholds for the intensity of an impact are defined for wilderness as follows:

<i>Negligible:</i>	There would be little or no effect on wilderness character or wilderness experience. The effect on wilderness character would be so small that it would not be of any measurable or perceptible consequence.
<i>Minor:</i>	An effect on one or more attributes of wilderness character and wilderness experience and associated values would occur; it would be slightly detectable and highly localized.
<i>Moderate:</i>	Attributes of wilderness character and wilderness experience would be affected in a substantial way in a single distinct area, or the impact would affect multiple areas but would not be permanent and would not affect an entire visitor season.
<i>Major:</i>	One or more attributes of wilderness character and wilderness experience would be affected substantially across more than one distinct area of the park on either a permanent or frequent but temporary basis during the course of an entire visitor season.

*Analysis area:* The area of analysis for wilderness is the expanded area of analysis, including the areas beyond Flamingo that could be accessed by visitors and boaters originating in Flamingo.

### **IMPACTS OF ALTERNATIVE A – NO ACTION ON WILDERNESS**

**Analysis.** Because the developed terrestrial areas in and around Flamingo are not within wilderness, there would be no direct effects under alternative A from demolition or construction of the amphitheater, housing, and maintenance facility; grading of the sites; or reopening of trails in that area. The distance of the nearest wilderness areas and the implementation of BMPs to reduce the noise from these activities would limit the potential effects on wilderness character and experience (such as solitude) in immediately surrounding wilderness. As a result, alternative A (no action) would have no or negligible (short-term) indirect effects on terrestrial wilderness during these activities.

As described for water resources, there is the potential for demolition, grading, restoration, and construction activities to cause the discharge of sediment or other pollutants to the surface waters in the Flamingo area. This could impact resources that contribute to the character of the submerged wilderness (bay bottom) immediately adjacent to Flamingo. Erosion control measures, as well as the spill prevention, control, and countermeasure procedures discussed for water resources would minimize this potential. As a result these activities could have short-term, negligible indirect adverse effects on submerged wilderness.

Visitor use originating at Flamingo but extending into the surrounding waters, islands, and backcountry areas could result in indirect impacts due to noise and boating uses off shore of Flamingo and would continue to cause impacts to seagrass beds (from grounding) and the bay bottom (from propeller scarring), both of which contribute to the character of this wilderness. This would have long-term, localized (in areas where boating activities occur), minor to possibly moderate adverse impacts to the wilderness character of the bay bottom. The channel leading up to the marina, where most boat use would occur and where any dredging would be needed, is excluded from the wilderness designation, so there would be no impacts from these activities. Because there are few, if any, visitors that experience the bay bottom wilderness through diving or snorkeling, there would be no impacts expected to visitor experience of submerged wilderness.

Construction of the chickees in general proximity to Johnson and Rankin Keys as replacement for two backcountry wilderness sites no longer available (Carl Ross Key and Shark Point campsites), would have varied impacts on wilderness and wilderness experience. Wilderness cannot be avoided in siting the chickees, and their construction would directly impact submerged wilderness (bay bottom), since piles must be driven into the bottom sediments to support the structures. Each piling would permanently impact a 4-inch square area of the bottom and indirectly affect the surrounding bay bottom during installation. As described for water resources, a silt curtain would be used to limit sedimentation and turbidity problems from the installation itself. The chickee structures would shade a total of about 1,000 square feet of bay bottom, affecting the nature of the bottom and its ability to support submerged aquatic vegetation. For these reasons, the chickees would result in both short-term and long-term, very localized minor adverse impacts to submerged wilderness. Use of the chickees would also have adverse impacts to wilderness in some respects, since it would bring boats and campers into close proximity to the sensitive resources of the nearby islands (e.g. nesting birds – see wildlife section, below). However, it would also provide a moderate benefit by providing the opportunity for additional wilderness experience in this area. To prevent adverse impacts from chickee use, the keys themselves would be closed to landings, the chickees would be located at least 500 feet (and most likely 1,000 feet or more) from the islands and in deep water so groundings would not occur, and the park would provide improved education, signage, and enforcement to prevent the public from accessing the islands and sensitive resources located there (Herling, pers.comm., 2007f).

Allowing the footprint of the lodge and cabins proposed for demolition to return to native conditions would restore approximately 27 acres of vegetation. This would reduce the amount of impervious

surfaces that contribute to non-point pollution and increase the amount of vegetated surface and soil available to filter sediments and pollutants in surface runoff before it enters Florida Bay. As a result, restoration would reduce the effects of water quality impacts (e.g., turbidity) to submerged wilderness in the bay, which would have long-term, minor indirect beneficial effects.

**Cumulative Impacts.** Cumulative impacts on the wilderness character or experience of the wilderness areas surrounding Flamingo have been limited to occasional intrusion due to maintenance requirements (exotic pest control, trail maintenance) or by visitors or boats, with short-term, minor to moderate, adverse consequences. There have been no fires or other disturbances in the surrounding wilderness, and none are planned. Most of the activities associated with alternative A are limited to the developed area, with short- and long-term, negligible to moderate adverse, as well as long-term, minor indirect beneficial, impacts on wilderness. The GMP is expected to include provisions for increased boater education and improved navigational tools so that resource protection and access to the park occur with reduced impacts. In combination with past, present, and reasonably foreseeable future actions, cumulative impacts to wilderness would be long-term, minor to moderate, and adverse.

**Conclusion.** Because the Flamingo developed area and much of the land surrounding it are not wilderness, demolition, grading, and construction-related activities under alternative A (no action) would have short-term, negligible indirect effects on terrestrial and submerged wilderness. Long-term, localized minor to moderate adverse impacts on the wilderness character of the bay bottom would occur from the occasional grounding of boats; however, there would be limited visitor use impacts to terrestrial wilderness. There would also be short and long term minor adverse impacts from the chickees in Florida Bay, as well as long-term benefits to wilderness experience. Long-term, minor indirect beneficial effects on submerged wilderness of Florida Bay would result from the improved quality of surface runoff associated with restoration of previously disturbed areas to native conditions.

Alternative A would not produce major adverse impacts on wilderness whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wilderness as a result of the implementation of alternative A.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON WILDERNESS**

**Analysis.** Similar to alternative A, actions proposed in the developed area of Flamingo would have no direct adverse effects on wilderness character or experience, as this area and much of the immediately surrounding lands are excluded from wilderness, and all construction would occur in already disturbed areas. There could be impacts from noise associated with demolition, grading and restoration, and construction activities; however, the distance to nearby wilderness areas, and the implementation of BMPs, would limit the potential for noise effects. As a result, these activities would have no or negligible, short-term indirect effects on terrestrial wilderness.

Erosion control measures, as well as the spill prevention, control, and countermeasure procedures, discussed for water resources would minimize the potential effects of erosion, sedimentation, and discharge of other pollutants during demolition, grading and restoration, and construction activities. As a result, these activities would have short-term, negligible indirect adverse impacts on the submerged wilderness in Florida Bay.

Trails planned under alternative B would not extend into wilderness, and as a result, visitor use would be concentrated in the developed area of Flamingo. There is sufficient buffer between wilderness and non-wilderness in this area, such that noise associated with visitor use of the area would have long-term, negligible indirect adverse impacts, if any.

Impacts related to the chickees would be similar to those described in alternative A, but there would likely be more use of this area with additional boat tours and an expected increase in the number of visitors to Flamingo. Similarly, the increase in boating uses in the bay waters could result in an increase of boaters accessing other wilderness areas in Florida Bay, Whitewater Bay, and beyond (i.e., in the expanded study area). Increased visitor use extending into the surrounding waters, islands, and backcountry areas could result in indirect minor adverse impacts due to noise and human presence, trampling, etc. Education, signage, and enforcement by the park would help limit these impacts to areas that are sensitive or off-limits to landing.

Boats originating at Flamingo could enter shallow waters and get stranded on the seagrass beds or damage the bottom with propellers; however, these long-term adverse impacts on the wilderness character of the bay bottom would remain localized and minor to possibly moderate. Because few, if any, visitors experience the bay bottom wilderness through diving or snorkeling, direct impacts to visitor experience of submerged wilderness are not expected. The channel leading up to the Flamingo marina, where most boat access occurs and where any dredging would be needed, is excluded from the wilderness designation, so there would be no impacts from these activities.

Although the restored lands under alternative B are not in designated wilderness, these areas would add to the buffer between the developed area campgrounds and the wilderness areas west of Flamingo. Allowing the majority of the footprint of the lodge and cabins proposed for demolition to return to native conditions, as well as restoration of other previously disturbed areas (B and C Loops in the campground) would restore approximately 50 acres of vegetation. This would reduce the amount of impervious surfaces that contribute to non-point pollution and increase the amount of vegetated surface and soil available to filter sediments and pollutants in surface runoff before it enters Florida Bay. As a result, restoration would reduce the effects of water quality (e.g., turbidity) impacts to submerged wilderness in the bay, which would have long-term, minor indirect beneficial effects.

**Cumulative Impacts.** Cumulative impacts on the wilderness character or values around Flamingo would be similar to alternative A, with the addition of some possible increased noise from more construction activities, boat-related impacts to the bay bottom wilderness, and the increased buffer provided by the restoration of previously disturbed areas. The GMP is expected to include provisions for increased boater education and improved navigational tools so that resource protection and access to the park occur with reduced impacts. Most of the activities associated with alternative B in Flamingo are limited to the developed area, with only potential short- and long-term, negligible to minor adverse, as well as long-term, minor indirect beneficial, effects on wilderness. In combination with past, present, and reasonably foreseeable future actions, cumulative impacts to wilderness would be long-term, minor to moderate, and adverse.

**Conclusion.** Because the Flamingo developed area and much of the land surrounding it are not wilderness, demolition, grading, and construction-related activities under alternative B would have short-term, negligible indirect effects on terrestrial and submerged wilderness in that area. Long-term, localized minor to moderate adverse impacts on the wilderness character of the bay bottom would occur from the occasional grounding of boats, and increased visitor use/boating extending into the surrounding waters, islands, and backcountry areas could result in minor adverse effects. There would also be short and long term minor adverse impacts from the construction and use of the chickees in Florida Bay, as well as long-term benefits to wilderness experience. Long-term, minor indirect beneficial effects on submerged wilderness of Florida Bay would result from the improved quality of surface runoff associated with restoration of previously disturbed areas to native conditions.

Alternative B would not produce major adverse impacts on wilderness whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a

goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wilderness as a result of the implementation of alternative B.

### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON WILDERNESS**

**Analysis.** Impacts to wilderness under alternative C would be very similar to those described for alternative B, although more visitors would be expected who would venture from Flamingo into the expanded study area and the wilderness areas of the surrounding bays and islands. Although alternative C involves more development of the immediate Flamingo area, the impacts from actions proposed (demolition, grading and restoration, and construction) would not have direct adverse effects on wilderness characters or experience, as these areas are excluded from wilderness. As with alternative B, there could be indirect impacts to adjacent wilderness from noise and the discharge of pollutants, including sediments, during these activities. However, the BMPs discussed previously would help offset these impacts, and as a result there would only be short-term, negligible indirect adverse impacts, if any, to terrestrial wilderness and short-term, negligible indirect adverse impacts to submerged wilderness in the immediate vicinity of Flamingo.

Trails planned under alternative C would not extend into wilderness, and as a result, visitor use would be concentrated in the developed area of Flamingo. There is sufficient buffer between wilderness and non-wilderness in this area, such that noise associated with visitor use of the area would have long-term, negligible indirect adverse impacts, if any.

Impacts related to the chickees would be similar to those described for alternatives A and B, but there would likely be even more use of this area with the expected increased number of visitors to Flamingo that are focused on ecotourism and backcountry experiences. Similarly, the increase in boating in the bay waters surrounding Flamingo could result in an increase of boaters accessing other wilderness areas in Florida Bay, Whitewater Bay, and beyond (i.e., in the expanded study area), which are especially popular with paddlers. Increased visitor use extending into the surrounding waters, islands, and backcountry areas could result in indirect minor adverse impacts due to noise and human presence, trampling, etc. Increased education, signage, and enforcement by the park would help limit these impacts.

Boats originating at Flamingo could enter shallow waters and get stranded on the seagrass beds or damage the bottom with propellers; however, these long-term adverse impacts on the wilderness character of the bay bottom would remain localized and minor to possibly moderate. Because few, if any, visitors experience the bay bottom wilderness through diving or snorkeling, impacts to visitor experience of submerged wilderness are not expected. The channel leading up to the Flamingo marina, where most boat use would occur and where any dredging would be needed, is excluded from the wilderness designation, so there would be no impacts from these activities.

Although the restored lands under alternative C are not in designated wilderness, these areas would add to the buffer between the developed area campgrounds and the wilderness areas west of Flamingo. Allowing some of the footprint of the lodge and cabins proposed for demolition to return to native conditions, as well as restoration of other previously disturbed areas (B, C, and T Loops and the Eco Pond area) would restore approximately 87 acres of vegetation. This would reduce the amount of impervious surfaces that contribute to non-point pollution and increase the amount of vegetated surface and soil available to filter sediments and pollutants in surface runoff before it enters Florida Bay. As a result, restoration would reduce the effects of water quality (e.g., turbidity) impacts to submerged wilderness in the bay, which would have long-term, minor indirect beneficial effects.

**Cumulative Impacts.** Cumulative impacts on the wilderness character or values around Flamingo would be similar to alternative B, with the addition of some possible increased noise from more construction activities, boat-related impacts to the bay bottom wilderness, and the increased buffer provided by the restoration of previously disturbed areas. The GMP is expected to include provisions for increased boater education and improved navigational tools so that resource protection and access to the park occur with

reduced impacts. Most of the activities associated with alternative C in Flamingo are limited to the developed area, with only potential short- and long-term, negligible to moderate adverse, as well as long-term, minor beneficial, indirect effects on wilderness. In combination with past, present, and reasonably foreseeable future actions, cumulative impacts to wilderness would be long-term, minor to moderate, and adverse.

**Conclusion.** Because the Flamingo developed area and much of the land surrounding it are not wilderness, demolition, grading, and construction-related activities under alternative C would have short-term, negligible indirect effects on terrestrial and submerged wilderness in that area. Long-term, localized minor to moderate adverse impacts on the wilderness character of the bay bottom would occur from the occasional grounding of boats accessing the bays from Flamingo, and increased visitor use/boating extending into the surrounding waters, islands, and backcountry areas could result in minor adverse effects. There would also be short and long term minor adverse impacts from the construction and use of the chickees in Florida Bay, as well as long-term benefits to wilderness experience. Long-term, minor indirect beneficial effects on submerged wilderness of Florida Bay would result from the improved quality of surface runoff associated with restoration of previously disturbed areas to native conditions.

Alternative C would not produce major adverse impacts on wilderness whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wilderness as a result of the implementation of alternative C.

## WILDLIFE AND WILDLIFE HABITAT

### AFFECTED ENVIRONMENT

The Everglades is a low, flat plain shaped by the action of water and weather, including fire, where slight changes in elevation, water salinity, and soils create a variety of different landscapes (NPS 2007). These landscapes each support their own community of plants and wildlife, including approximately 347 birds, more than 40 mammals, more than 50 reptiles, and 15 amphibians (NPS 1999). Not all of these animals or plant communities occur in the Flamingo area, so the following sections focus on the wildlife, including aquatic species, and vegetation that may be affected.

### WILDLIFE

Although the primary project area is primarily developed, it is surrounded by vegetation types that provide habitat for a variety of wildlife, including coastal prairie, salt marshes, mangrove swamps, coastal strand, and tropical hardwood hammocks (NPS 2007, USGS 2001). The vegetation of these communities is described in more detail in the “Vegetation” section below.

The coastal prairie is located between the tidal mud flats of Florida Bay and dry land, and is periodically flooded by hurricane waves and buffeted by heavy winds (NPS 2007). Salt marsh communities occur at the interface of the land and sea, and are subject to occasional flooding. This environment is very stressful for animal life because of the dramatic, irregular, and sudden fluctuations in salinity and water level. As a result, very few fish, reptiles, birds, or mammal species are considered residents of salt marshes (NPS 2006). Coastal prairie and salt marshes are found throughout the Flamingo area primarily on the fringe of the developed areas, but also in small pockets within the developed area. Surrounding the developed area, these habitats are found interspersed with the mangroves to the north.

Mangroves occur in an estuary system that is a valuable nursery for shrimp and fish, and provide foraging and nesting habitat for many birds (NPS 2003, 2007). Mangrove communities occur along the coast near the campgrounds at Flamingo, in small pockets elsewhere along the coast, and also on the landward side of the developed area.

Coastal strands are coastal dune communities dominated by evergreen shrubs (USGS 2001) and are found in small pockets near the B and C Loop campgrounds, as well as near the employee housing area. Hammocks are dense stands of hardwood trees that grow on natural rises of only a few inches in the land (NPS 2007). These hammocks are generally limited to the coastal side of the B and C Loops, as well as in the vicinity of the employee housing.

Aquatic habitats in the Flamingo area include freshwater and marine environments. Freshwater sources include the lined sewage lagoons at the site, as well as Eco Pond. The American alligator (*Alligator mississippiensis*), as well as wading and shore birds, have been observed using the sewage lagoons. Eco Pond is a constructed pond formerly used for tertiary wastewater treatment that supports fish, amphibians, reptiles, wading and shore birds, ducks, and the occasional raptor. The marine habitats in the Flamingo area are characterized by the brackish interface between fresh water and Florida Bay (NPS 2003). Seagrass beds also serve as food for many marine species and provide the primary productivity and shelter that supports hundreds of associated animal species.

Combined, these habitats support numerous wildlife species, many of which are considered endangered or threatened, or of special concern, by the federal government or the state. Those “listed species” are addressed in the following section, while this section focuses on other common wildlife in the Flamingo area. Some of the more common fish and wildlife species observed in the area are listed in Tables 3-1 through 3-3.

**Table 3-1 – Common Wildlife in the Flamingo Area**

Common Name	Scientific Name
<b>Mammals</b>	
Opossum	<i>Didelphis marsupialis</i>
Raccoon	<i>Procyon lotor</i>
Bobcat	<i>Lynx rufus</i>
Rabbit	<i>Sylvilagus</i> sp.
<b>Birds</b>	
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Great blue heron	<i>Ardea herodias</i>
Turkey vulture	<i>Cathartes aura</i>
Eastern screech-owl	<i>Otus asio</i>
Great egret	<i>Casmerodius albus</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Cattle egret	<i>Bubulcus ibis</i>
<b>Reptiles</b>	
Green anole	<i>Anolis carolinensis</i>
Brown anole	<i>Anolis sagrei</i>
Southeastern five-lined skink	<i>Eumeces inexpectatus</i>
Ground skink	<i>Scincella lateralis</i>
Eastern garter snake	<i>Thamnophis sirtalis</i>
Peninsula ribbon snake	<i>Thamnophis sauritus</i>
Eastern mud snake	<i>Farancia abacura</i>
Corn snake	<i>Elaphe guttata</i>
Florida cottonmouth	<i>Aghistrodon piscivorus</i>
Dusky pigmy rattlesnake	<i>Sistrurus miliarius</i>
Eastern diamondback	<i>Crotalus adamanteus</i>
<b>Amphibians</b>	
Florida cricket frog	<i>Acris gryllus</i>
Green treefrog	<i>Hyla cinerea</i>
Squirrel treefrog	<i>Hyla squirella</i>
Little grass frog	<i>Pseudacris ocularis</i>
Eastern narrow-mouth toad	<i>Gastrophyne carolinesis</i>
Southern leopard frog	<i>Rana utricularia</i>

Source: NPS 2003

**Table 3-2 – Freshwater Species in the Flamingo Area**

Common Name	Scientific Name
<b>Amphibians</b>	
Everglades dwarf siren	<i>Pseudobranchius striatus</i>
Peninsula newt	<i>Notophthalmus viridescens</i>
<b>Reptiles</b>	
Brown water snake	<i>Nerodia taxispilota</i>
Florida water snake	<i>Nerodia fasciata</i>
South Florida swamp snake	<i>Seminatrix pygaea</i>
American alligator	<i>Alligator mississippiensis</i>
Striped mud turtle	<i>Kinosternon baurii</i>
Diamondback terrapin	<i>Malaclemys terrapin</i>
Florida softshell turtle	<i>Apalone ferox</i>
<b>Fish</b>	
Largemouth bass	<i>Micropterus salmoides</i>
Bluegill	<i>Lepomis macrochirus</i>
Florida gar	<i>Lepisosteus platyrhincus</i>
Mosquitofish	<i>Gambusia holbrooki</i>

Source: NPS 2003

**Table 3-3 – Marine Species in the Flamingo Area**

Common Name	Scientific Name
<b>Reptiles</b>	
Mangrove salt marsh snake	<i>Nerodia clarkia</i>
<b>Fish</b>	
Snook	<i>Centropomus undecimalis</i>
Red drum	<i>Sciaenops ocellatus</i>
Spotted seatrout	<i>Cynoscion nebulosus</i>
Gray snapper	<i>Lutjanus griseus</i>
Tarpon	<i>Megalops atlanticus</i>
Black drum	<i>Pogonias cromis</i>
Sheepshead	<i>Archosargus probatocephalus</i>
Spanish mackerel	<i>Scomberomorus commerson</i>
Lady fish	<i>Elops saurus</i>
Crevalle jack	<i>Caranx hippos</i>

Source: NPS 2003

Wildlife in the expanded study area would include many of the same species as found in and around Flamingo, plus many other species depending on the location and habitat. Of particular interest to this plan are wildlife species known to occur in and around Johnson and Rankin Keys, where the new backcountry chickees would be located. These islands provide habitat for a variety of wading birds, eagles, and ospreys, although no rookeries are documented. The waters surrounding the keys would support the same marine species as listed above.

In addition to native wildlife, many non-native animals also occur at Everglades National Park. These include pets that have been turned loose, such as pythons (*Python molurus*), boa constrictors (*Boa constrictor*), iguanas, parakeets, and parrots (*Amazona spp.*). In addition, wild hogs (*Sus scrofa*) are known to occur in the park. Aquatic environments have also been invaded by non-natives species, including blue and spotted tilapias (*Oreochromis aureus* and *Tilapia mariae*, respectively), oscars (*Astronotus ocellatus*), and Mayan cichlids (*Cichlasoma urophthalmus*) (NPS 1997).

## VEGETATION

Much of the project area is relatively disturbed and is characterized by artificially maintained vegetation. Mowed lawn covers much of the area, including large portions of the campgrounds and concessioner-managed areas (NPS 2003). The vegetation outside of these developed areas is generally considered coastal prairie and is interspersed with salt marshes, mangrove swamps, tropical hardwood hammocks, and coastal dunes.

Coastal prairie is an area that is periodically flooded with saltwater during tropical storms, while saltwater intrusion occurs during droughts<sup>1</sup>. As a result, this vegetation type is characterized by salt-tolerant succulents, such as saltwort (*Batis maritima*), glasswort (*Salicornia* spp.), sea purslane (*Sesuvium* spp.) and other graminoids, such as saltgrass (*Distichlis spicata*), smutgrass (*Sporobolus* spp.), and keys grass (*Monanthocloe littoralis*), that can withstand these harsh conditions (NPS 2003, 2007; Welch and Madden 1999). The salt marshes of the coastal prairie often support a dense stand of only one or two species, with the composition determined by site conditions such as water elevation, wave energy, salinity level, and substrate (NPS 2006). Some of the typical dominant species in these marshes include bunch cordgrass (*Spartina bakeri*), gulf cordgrass (*Spartina spartinae*), Roemer's rush (*Juncus roemerianus*), saltwater cordgrass (*Spartina alterniflora*), and saltmeadow cordgrass (*Spartina patens*) (USGS 2001).

Mangrove swamps are found in the coastal channels and winding rivers around the tip of South Florida, and are subject to tidal flushing, which produces elevated salinity (NPS 2003, 2007). As a result, each mangrove species, including red (*Rhizophora mangle*), black (*Avicennia germinans*), and white (*Laguncularia racemosa*) mangroves, has a different level of salt tolerance, which in part determines where they occur in tidal zones (NPS 2007). Vegetation is also found in the form of submerged aquatic vegetation (SAV, or seagrasses) on the bottom of Florida Bay and other shallow waters around the Flamingo area. The most common seagrass species are turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoalgrass (*Halodule wrightii*). A die-off of seagrasses in West Florida Bay occurred in the late 1980s, and is still being investigated through the long-term ecological monitoring of park waters (see "Water Quality" section).

In southern Florida, saw palmetto (*Serenoa repens*) and sea grape are common in the shrubby coastal strand that occurs on the dunes. Other evergreen shrubs found in this vegetation type include southern bayberry (*Myrica cerifera*), and live oak (*Quercus virginiana*) (USGS 2001).

Tropical hardwood hammocks, which rarely flood because of their slightly higher elevation, support many tropical and temperate species such as mahogany (*Swietenia mahogoni*), gumbo limbo (*Bursera simaruba*), cocoplum (*Chrysobalanus icaco*), pigeon-plum (*Coccoloba diversifolia*), sea grape (*Coccoloba uvifera*), lance wood (*Ocotea coriacea*), white stopper (*Eugenia axillaris*), Spanish stopper (*Eugenia foetida*), seven-year apple (*Casasia clusiifolia*), palo de corcho (*Guapira discolor*), Florida poison-tree (*Metopium toxiferum*), cabbage palmetto (*Sabal palmetto*), live oak, and hackberry (*Celtis laevigata*) (NPS 2007, USGS 2001). Ferns and airplants thrive in the moisture-laden air inside the hammock, which is shaded by the trees. Acids from decaying plants dissolve the limestone around the hammocks, creating a natural moat that protects the vegetation from fire (NPS 2007).

Non-native species also occur in the Flamingo area, including thickets of Brazilian pepper (*Schinus terebinthifolius*) and latherleaf (*Colubrina asiatica*) (NPS 1998, Welch and Madden 1997). Native vines, herbs, and small shrubs tend to occur on the edge or in the understory of these thickets, including coral bean (*Erythrina herbacea*), saffron plum (*Bumelia celastrina*), Virginia creeper (*Parthenocissus*

<sup>1</sup> Saltwater intrusion occurs when the natural balance between freshwater and saltwater in coastal aquifers is disturbed. Groundwater withdrawals and other human activities (e.g., draining lands via canals) lower ground-water levels and reduce fresh ground water flow to coastal waters. This ultimately causes saltwater to intrude coastal aquifers (Barlow 2003), exposing plants to saline groundwater conditions.

*quinquefolia*), creeping cucumber (*Melothria pendula*), possum grape (*Cissus sicyoides*), and climbing hempweed (*Mikania scandens*) (NPS 1998).

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

The NPS Organic Act of 1916 and the NPS *Management Policies 2006* (NPS 2006b) direct parks to provide for the protection of park resources. The *Management Policies 2006* state that “the Service will not attempt to solely preserve individual species (except threatened or endangered species) or individual natural processes; rather, it will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems. Just as all components of a natural system will be recognized as important, natural change will also be recognized as an integral part of the functioning of natural systems.”

### ASSUMPTIONS, METHODOLOGY AND IMPACT THRESHOLDS

Maps showing vegetation cover within the Flamingo area and communications with NPS staff (Smith, pers. comm., 2007b) were used to identify baseline conditions for wildlife, wildlife habitat, and vegetation. Available information was also taken from other NPS and non-NPS resources to describe these resources in more detail.

In general, it was assumed that there would be impacts to wildlife and wildlife habitat that occur from the construction phase of the action alternatives, as well as post-construction effects. The primary steps taken in assessing impacts on wildlife and wildlife habitat (including vegetation) included determining:

1. Which species are found in areas likely to be affected by management actions described in the alternatives;
2. Habitat/vegetation loss or alteration caused by the alternatives; and
3. Displacement and disturbance potential of the actions and the species’ potential to be affected by construction or future use and management activities.

The thresholds for the intensity of an impact are defined as follows:

#### Wildlife and Wildlife Habitat

*Negligible:* There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.

*Minor:* A change in effects on wildlife and habitats would be localized within a small area. The change would be measurable or perceptible in terms of abundance, distribution, quantity, or quality of populations. While the mortality of individual animals might occur, the viability of wildlife populations would not be affected and the community, if left alone, would recover. Impacts would be detectable and are expected to be outside the natural range of variability.

*Moderate:* A change in effects on wildlife and habitats would occur over a relatively large area. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of populations. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and could be outside the natural range of variability. Disruptions to key ecosystem processes that would be outside natural variation might occur, but the ecosystem would soon return to natural conditions. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

- Major:* A change in effects on wildlife and habitats would be readily apparent, and would substantially change wildlife populations over a large area in and out of the park. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and would be expected to be outside the natural range of variability or be permanent. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation would be needed to offset adverse effects, and its success would not be assured.
- Analysis area:* The focus of this analysis is the primary Flamingo area that could be directly affected by the proposed actions; however, impacts to wildlife in the expanded area of analysis from boaters or hikers originating at Flamingo are also discussed.

### **Vegetation**

- Negligible:* Impacts would cause no measurable or perceptible changes in plant community size, integrity, or continuity.
- Minor:* Impacts would cause measurable or perceptible changes but would be localized within a relatively small area. The overall viability of the plant community would not be affected and, if left alone, would recover.
- Moderate:* Impacts would cause a change in the plant community (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized.
- Major:* Impacts to the plant community would be substantial, highly noticeable, and permanent over a large area. Extensive mitigation would be needed to offset adverse effects, and its success would not be assured.
- Analysis area:* The focus of this analysis is the primary Flamingo area that could be directly affected by the proposed actions; however, impacts to vegetation in the expanded area of analysis from boaters or hikers originating at Flamingo are also discussed.

## **IMPACTS OF ALTERNATIVE A – NO ACTION ON WILDLIFE AND WILDLIFE HABITAT**

### **Wildlife and Wildlife Habitat**

**Analysis.** In the primary study area, the noise associated with machinery and the presence of people during the re-opening of trails; reconstruction of the amphitheater, housing, and maintenance facility; and demolition activities would temporarily displace some wildlife in adjacent habitats. Displaced wildlife could increase competition between individuals in the surrounding available habitat. Some less mobile individuals may even be killed outright during construction, but mitigation measures would be taken to minimize the potential (such as removing individuals that get trapped in trenches). Temporary loss of habitat during demolition and construction is not expected to occur, as the footprint during these activities is expected to be within previously disturbed areas. The use of previously disturbed areas would be further maximized to the extent possible by selectively choosing staging areas, parking all vehicles on existing roads and parking lots, and clearly defining and marking construction zones and perimeters.

Steps would be taken to minimize the introduction of non-native species, which could affect the makeup of wildlife habitat, during and after construction. These could include washing equipment before entering the park; minimizing disturbances; initiating revegetation of disturbed areas immediately after construction; salvaging topsoil and native vegetation from the area, and limiting the amount of topsoil imported for revegetation; using seeds from native species during revegetation; and monitoring reclamation, implementing exotic species control as necessary. The permanent footprint for the trails and reconstructed facilities would not be increased, and following completion of the project, wildlife would be expected to reoccupy all available habitat adjacent to the sites.

Construction of the two backcountry chickees in the vicinity of Rankin and Johnson Keys would include installation of pilings and platforms/docks in the subtidal zone. Aquatic wildlife in the area of construction would be displaced, and benthos at the piling locations would be lost. Noise from construction equipment, especially the pile driver, would temporarily disturb aquatic species and fish in the area, and as well as other wildlife on the nearby islands. Birds may flush from the area, but would be expected to return once construction was completed. Impacts from construction would be short-term (except for the piling location itself), limited to daylight hours, minor, and adverse. Following completion of the chickees, the pilings would add a new habitat type to the area, providing substrate for colonization by invertebrates, while the platforms themselves would shade the bay bottom, causing a change in habitat conditions there and limiting growth of seagrass. The chickees would be considered in-water structures and subject to coordination and/or permitting from the Army Corps of Engineers, U.S. Coast Guard, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and the Florida Department of Environmental Protection.

Use of the chickees would also have adverse impacts to wildlife in some respects, since boaters, paddlers and campers would be in close proximity to the sensitive resources of the nearby keys that are home to many shore birds, wading birds and ospreys. Some flushing of birds on the keys or nearby flats could be expected. To prevent adverse impacts from chickee use, the keys themselves would remain closed to landings, the chickees would be located at least 500 feet (and most likely 1,000 feet or more) from the keys and in deep water so groundings would not occur, and the park would provide improved education, signage, and enforcement to prevent the public from accessing the islands and sensitive resources located there (Herling, pers. comm., 2007f).

There is also the potential for erosion and sedimentation during construction activities, as well as petroleum spills from equipment, to contribute to turbidity and pollution in surface waters. If severe, turbidity can reduce light penetration and visibility, affect aquatic organisms, and reduce the ability of predatory fish and birds to see their prey. However, pre- and post-construction erosion control BMPs would minimize impacts, including the installation and inspection of silt fences, straw bale barriers, temporary earthen berms, sediment traps, or other equivalent measures; and the revegetation of disturbed areas. At the chickees, silt curtains would be used to reduce turbidity from piling installation. The use of spill prevention, control, and countermeasure procedures, as well as stormwater pollution prevention measures, would reduce the potential for petroleum products from leaking equipment or vehicles to reach surface waters. Taking into consideration the impacts and the proposed mitigation measures, construction activities would have short-term, localized, negligible adverse impacts to wildlife and wildlife habitat.

Visitor use levels in the immediate Flamingo area would continue to be constrained by the current facilities and level of services available. However, some impacts associated with visitor use would occur, including roadkill of wildlife on the main entrance road, off-trail use that has the potential to trample wildlife habitat and introduce non-natives. In addition, charter and tour boats with outboard engines can have impacts on the aquatic habitat provided by seagrasses and other submerged aquatic vegetation, if the grass bed is fragmented or damaged by propellers or if the boats run aground, creating propeller scarring and barren areas where fish and other species once flourished. Boat use can also directly affect aquatic species as a result of propeller strikes. In addition, mangrove habitat and the species it supports are affected by pruning for boater safety. Indirect adverse impacts to wildlife, including flushing of birds, would occur in the expanded study area, depending on where visitors and boaters would venture from Flamingo. Impacts are likely to be limited to areas readily accessible by boat, given the nature of the surrounding areas. All visitor use-related activities would have long-term, negligible to minor effects on wildlife and wildlife habitat throughout and beyond the Flamingo area.

In the primary study area, allowing the footprint of the lodges and cottages proposed for demolition to return to native conditions would provide approximately 27 acres of additional wildlife habitat in Flamingo. The restored soil and vegetation would help filter surface runoff and any associated pollutants (as described for water resources) before they are discharged to Florida Bay, which would have a

beneficial effect on aquatic habitat and species, as well as birds and fish that prey on aquatic species. The removal of any fill materials may also reduce the potential for exotics to become established. The NPS would also allow for the natural restoration of Eco Pond, which would restore native vegetation and associated animal communities. These actions would result in long-term, localized, minor, beneficial effects on wildlife and wildlife habitat.

## **Vegetation**

**Analysis.** Vegetation impacts would be limited primarily to the developed area of Flamingo, since most boaters leaving the Flamingo area would not directly impact vegetation, and the Florida Bay keys within the project study area are closed to landing. Because disturbances due to demolition and construction would be limited to previously developed areas, there would be only temporary impacts to vegetation during activities associated with reopening of trails, reconstruction of the various facilities, and demolition of the lodge and cottages. Although most of the footprint has been previously disturbed, soil disturbances can increase the potential for non-native species to invade the area. The presence of people and equipment (including vehicles) associated with this work would also have the potential to introduce non-native species. However, soil disturbances would be minimized to the extent possible by selectively choosing staging areas, parking all vehicles on existing roads and parking lots, and clearly defining and marking construction zones and perimeters. Other steps would also be taken to minimize the introduction of non-native species, which could affect the makeup of the vegetation communities surrounding project sites. These could include washing equipment before entering the park; initiating revegetation of disturbed areas immediately after construction; salvaging topsoil and native vegetation from the area and limiting the amount of topsoil imported for revegetation; using seeds from native species during revegetation; and monitoring reclamation, implementing exotic species control as necessary. As a result, construction activities would have short-term, localized, negligible adverse impacts to vegetation under the no action alternative.

Construction of the backcountry chickees would include installation of pilings and platforms/docks offshore from Rankin and Johnson Keys in the subtidal zone. The bay bottom in that area is a mud/silt substrate that is conducive to seagrass habitat, but the pilings would be sited to avoid seagrass beds. The piling footings would directly impact bay bottom habitat, while the platforms themselves would shade the bay bottom (approximately 1,000 square feet), causing a change in habitat conditions there and limiting the potential growth of seagrass over a very small area, causing negligible to minor adverse impacts to submerged aquatic vegetation.

Visitor use levels in the Flamingo area would continue to be constrained by the current facilities and level of services available. However, some impacts would occur, including trampling of vegetation from off-trail use. In the waters surrounding Flamingo, impacts to submerged aquatic vegetation could be expected from boaters running aground or from propeller scarring. Park personnel have begun an assessment of propeller scarring/groundings in the bay's shallower areas, and report that high-impact areas have been badly damaged (Herling, pers. comm., 2007d). Boats originating from Flamingo could add to these damages, and the barren areas created can last five years or longer (FDEP 2007). In addition, mangrove trees would continue to be affected by pruning for boater safety. These visitor use-related activities would have long-term, negligible to minor adverse effects to vegetation throughout the Flamingo area, assuming disturbed areas would recover.

In the primary study area, allowing the footprint of the lodges and cottages proposed for demolition to return to native conditions would restore approximately 27 acres of primarily disturbed vegetation. The restored soil and vegetation would help filter surface runoff and any associated pollutants (as described for water resources) before they are discharged to Florida Bay, which would have a beneficial effect on aquatic habitat and species (such as seagrasses). The removal of any fill materials may also reduce the potential for exotics to become established. The NPS would allow for the natural restoration of Eco Pond, which would enhance the associated native vegetation. These actions would result in long-term, localized

(in the vicinity of the areas to be reclaimed and Eco Pond), minor beneficial effects on vegetation under the no action.

**Cumulative Impacts.** Wildlife, wildlife habitat, and vegetation have all been affected by continued development of the facilities, trails, parking, and roads in the Flamingo area, as well as infrastructure upgrades (wastewater treatment plant, potable water system). In addition, visitor use in the area, which had increased until the recent hurricane events, also had impacts on terrestrial and submerged aquatic vegetation. Maintenance activities such as ongoing exotic plant control, fire management, and landscape management have also contributed to impacts on wildlife, wildlife habitat, and vegetation. Exotic plant control and prescribed burns are used for the restoration of habitat and although there may be short-term, adverse impacts, the long-term effects are beneficial.

Other past and present activities that have affected or are affecting wildlife, wildlife habitat, and vegetation include various infrastructure upgrades, the removal of underground storage tanks, resurfacing of roads and parking areas, and maintenance activities at Flamingo. However, the impacts would be temporary, only lasting the duration of the construction or system maintenance activities. Plans for restoring the Everglades ecosystem would have longer-term, beneficial effects, while some of the planned regional transportation projects may indirectly contribute to visitor-use related impacts on wildlife, wildlife habitat and vegetation, if they contribute to increased visitation to Flamingo over time.

Alternative A would contribute some short- and long-term, negligible to minor adverse impacts, as well as long-term, minor, beneficial effects from restoration of disturbed areas. Taking these factors into consideration, the cumulative impacts to wildlife, wildlife habitat, and vegetation are expected to be long-term, minor, and adverse.

**Conclusion.** Construction activities under the no action alternative would have short-term, localized, negligible to minor adverse impacts on wildlife, wildlife habitat, and vegetation. Long-term impacts from visitor use would occur from off-trail use, disturbance to birds and other wildlife from the presence of visitors, and the effects of outboard engines on seagrass and other submerged vegetation, having negligible to minor adverse impacts throughout the Flamingo area. There would also be long-term, minor, beneficial effects from the restoration of the current lodge and cottage areas.

Alternative A would not produce major adverse impacts on wildlife, wildlife habitat, or vegetation resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife or wildlife habitat as a result of the implementation of alternative A.

## **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON WILDLIFE AND WILDLIFE HABITAT**

### **Wildlife and Wildlife Habitat**

**Analysis.** Impacts to wildlife from construction would be similar to alternative A, since all additional construction would occur within the developed area. There would be a new lodge and cottages, reconfigured parking areas, new walking/bicycle paths, upgrades to trails to maximize safety, and extended electric utilities to the campground's T Loop for RVs. The impacts during construction discussed under alternative A for the main Flamingo area (such as displacement of wildlife due to noise, the presence of people, the potential for the introduction of exotic species, and the potential for erosion/sedimentation and other water quality impacts) and for the chickees would also occur during construction under alternative B. In addition, the same mitigation measures would be applied during construction under alternative B. However, because there are many more construction-related activities under this alternative, the impacts are likely to occur over a longer period of time, over a greater area, and would result in more permanent facilities when compared to alternative A (even if these occur in areas

that were previously disturbed). Therefore, impacts of construction would be short-term (for the duration of each construction activity), minor, and adverse.

Although the number of camping sites would be scaled back under this alternative, visitor use levels in the Flamingo area would likely increase over alternative A given the increase in other facilities and level of services that would be available. These facilities and services would include new overnight accommodations (lodge, cottages, houseboat rentals), gathering areas, including a swimming pool, restaurant/lounge; new walking/bicycle paths and non-motorized boat trails; upgraded trails; outfitting and livery services; the Snake Bight Trail tram (seasonal); and additional paddling and boat tours.

More visitors in the area could translate to more impacts on wildlife and wildlife habitat from the associated increases in noise, vehicle traffic, and the presence of people; trampling of wildlife habitat from increased off-trail use; the potential for exotic species introductions (from vehicles and people). Roadkill along the main entrance road may increase with the increased visitation expected. There would be more boats with outboard engines originating in Flamingo but using the expanded study area that could affect habitat provided by seagrass and other submerged vegetation or cause propeller strikes; and the increased potential for aquatic wildlife to become entangled in fishing lines. Indirect impacts from boating and visitors could increase impacts to wildlife on the keys near the backcountry chickees. In addition, more recreational users could result in more requests for pruning mangrove trees to improve passage for boats. However, there would be an increase in environmental awareness and interpretive programs (e.g., guided boat tours) that would help educate visitors with the intent of reducing impacts on wildlife and wildlife habitat.

Operation of the new visitor facilities could also affect night skies by introducing new sources of light, which can affect wildlife such as migratory birds that rely on the moon and stars for navigation, and other nocturnal wetland species such as frogs and salamanders. Increased lighting can also deter certain animals (e.g., bobcats) from using the area, while attracting others (e.g., raccoons). Per NPS *Management Policies 2006*, artificial lighting would not be used in locations where its presence will disrupt wildlife dependent on the dark; minimal-impact lighting techniques would be used (possibly including consideration of yellow versus white lights, use of timers); and artificial lighting will be shielded and directed where necessary with regard for natural night sky conditions. Along these same lines, scavengers such as raccoons and crows (*Corvus corvus*) may also be attracted to the new facilities due to increases in food sources (including trash) from expanded visitor services and use. As a result, visitor use-related activities, including operation of the new facilities, would have long-term, minor to moderate, adverse effects on wildlife and wildlife habitat throughout the Flamingo area.

Alternative B would also provide several benefits for wildlife and habitat. The proposed siting layout would be more compact, fit into the landscape, and reduce the footprint of what is currently disturbed. The majority of the old lodge site and cottages, as well as the B and C Loops in the campground, would be restored to natural conditions. Allowing the footprint of these areas to return to native conditions would restore approximately 50 acres of wildlife habitat. The restored soil and vegetation would help filter surface runoff and any associated pollutants (as described for water resources) before they are discharged to Florida Bay, which would have a beneficial effect on aquatic habitat and species, as well as predatory birds and fish that feed on aquatic species. The removal of any fill materials may also reduce the potential for exotics to become established. Native vegetation would be used in all manicured or landscaped areas. New structures would be raised to protect them against the forces of hurricanes, which would also help reduce the surface area that is permanently covered with buildings. These actions would result in long-term, minor to moderate, beneficial impacts on wildlife and wildlife habitat.

## **Vegetation**

**Analysis.** Construction related activities associated with developments under alternative B (described above for wildlife and wildlife habitat) would only cause minor impacts to vegetation as these would be

limited to previously disturbed areas and a very small area associated with the chickees. There is the potential for introducing non-native species during construction; however these impacts could be minimized using the mitigation described for wildlife and wildlife habitat. Therefore, short-term, localized negligible to minor, adverse impacts on vegetation are expected as a result of construction activities under alternative B.

Visitor use levels in the Flamingo area would likely increase over alternative A given the increase in the facilities and level of services described under wildlife and wildlife habitat. More visitors in the area could translate to more impacts on vegetation as a result of increased off-trail use and the associated trampling and the potential for exotic species introductions (from vehicles and people); and the increased number of boats with outboard engines that could affect submerged vegetation. The additional boat use could have damaging effects throughout the expanded study area. More recreational users could result in more requests for pruning mangrove trees to improve passage for boats. However, this would be somewhat balanced by the increase in environmental awareness and interpretive programs (e.g., guided boat tours) that would help educate visitors with the intent of reducing impacts on vegetation. Overall, visitor use-related activities would have long-term, minor, adverse effects on vegetation throughout the Flamingo study area.

Under alternative B, the NPS would provide facilities and services in a more compact, efficient siting layout that fits into the landscape, and reduces the footprint over what is currently disturbed. The majority of the old lodge site and cottages, as well as the campground's B and C Loops, would be restored to natural conditions. Allowing the footprint of these areas to return to native conditions would restore approximately 50 acres of primarily disturbed vegetation, and native vegetation would be used in all manicured or landscaped areas that remain. These actions would result in long-term, minor to moderate, beneficial impacts on vegetation.

**Cumulative Impacts.** The cumulative impacts under alternative B would be similar to those described for alternative A, although alternative B would contribute some short- and long-term, negligible to moderate adverse impacts, as well as long-term, minor to moderate, beneficial effects (from reducing the footprint of currently disturbed areas and allowing some areas to be restored to natural conditions). Taking these factors into consideration, the cumulative impacts to wildlife, wildlife habitat, and vegetation are expected to be long-term, minor, and adverse.

**Conclusion.** Construction activities under alternative B would have short-term, localized, negligible to minor adverse impacts on wildlife, wildlife habitat, and vegetation. Increases in visitation are expected as a result of the new facilities and services provided, which could have long-term, minor to moderate adverse impacts throughout the Flamingo area. There would also be long-term, minor to moderate, beneficial effects from the reduction in the footprint and restoration of previously disturbed areas.

Alternative B would not produce major adverse impacts on wildlife, wildlife habitat, or vegetation resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife or wildlife habitat as a result of the implementation of alternative B.

## **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON WILDLIFE AND WILDLIFE HABITAT**

### **Wildlife and Wildlife Habitat**

**Analysis.** Alternative C would involve more construction in the primary Flamingo area, but still limited to previously disturbed areas. This would include a new RV camping area; lodge (including restaurant); cottages; ecotents, gathering areas (no pool); and new walking paths/trails. The road would also be reconfigured, providing dedicated bicycle trails. Parking areas would also be reconfigured to provide for

more efficient and safer use and circulation. The impacts during construction discussed under alternatives A and B for the main area (such as displacement of wildlife due to noise, the presence of people, the potential for the introduction of exotic species, and the potential for erosion/sedimentation and other water quality impacts) and for the chickees would also occur during construction under alternative C. In addition, the same mitigation measures would be applied during construction under alternative C. However, because there are many more construction-related activities under this alternative, the impacts are likely to occur over a longer period of time, over a greater area, and would result in more permanent facilities when compared to alternative A (even if these occur in areas that were previously disturbed). Therefore, impacts of construction would be short-term (for the duration of each construction activity), minor to moderate, and adverse.

Although camping and RV sites would be scaled back under this alternative as compared to alternative A, visitor use levels in the Flamingo area would likely increase over alternative A given the increase in other facilities and level of services that would be available. These facilities and services include those described for alternative B, as well as ecotents, a floating camp, indoor meeting space, more screened gathering areas, and science/research work stations, new bicycle lanes/walking trails, a wider range of outfitting and livery service, including backcountry escort and additional Florida Bay fishing charters, longer multi-day backcountry trips, guided tours of both Florida Bay and Whitewater Bay, more interpretive and educational hikes, longer duration and a wider variety of interpretive themes, and dedicated canoe/kayak staging areas.

More visitors in the area and operation of the new visitor facilities could translate to more impacts on wildlife and wildlife habitat, as discussed for alternative B. However, the measures identified in alternative B to offset some of the impacts (e.g., increased environmental awareness, greater emphasis on interpretive programs, and considerations for lighting) would help offset some of the effects. As a result, visitor use-related activities, including operation of the new facilities, would have long-term, minor to moderate, adverse effects on wildlife and wildlife habitat throughout the Flamingo area.

Alternative C would offer many benefits for wildlife. Flamingo would be redesigned in an even more efficient siting layout that fits into the landscape, and reduces the footprint over what is currently disturbed. The old lodge site and cottages would be used for a combination of RV camping and the new lodge and cottages; some previously disturbed areas of this site would also be restored. Under this alternative, the campground's B, C, and T Loops would be restored to natural conditions. Allowing the footprint of these areas to return to native conditions would restore approximately 87 acres of wildlife habitat. Eco Pond and the area around it would be actively restored to coastal prairie habitat, including the small wetland located between Eco Pond and walk-in camping. The removal of the road around the north side of this wetland would allow better movement of wildlife between the pond and this area, where natural hydrology would also be restored. Native vegetation would be used in all manicured or landscaped areas. These actions would result in long-term, moderate, beneficial effects for wildlife and wildlife habitat.

## **Vegetation**

**Analysis.** Similar to alternative B, construction related activities associated with developments under alternative C would only cause minor impacts to vegetation as they would be limited to previously disturbed areas and a relatively small area around the two proposed chickees. There is the potential for introducing non-native species during construction; however these impacts could be minimized using the mitigation described for alternative A. Therefore, short-term, localized, negligible to minor, adverse impacts on vegetation are expected as a result of construction activities under alternative C.

Visitor use levels in the Flamingo area would likely increase over alternative A given the increase in the facilities and level of services that would be available (described in the analysis for wildlife and wildlife habitat under alternative C). More visitors in the area could translate to more impacts on all types of vegetation, as described under alternative B. However, the measures identified in alternative B to offset

some of the impacts (e.g., increased environmental awareness, greater emphasis on interpretive programs, and considerations for lighting) would reduce the effects. As a result, visitor use-related activities would have long-term, minor, adverse effects on vegetation throughout the Flamingo area.

Alternative C would offer many benefits to native vegetation. The NPS would provide facilities and services in a more compact, efficient siting layout that fits into the landscape, and reduces the footprint over what is currently disturbed. Many areas, including the B, C, and T Loops in the campground, would be restored to natural conditions. There would be more active restoration of the coastal prairie around Eco Pond, including the wetland located between Eco Pond and the walk-in camping, where natural hydrology would also be restored. Allowing these areas to return to native conditions would restore approximately 87 acres of primarily disturbed vegetation. Native vegetation would be used in all manicured or landscaped areas. These actions would result in long-term, moderate, beneficial effects for vegetation.

**Cumulative Impacts.** The cumulative impacts under alternative C would be similar to those described for alternative A (no action), although alternative C would contribute some short- and long-term, negligible to moderate adverse impacts, as well as substantial long-term, moderate, beneficial effects (from reducing the footprint of currently disturbed areas and allowing some areas to be restored to natural conditions). Taking these factors into consideration, the cumulative impacts to wildlife, wildlife habitat, and vegetation are expected to be long-term, negligible to minor, and adverse.

**Conclusion.** Construction activities under alternative C would have short-term, localized, negligible to moderate adverse impacts on wildlife, wildlife habitat, and vegetation. Increases in visitation are expected as a result of the new facilities and services provided, which could have long-term, minor to moderate adverse impacts throughout the Flamingo area. There would also be long-term, moderate, beneficial effects from the reduction in the footprint and restoration of previously disturbed areas.

Alternative C would not produce major adverse impacts on wildlife, wildlife habitat, or vegetation resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of wildlife or wildlife habitat as a result of the implementation of alternative C.

## THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN

### AFFECTED ENVIRONMENT

This section provides a summary of the federally-listed threatened and endangered species (T&E) and state-listed/species of special concern found at Everglades National Park that may occur in the Flamingo study area, with emphasis on those species in the primary project area and near the chickee locations. The following references were consulted for incorporation of applicable information: Environmental Assessment Flamingo Potable Water System Improvement Project, Everglades National Park; Environmental Assessment Flamingo Wastewater System Improvements, Everglades National Park; the South Florida and Caribbean Parks Exotic Plant Management Plan/EIS; Section 7, Endangered Species Act (ESA) consultation with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA-NMFS) (see Appendix B); USFWS Endangered Species Web site; USFWS Critical Habitat Portal; NOAA-NMFS, Office of Protected Resources Web site; and the Florida Fish and Wildlife Commission Web site. In addition, the park's natural resources staff was consulted for information regarding T&E species and species of special concern potentially occurring in the proposed project area (Bass, pers. comm., 2007; Herling, pers. comm., 2007c, 2007f).

### FEDERALLY LISTED SPECIES

Plants and animals federally classified as endangered or threatened are protected under the Endangered Species Act (ESA) of 1973, as amended. According to the Endangered Species Act of 1973, "endangered species" means any plant and animal species in danger of extinction throughout all or a substantial part of its range. A "threatened species" is any species likely to become an endangered species in the foreseeable future throughout all or a substantial part of its range. "Proposed Species" are species of animal or plant proposed in the Federal Register to be listed under Section 4 of the ESA. "Candidate Species" are species for which the USFWS and NOAA-NMFS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA.

Everglades National Park provides habitat for a number of federally-listed threatened and endangered species, including candidate species. Seventeen such species, including one plant, have the potential to occur in and around the Flamingo study area, and are described in Table 3-4. (Note – the bald eagle (*Haliaeetus leucocephalus*) was delisted in 2007).

**Table 3-4 – Federally-Listed Threatened and Endangered Species  
with Potential to Occur in the Flamingo Study Area**

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
<b>Mammals</b>				
Mangrove fox squirrel	<i>Sciurus niger</i>	Candidate	<p>Subspecies of the fox squirrel, found only in southwest Florida. 10 to 12 inches in body length, with tails 8 to 10 inches long. Most individuals found in Florida are gray, black, and brown with white nose and ears. May weigh up to 2 pounds. Preferred habitat is mangrove stands, but they spend a great deal of time on the ground searching for nuts, buds, and seeds.</p> <p>Few details are known of the habits and specific preferences of this candidate species. Mangrove fox squirrels have not been seen in the Flamingo area for many years until recent occurrences of road fatalities. Three incidents of mortality along the road to Flamingo have been documented. No observations or reports of live individuals in the wild have been recorded.</p>	No federally designated critical habitat.
Florida panther	<i>Felis concolor coryi</i>	Endangered	<p>Large, pale brown or buff cat with white underparts and tail tip. Mature males weigh between 100 - 150 pounds and can reach 7 feet from nose to tip of tail. Females are smaller – from 50 - 100 pounds and up to 6 feet in length. Subsist on mammalian prey consisting of white-tailed deer, wild hogs, and, in some areas, raccoon. Home ranges cover 20 to over 450 square miles.</p> <p>Prefer large remote tracts with adequate prey, cover, and little disturbance. Habitat use is highly diverse and varies from upland hardwood hammocks, pinelands, and palm forests to wetland habitats of swamp and cypress. Cover is important, especially during hunting and denning. The historic range extended from eastern Texas through the southeastern states. The only known self-sustaining population occurs in south Florida, generally within the Big Cypress Swamp region. The wild population is estimated to be 30 - 50 adult animals.</p> <p>The recovery plan seeks to achieve 3 viable, self-sustaining populations within the historic range of the Florida panther through three sub-objectives: identify, protect, and enhance existing panthers and protect habitats; establish positive public opinion support for panther management; and reintroduce Florida panthers into suitable habitat.</p> <p>Florida panthers are occasionally sighted in the Flamingo area. Their use of the area is not yet clear. No reports of breeding pairs or denning activity are documented in the area. They most likely pass through the area during hunting activities, and their presence would be considered transient.</p>	No federally designated critical habitat.

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
West Indian manatee	<i>Trichechus manatus</i>	Endangered	<p>Fully aquatic herbivorous mammal. Occurs in the park's marine and estuarine systems, and spends about 5 hours a day feeding. Submerged aquatic vegetation, such as seagrasses, is a major component of the manatee diet, and although manatees appear to tolerate marine and hypersaline conditions, they are most frequently found in fresh or brackish waters.</p> <p>Changes in freshwater flow on salinity patterns, submerged vegetation, and the overall quality of the foraging habitat in Florida Bay and elsewhere in the park are, along with water temperature, important influences on the distribution and abundance of manatees in the area. Increases in salinity are generally considered to result in less favorable conditions for manatees, although manatees move freely through a wide range of salinities. Manatees may or may not need freshwater to survive, but are frequently reported drinking freshwater from natural sources as well as hoses, sewage outfalls, and culverts in marine and estuarine areas. Adult manatees are seen on both sides of the Buttonwood Canal plug, year round, but most frequently on the Whitewater Bay side in winter months and on the Florida Bay side in spring and summer. As many as 10 - 15 manatees have been seen on the Whitewater Bay side at any one time. Cows with dependent calves are occasionally seen on the Whitewater Bay side.</p>	Portions of Everglades National Park are within federally designated critical habitat. Flamingo is not within critical habitat.
<b>Fish</b>				
Smalltooth sawfish	<i>Pristis pectinata</i>	Endangered	NMFS proposed the smalltooth sawfish for federal listing on April 16, 2001. In the US, smalltooth sawfish are generally shallow water marine fish of inshore bars, mangrove edges, and seagrass beds. Commonly found in shallow water throughout the northern Gulf of Mexico, they have been reported to migrate northward along the Atlantic seaboard. They subsist chiefly on whatever small schooling fish may be abundant locally, such as mullet and anchovies. They are generally 2 feet long at birth and may grow to a length of 18 feet. Over the past century, the population of smalltooth sawfish has been reduced by fishing, habitat alteration, and habitat degradation. Currently smalltooth sawfish are primarily found in the Everglades and Florida Keys. Within the Flamingo coastal area, they are occasionally caught and released by anglers.	No federally designated critical habitat.

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
<b>Reptiles</b>				
Atlantic hawksbill turtle	<i>Eretmochelys imbricata</i>	Endangered	<p>A small to medium-sized sea turtle having an elongated oval shell, a relatively small head with a distinctive hawk-like beak, and flippers with two claws. General coloration is brown with numerous splashes of yellow, orange, or reddish-brown on the shell.</p> <p>In most locations nesting occurs sometime between April and November. In contrast to all other sea turtle species, hawksbills nest in low densities on scattered small beaches. Hawksbills frequent rocky areas, coral reefs, shallow coastal areas, lagoons or oceanic islands, and narrow creeks and passes. They are seldom seen in water deeper than 65 feet. Hatchlings are often found floating in masses of sea plants, and nesting may occur on almost any undisturbed deep-sand beach in the tropics.</p> <p>Threats to this species include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from commercial fishing operations. These turtles occasionally nest on the beaches at Flamingo.</p>	No designated critical habitat in Everglades National Park
Green turtle	<i>Chelonia mydas</i>	Endangered	<p>Grows to a maximum size of about 4 feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. Color varies. The nesting season is roughly June - September. Green turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The turtles are attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting. Green turtles have strong nesting site fidelity and often make long distance migrations between feeding grounds and nesting beaches.</p> <p>Threats to this species include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations. These turtles occasionally nest on the beaches at Flamingo.</p>	No designated critical habitat in Everglades National Park

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
Kemp's Ridley turtle	<i>Lepidochelys kempii</i>	Endangered	One of the smallest of the sea turtles, adults reach about 2 feet in length and weigh up to 100 pounds. The adult Kemp's Ridley has an oval shell that is almost as wide as it is long and is usually olive-gray in color. Nesting occurs off the Tamaulipas and Veracruz coasts of Mexico. Outside of nesting, the major habitat for Kemp's Ridleys is the nearshore and inshore waters of the northern Gulf of Mexico, especially Louisiana waters. Kemp's Ridleys are often found in salt marsh habitats. The preferred sections of nesting beach are backed up by extensive swamps or large bodies of open water having seasonal, narrow ocean connections. The decline of this species is primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations. These turtles occasionally nest on the beaches at Flamingo.	No federally designated critical habitat.
Atlantic leatherback turtle	<i>Dermochelys coriacea</i>	Endangered	<p>Largest, deepest diving, and most migratory and wide-ranging of all sea turtles. An adult can reach 4 - 8 feet in length and 500 – 2,000 pounds in weight. Nesting occurs from about March - July. Of all the sea turtles, the leatherback spends the most time in the open ocean. Adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the crawl to dry sand is not too far. The preferred beaches have proximity to deep water and generally rough seas.</p> <p>Threats to this species include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes. These turtles occasionally nest on the beaches at Flamingo.</p>	No designated critical habitat in Everglades National Park
Loggerhead turtle	<i>Caretta caretta</i>	Threatened	<p>Characterized by a large head with blunt jaws. The shell and flippers are a reddish-brown color. Nesting season extends from about May - August. The loggerhead is widely distributed within its range. It may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and ship wrecks are often used as feeding areas. Loggerheads nest on ocean beaches and occasionally on estuarine shorelines with suitable sand.</p> <p>Threats to this species include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; disease; and incidental take from channel dredging and commercial trawling, longline, and gill net fisheries. These turtles occasionally nest on the beaches at Flamingo.</p>	No federally designated critical habitat.

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
American crocodile	<i>Crocodylus acutus</i>	Threatened	<p>Most widely distributed new world crocodile, ranging from southern Florida to northern South America. Habitat consists of freshwater or brackish water coastal inlets, lagoons, and mangrove swamps. Species was listed as endangered in October 1975; listing status was changed to threatened in March 2007. This species has designated critical habitat within the park. A large species, with males reaching lengths of 15 feet, they feed at night, primarily eating fish and other aquatic species including turtles and crabs, but may take birds.</p> <p>American crocodiles use holes or mounds for nesting and can use a variety of environments to construct their nests. The number of eggs in a nest ranges from 20 to over 60. Soil disturbance tends to attract American crocodiles seeking nesting sites. The total population of American crocodiles is not known. The Florida population is estimated to be 400 - 500 animals. American crocodiles have become endangered due largely to hunting and loss of habitat (destruction of coastal mangroves and beach development).</p> <p>American crocodiles are found in the marine and brackish waterways adjacent to the Flamingo developed area. They are not found in the freshwater system at Eco Pond.</p>	Portions of Everglades National Park are within designated critical habitat, including the Flamingo area.
Eastern indigo snake	<i>Drymarchon corias couperi</i>	Threatened	<p>Large, non-poisonous snake that may reach up to 8 feet. The snake gets its name from its shiny, blue-black color. Its diet consists mainly of other snakes, amphibians, small mammals, and occasionally birds and turtles. The species occurs throughout Florida and along the coastal plain of Georgia. They prefer well-drained, sandy soils, and often use tortoise burrows for nesting.</p> <p>The decline in populations is attributed to loss of habitat to agriculture, and also collecting for the pet trade. The species has suffered from mortality during gassing of gopher tortoise burrows for rattlesnake collection.</p> <p>Little is known about the specific habits and niche of the Eastern indigo snake in the park. The species is generally found in and near hardwood hammocks, and has shown no preference for disturbed sites.</p>	No federally designated critical habitat.

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
<b>Birds</b>				
Wood stork	<i>Mycteria americana</i>	Endangered	<p>Large, long-legged wading birds, standing about 50 inches tall, with a wingspan over 60 inches. They have white plumage and a short, black tail. Their bill is black, thick at the base, and curved. These birds eat small fish, and probe with their bills for their food in shallow water no more than about 10 inches deep. They feed in freshwater marshes, tidal creeks, and brackish wetlands, and nest primarily in cypress or mangrove swamps.</p> <p>Wood storks use thermal drafts for soaring, and may travel 80 miles from nest to feeding areas. Highly social, these birds nest in large rookeries and feed in flocks. They are long-lived and first breed at 4 years old. The current world population is estimated at 11,000 birds. Their U.S. range consists of parts of Florida, Georgia, and South Carolina. In south Florida nesting occurs as early as October, with young leaving the nest in February or March. The decline in wood stork populations is attributed mostly to loss of habitat by destruction of wetlands and control of flows that created the Everglades.</p> <p>Wood storks are known to forage in the vicinity of the project area, and are infrequently observed loafing (resting) in and around Eco Pond. A nesting colony has been established approximately 15 miles from Flamingo at Paurotis Pond.</p>	No federally designated critical habitat.
Everglades snail kite	<i>Rostrhamus sociabilis plumbeus</i>	Endangered	<p>Medium-sized hawk that feeds almost exclusively on the <i>Pomacea</i> snail (apple snail), a large species occurring near the surface of Florida waters. The Everglades snail kite extracts the snail using its greatly curved beak. The species inhabits open freshwater marshes, vegetated by sawgrass and spikerushes that support apple snails. The water level must be adequate to prevent drying out of the surface.</p> <p>The Everglades snail kite is threatened primarily from habitat destruction. Widespread drainage has lowered the water table, permitting drying. In addition, invasive plant species have grown in historically clear waters used by the kite for hunting by sight. These raptors are currently restricted to several locations in Florida. Recovery efforts include snail production management, protection of drought-related habitats, use of artificial nest structures, control of exotic vegetation, and limiting human disturbance.</p> <p>The project area lies within the historical habitat of the Everglades snail kite. However, the species has not bred in this portion of the park for many years. There are no known nesting sites near Flamingo, although nonbreeding kites are seen in the project area during winter foraging in suitable marshes such as Nine Mile Pond. Concentrations of these raptors occur further to the north, near Shark Valley and other northern portions of the park.</p>	Portions of Everglades National Park are within designated critical habitat. Flamingo is not within critical habitat.

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
Cape Sable seaside sparrow	<i>Ammodramus maritime mirabilis</i>	Endangered	<p>Small, olive-brown birds about 5 inches long. They are distributed over a large portion of South Florida, with the largest population in the Big Cypress National Preserve and near Taylor Slough. Birds were discovered in the early 1900s on Cape Sable in Monroe County and placed on the endangered species list in 1967. They inhabit brushless, subtropical marshes that remain dry for most of the year.</p> <p>Cape Sable seaside sparrows have declined primarily due to hydrologic and vegetation changes in their native range. The water control projects implemented throughout the Everglades, and intensive burning to promote agriculture, have disrupted their habitat. Periodic flooding is necessary to maintain subtropical prairie grasses, and they are susceptible to fire and hurricane. Hurricane Andrew in 1992 killed many individuals. Cape Sable seaside sparrows are known to nest and forage in the shortgrass marsh habitat surrounding the Flamingo area.</p>	Portions of Everglades National Park are within designated critical habitat. Flamingo is not within critical habitat.
<b>Invertebrates</b>				
Stock island tree snail	<i>Orthalicus reses reses</i>	Threatened	<p>Large, buff-colored, conical snails, about 2 inches in length. The species is hermaphroditic and lives about 6 years. During the rainy season the snails are active, and enter a dormant stage during the dry months of December through May. Nests containing about 8 - 20 eggs are built in September and hatch in June. These snails graze on fungi and algae that grow on smooth and roughbarked trees of hardwood hammocks. The historical range includes natural hammocks of Stock Island and Key West.</p> <p>The Stock Island tree snail has declined in population largely due to destruction of habitat. There is no direct competition with this species for food. Individuals are also lost to predation by cats and rodents. Recovery efforts have included collection of wild specimens for captive breeding.</p>	No federally designated critical habitat.
Miami Blue Butterfly	<i>Cyclargus thomasi bethunebakeri</i>	Candidate	<p>Small, brightly colored butterfly whose population is threatened by habitat loss and fragmentation. This species is known to inhabit tropical coastal hammocks, pinelands, pine rocklands, and open coastal areas. Reintroduction efforts have been underway in the park since May 2004, when six rounds of releases occurred at eight locations. Adults of the Miami blue butterfly have been found to nectar at a wide variety of flowers, both native and exotic, some of which are Spanish needles (<i>Bidens alba</i>), Leavenworth's tickseed (<i>Coreopsis leavensorthi</i>), buttonsage (<i>Lantana involucrata</i>), and the exotic Brazilian pepper (<i>Schinus terebinthifolius</i>). Suitably open habitat and nectar sources in close proximity are critical to the survival of this species because of the Miami blue butterfly's observed colonial habit and sedentary behavior.</p>	No federally designated critical habitat.

Common Name	Scientific Name	Federal Status	Species Information	Designated Critical Habitat in Park
<b>Plants</b>				
Cape Sable thoroughwort	<i>Chromolaena frustrata</i>	Candidate	<p>An erect, fragrant herb that grows to about 8 inches tall with one to many stems and opposite leaves. Each head has 25 or more small flowers, with blue or violet petals. This plant has been observed most commonly in open sun to partial shade at the edges of rockland hammock and in coastal rock barren. It was historically known from coastal berm along the northern edges of Florida Bay. It is often found under other plant species, buffering it from full exposure to the sun. It has not been observed in disturbed areas. The Cape Sable thoroughwort's restricted ecological range and its drastic loss of habitat suggest that the number of individuals is declining. The total known population is between 1,000 - 10,000 plants.</p> <p>Habitat loss threatens the Cape Sable thoroughwort. Exotic plant species negatively affect the Cape Sable thoroughwort wherever it occurs. Brazilian pepper occurs in all habitats where the Cape Sable thoroughwort occurs and is currently a problem in coastal rock barrens and rockland hammocks. Latherleaf (<i>Colubrina asiatica</i>) is invading large areas of hammocks within Everglades National Park along the edge of Florida Bay. The Cape Sable thoroughwort may be located in the general vicinity of Flamingo, near Bear Lake Road, just outside of Flamingo (Smith 2007).</p>	No federally designated critical habitat.

Source: Smith 2007; Bass 2007; NPS 2002; NPS 2003; USFWS 2005; USFWS 2001; USFWS No date; Herling 2007; USFWS 2007;)

#### STATE LISTED SPECIES AND SPECIES OF SPECIAL CONCERN

The state of Florida lists a variety of plant and animal species as endangered, threatened, species of special concern, or commercially exploited. The state defines these species under the Florida Endangered and Threatened Species Act (Title 28, Florida Statutes, Natural Resources Conservation, Reclamation, and Use, Chapter 372, Wildlife, Section 372.072) as follows:

- A threatened species is any species of fish and wildlife naturally occurring in Florida which may not be in immediate danger of extinction, but which exists in such small populations as to become endangered if it is subjected to increased stress as a result of further modification of its environment.
- Endangered species are defined as any species of fish and wildlife naturally occurring in Florida, whose prospects of survival are in jeopardy due to modification or loss of habitat; over utilization for commercial, sporting, scientific, or educational purposes; disease; predation; inadequacy of regulatory mechanisms; or other natural or manmade factors affecting its continued existence.

The Florida Game and Fish Commission list includes 118 animal species (FWC 2006); and the Florida Department of Agriculture identifies 542 plant species (421 endangered species, 113 threatened species, and eight commercially-exploited species (DOACS 2003). Of the state-listed species, 19 plant species and nine animal species, all birds, have the potential to occur in the study area (tables 3-5 and 3-6). Currently, no specific information is available on the occurrence of state-listed plant species in the area. Prior to implementation of any construction under any alternatives, a site survey for these species would be conducted by a qualified botanist.

**Table 3-5 – State-Listed Plant Species with Potential to Occur in the Flamingo Study Area**

Common Name	Scientific Name	Florida Status	Habitat
Wild cinnamon	<i>Canella winterana</i>	Endangered	Coastal hammocks
West Indian cocks comb	<i>Celosia nitida</i>	Endangered	Coastal shell mounds
Cowhorn orchid	<i>Cyrtopodium punctatum</i>	Endangered	Buttonwood forests, cypress prairie, cypress domes
Guiana plum	<i>Drypetes lateriflora</i>	Threatened	Coastal hammocks
Dollar orchid	<i>Encyclia boothiana</i>	Endangered	Coastal buttonwood forests
Shell orchid	<i>Encyclia cochleata</i>	Endangered	Coastal & pineland hammocks
Blacktorch	<i>Erithalis fruticosa</i>	Threatened	--
Wild cotton	<i>Gossypium hirsutum</i>	Endangered	Coastal buttonwood forests
Manchineel	<i>Hippomane mancinella</i>	Endangered	Coastal hammocks & buttonwood forests
Joewood	<i>Jacquinia keyensis</i>	Threatened	Coastal hammocks and coastal thickets
Florida mayten	<i>Maytenus phyllanthoides</i>	Threatened	Margins of coastal hammocks along the ecotone with mangrove swamps and salt marshes.
Mule ear oncidium or CapeSable dancing lady orchid	<i>Oncidium undulatum</i>	Endangered	Coastal hammocks and buttonwood forests
Swampbush	<i>Pavonia paludicola</i>	Endangered	Coastal mangrove forests
West Indian mahogany	<i>Swietenia mahagoni</i>	Threatened	Rockland hammocks and coastal berms.
Common wild pine	<i>Tillandsia fasciculata</i> var. <i>densispica</i>	Endangered	Pineland and coastal hammocks, cypress domes & prairies, coastal buttonwood forests
Giant wild pine, giant air plant	<i>Tillandsia utriculata</i>	Endangered	Pineland and coastal hammocks, cypress domes & prairies, coastal buttonwood forests
Inflated wild pine	<i>Tillandsia balbisiana</i>	Threatened	Moist forests and swamps.
Worm-vine orchid	<i>Vanilla barbellata</i>	Endangered	Coastal buttonwood forests, east everglades shrub heads
White fenrose	<i>Kosteletskyia depressa</i>	Endangered	--
Chapman's bristlegrass	<i>Paspalidium chapman</i>	Endangered	--
Florida thatch palm	<i>Thrinax radiata</i>	Endangered	--

Source: NPS 2002; NPS 2003; FWC 2006; DOACS 2003; NPS no date.

**Table 3-6 – State-Listed Animal Species with Potential to Occur in the Flamingo Study Area**

Common Name	Scientific Name	Florida Status
Osprey	<i>Pandion haliaetus</i>	Species of special concern
<p><b>Species Information:</b> The project area is inhabited by the osprey, a large, long-winged raptor that is brown above, white below, and has a white head with a dark eye stripe. The wing has a distinctive bend at the "wrist" and from a distance can resemble a gull. This species ranges from Alaska eastward to Newfoundland and south to Arizona and Florida. They winter along the Gulf Coast and in California. They inhabit lakes, rivers, and seacoasts. They fish by hovering over the water; when they sight prey they dive talons first into the water. The nest is a mass of sticks and debris placed in trees, on telephone poles, on rocks, or on the ground. Most broods include 2 – 4 chicks. Due to the use of pesticides, osprey populations declined dramatically in the 1950s and 1960s, but since then the species has recovered substantially.</p> <p>Three to four osprey nests have been identified near the new potable water treatment plant, within the Flamingo developed area.</p>		
White crowned pigeon	<i>Columba leucophala</i>	Threatened
<p><b>Species Information:</b> In south Florida, including the greater Flamingo area, the white-crowned pigeon is common in summer and uncommon in winter. The birds feed in hardwoods, such as fig, pigeon plum, poisonwood, and other fruit-bearing trees. Birds nesting on small keys in Florida Bay fly to the mainland (e.g., Flamingo area) or upper Keys (e.g., Key Largo) daily to feed. White-crowned pigeons have also been observed at Eco Pond. They are permanent residents in Florida, but their population numbers are highly seasonal. White-crowned pigeons begin returning to Florida in large numbers in April and the numbers increase until early June. Populations remain high through the summer with the seasonal peak occurring in September when many juvenile birds are flying. Most white-crowned pigeons leave Florida between mid-September and mid-October. Most white-crowned pigeons from Florida Bay and the Upper Keys fly to the Bahamas.</p> <p>More than half of the Florida population nests in Florida Bay, in Everglades National Park. Nesting on mainland Florida is rare. Nesting requires mangrove covered islands that are free of raccoons and human disturbance. White-crowned pigeons require an abundant supply of fruit. The plants that produce this fruit are found in a number of habitats on the southern tip of the peninsula and in tropical hardwood forests on the Florida Keys. Fruiting hardwoods in the vicinity of the Flamingo area provide potential feeding habitat for white-crowned pigeons. These areas are found on natural high ground hardwood hammocks and artificial high ground such as road shoulders, berms, and fill areas.</p>		
Brown pelican	<i>Pelecanus occidentalis</i>	Species of special concern
<p><b>Species Information:</b> The brown pelican is a large, brown water bird, with a white head and neck. Young brown pelicans have a gray head and neck and white underbelly. This species can reach up to 8 pounds and have a wingspan of over 7 feet. Brown pelicans nest in colonies on coastal islands. Nests are generally built in mangrove trees, but ground nests are also used. The eastern subspecies nests in early spring or summer. Brown pelicans are commonly observed at the Flamingo Marina. They are often observed feeding offshore and day roosting in the coastal mangroves.</p>		
Roseate spoonbill	<i>Platalea ajaja</i>	Species of special concern
<p><b>Species Information:</b> Roseate spoonbills are found in the coastal marshes, mudflats, and mangrove keys from Florida to coastal Texas. These large wading birds stand almost 3 feet tall and have a wingspan in excess of 4 feet. The term 'Roseate' refers to the brilliant pink color of the adult bird.</p> <p>This species is often found in small groups with other wading birds. To feed, roseate spoonbills immerse their bill tips in water and swing their heads from side to side. Their diet consists of small fishes, crustaceans, mollusks, slugs and aquatic insects. Roseate spoonbills often nest in rookeries with herons, ibis, and other wading birds. They construct their nests of sticks, in trees or bushes, 5 - 15 feet off the ground. Early in the 20th century, this species was depleted by the feather trade. Since protective laws have been enacted in Florida, their numbers have risen. Roseate spoonbills are commonly observed flying over the Flamingo developed area and roosting at Eco Pond. They are occasionally seen feeding on flats near the Flamingo visitor center and within Eco Pond. They nest on islands in Florida Bay.</p>		

Common Name	Scientific Name	Florida Status
Tricolored heron	<i>Egretta tricolor</i>	Species of special concern
<b>Species Information:</b> The Tricolored heron is a wading bird found from Massachusetts to the Gulf Coast. Reaching 30 inches in height, and weighing up to one pound, its slate-gray plumage is complemented by a white belly and a white chin stripe. During most of the year, the bill is yellow with a black tip and its legs are yellow. During mating season the bill turns bright blue and the legs are bright pink. Its diet consists primarily of fish, but may include small reptiles, amphibians, insects, and crustaceans. This species usually breeds in brackish and saltwater coastal areas, in mixed colonies with other herons. Nests are close to the ground. Tricolored herons are extremely common throughout most of Flamingo, including Eco Pond, the shoreline areas, and most places with standing water. These birds are observed feeding, but not nesting, in the Flamingo area. They appear to use Flamingo only during daylight hours.		
Snowy egret	<i>Egretta thula</i>	Species of special concern
<b>Species Information:</b> The snowy egret is a small white heron, about 2 feet tall, with a 3 foot wingspan, and weighing just less than 1 pound. This species is distinguished by a black bill and legs, with yellow feet. Both male and female have the same coloring. Snowy egrets breed in shared colonies in salt marshes, ponds and shallow bays. Prey includes aquatic organisms and insects, such as shrimp, fish, frogs, and insects. They forage by walking slowly or standing motionless and striking at the prey. The species was reduced from common to rare by 20th century plume hunting. Snowy egrets are extremely common throughout most of Flamingo, including Eco Pond, the shoreline areas, and most places with standing water. These birds are observed feeding, but not nesting, in the Flamingo area. They appear to use Flamingo only during daylight hours.		
Little blue heron	<i>Egretta caerulea</i>	Species of special concern
<b>Species Information:</b> The little blue heron is a wading bird found along the Atlantic coast from Massachusetts to Florida, and is most abundant along the Gulf of Mexico. This species ranges up to 30 inches in height and can have a wingspread of 3 feet. Adults have a purple head and neck, with a slate-gray body. The long neck is held in an "S" curve at rest and in flight. Young are all white, with a blue bill and green legs. Little blue herons feed during the day on fish, reptiles, crustaceans, and insects. The long bill is used to jab and eat the prey. Little blue herons are commonly seen in the Flamingo area, especially at Eco Pond and in the shoreline areas. They use the Flamingo area for feeding and day roosting only.		
White ibis	<i>Eudocimus albus</i>	Species of special concern
<b>Species Information:</b> The white ibis is a medium-sized wading bird. Its feathers are entirely white, except for its dark wing tips. The face of the ibis is bare and pink, blending into a long, curved bill. It has long pink legs and webbed toes. Barriers, marshes, coastal islands and inland lakes are the preferred habitat and nesting sites. White ibis probe for aquatic crustaceans and insects using the curved bill. White ibis are found throughout the Flamingo area, including the mowed lawns. They use the area, including Eco Pond, extensively for feeding and roosting. They have not been observed nesting within the Flamingo area. Large numbers are frequently seen at Eco Pond at sundown.		
Reddish egret	<i>Egretta rufescens</i>	Species of special concern
<b>Species Information:</b> The reddish egret is an uncommon bird which breeds in scattered areas along the Gulf of Mexico, the Caribbean and west Mexico. Reddish egrets stand about 30 inches tall and have a wingspan of 4-feet. The head and neck are chestnut, and head plumes may give a golden-maned appearance. The reddish egret nests exclusively on coastal islands, usually building the nest of sticks, 10 to 20 feet above the ground in bushes or trees. In the early 1900s, most populations of reddish egrets were exterminated by plume hunters. Protection from plume hunters has helped reestablish and stabilize populations, but development pressure, and coastal dredging and filling are still a threat to their survival. Within the Flamingo area, reddish egrets have been observed feeding in the shallow coastal areas such as Snake Bight. They are rarely observed at Eco Pond.		

Source: NPS, 2002; NPS, 2003

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

The primary regulation governing this topic is the Endangered Species Act, 16 USC § 1531-1543.

The purpose of the ESA is to conserve “the ecosystem upon which endangered and threatened species depend” and to conserve and recover listed species. The ESA is a comprehensive wildlife conservation law administered by the Department of Interior’s U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration-Fisheries. This act mandates that all federal agencies protect listed species and preserve their habitats.

The state of Florida also has regulations for the protection of threatened and endangered species. The Florida Endangered and Threatened Species Act (Title 28, Florida Statutes, Natural Resources Conservation, Reclamation, and Use, Chapter 372, Wildlife, Section 372.072) is the primary regulation in the state, and sets the policy to conserve and wisely manage these resources, as well as provide for research and management to conserve and protect these species as a natural resource. This act also emphasizes coordination with other state agencies, and outlines annual reporting requirements as well the development of specific biological goals for manatees.

The Endangered Species Protection Act (Florida Statutes Section 372.0725) prohibits the intentional wounding or killing of any fish or wildlife species designated by the Florida Game and Fresh Water Fish Commission as “endangered”, “threatened” or of “special concern”. This prohibition also extends to the intentional destruction of the nests or eggs of any such species.

The protection of endangered, threatened, or “commercially exploited” plants is addressed in the Preservation of Native Flora of Florida Act (Florida Statutes Section 581.185). Commercially exploited plants are defined as species native to the state which are subject to being removed in substantial numbers from native habitats in the state and sold or transported for sale. This act sets the policy for the state of Florida relating to these species, and includes several prohibitions covering the “willful destroying or harvesting” of such plants. It also contains an exemption for agricultural and silvicultural uses.

Section 4.4.2.3 of the NPS *Management Policies 2006* provides specific guidance for management of threatened or endangered plants and animals. These policies dictate that the NPS will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. The Service will fully meet its obligations under the NPS Organic Act and the Endangered Species Act to both proactively conserve listed species and prevent detrimental effects on these species. This section also states that the National Park Service will inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition, the Service will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance.

### ASSUMPTIONS, METHODOLOGY AND IMPACT THRESHOLDS

The USFWS and NOAA-NMFS guidance for implementing Section 7 consultation under the Endangered Species Act uses the following terminology to assess impacts to listed species<sup>2</sup>:

“**No Effect**” – the appropriate conclusion when the action agency determines its proposed action will not affect a listed species or designated critical habitat.” (p. xvi)

<sup>2</sup> U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook, Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act.

**“Is not likely to adversely affect”** – the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. **Beneficial effects** are contemporaneous positive effects without any adverse effects on the species. **Insignificant effects** relate to the size of the impact and should never reach the scale where take occurs. **Discountable effects** are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect or evaluate insignificant effects; or (2) expect discountable effects to occur.” (pp. xv-xvi)

**“Is likely to adversely affect”** – the appropriate finding in a biological assessment (or conclusion during informal consultation) if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial (see definition of “is not likely to adversely affect”). In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action “is likely to adversely affect” the listed species. If incidental take is anticipated to occur as a result of the proposed action, an “is likely to adversely affect” determination should be made. An “is likely to adversely affect” determination requires the initiation of formal Section 7 consultation.” (p. xv)

Based on these impact levels, the thresholds for threatened and endangered species are as follows:

#### **Adverse**

- Negligible:* There would be no observable or measurable impacts to federally-listed 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.
- Minor:* 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 “not likely to adversely affect” under Section 7 of the Endangered Species Act.
- Moderate:* Individuals may be impacted by disturbances that interfere with critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat; however, the level of impact would not result in a physical injury, mortality, or extirpation from the park. This impact intensity would equate to a determination of “likely to adversely affect” under Section 7 of the Endangered Species Act.
- Major:* Individuals may suffer physical injury or mortality or populations may be extirpated from the park. This impact intensity would equate to a determination of “likely to adversely affect” under Section 7 of the Endangered Species Act.

#### **Beneficial**

- Negligible:* There would be no observable or measurable impacts to federally-listed 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.
- Minor:* 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. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.
- Moderate:* Impacts would result in improved viability of the species, population structure, and species population levels in the park, as species-limiting factors (e.g., habitat loss, competition, and mortality) are reduced. This impact intensity would equate to a

determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.

*Major:* Impacts would result in highly noticeable 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 nearly eliminated. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the Endangered Species Act.

The assessment of impacts on wildlife species listed by the state of Florida (but not at the federal level under the Endangered Species Act) and species protected under the Migratory Bird Treaty Act that the park has identified as needing special management consideration uses the same thresholds developed for wildlife (see the “Wildlife and Wildlife Habitat” section).

*Analysis area:* The primary area of analysis is the immediate Flamingo area that could be directly affected by the proposed actions; however, impacts to wildlife in the expanded area of analysis from boaters or hikers originating at Flamingo are also discussed.

## **IMPACTS OF ALTERNATIVE A – NO ACTION ON THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN**

### **Analysis.**

#### ***Federally-Listed Species***

In the immediate Flamingo area, construction and demolition activities associated with removal of the lodge and cottages, reclamation of that area, trail upgrades and reconstruction of the amphitheater and other structures could temporarily, and locally, cause the displacement of threatened and endangered animals from adjacent habitat, or cause them to avoid the area. This could include listed mammals (the fox squirrel and Florida panther), reptiles (the American crocodile, the eastern indigo snake, and sea turtles), and birds (the wood stork). However, most of these species are considered transient in the Flamingo area, and critical periods would be avoided for species such as crocodiles, which are known to nest in the project area, as well as sea turtles, which are also known to nest occasionally on the beaches in the greater Flamingo area. Preconstruction surveys would be conducted, and should nest sites be identified, additional measures would be taken to avoid impacts (e.g., fencing off nest sites and providing information to contractors about the species).

Temporary loss of habitat, including critical habitat for the American crocodile, during construction is not expected to occur, as the footprint during these activities is expected to be within previously disturbed areas and will not intrude into crocodile nesting habitat. The use of previously undisturbed areas would be further minimized to the extent possible by selectively choosing staging areas; parking all vehicles on existing roads and parking lots; and clearly defining and marking construction zones and perimeters. There would be no permanent loss of habitat for threatened and endangered species, including critical habitat for the American crocodile.

Construction of the two proposed chickees is not expected to adversely affect any of the federally listed species that could occur in those areas. There would be limited disturbance of sediments and the water column during installation of the pilings, with a short-term increase in turbidity, noise, and propeller wash during construction. The manatee, sea turtles, and sawfish could occur in adjacent waters, but the chickees would be built far enough away from the nearby keys (at least 500 feet but more likely 1,000 feet or more) so as not to disturb any nesting turtles. With the use of silt curtains to minimize turbidity and adherence to standard manatee and sea turtle protection measures, including no-wake zones and construction monitoring, this action would have few adverse effects on the West Indian manatee, smalltooth sawfish, crocodile, or any of the listed turtle species.

There is only one listed plant species with the potential to occur in the Flamingo area, the Cape Sable thoroughwort, one listed invertebrate, the Stock Island tree snail, and one candidate invertebrate, the

Miami blue butterfly. Because construction activities are likely to be limited to previously developed areas, and the permanent footprint would not increase, the only impacts to these species would be from the potential for non-native species to invade the area as a result of soil disturbances. The presence of people and equipment (including vehicles) associated with the trail or amphitheater work would also have the potential to introduce non-native species, which can outcompete or alter habitat (hammocks) for the Cape Sable thoroughwort, as well as habitat for the tree snail and butterfly.

However, steps would be taken to minimize the introduction of non-native species, which could affect the makeup of threatened and endangered species habitat, as well as adversely affect the Cape Sable thoroughwort, during and after construction. These could include washing equipment before entering the park; minimizing disturbances; initiating revegetation of disturbed areas immediately after construction; salvaging topsoil and native vegetation from the area, and limiting the amount of topsoil imported, for revegetation; using seeds from native species during revegetation; and monitoring reclamation, implementing exotic species control as necessary. In addition, surveys would be conducted for this species prior to taking any specific actions, and if found, measures would be taken to avoid impacts (e.g., fencing off plants and providing information to contractors about the species).

There is also the potential for any erosion and sedimentation during construction activities, as well as petroleum spills from equipment, to contribute to turbidity and pollution in surface waters. This could affect the aquatic habitat for listed species such as the manatee, smalltooth sawfish, and the various sea turtles. It can also reduce light penetration which in turn could affect sea grasses that play an important part in the diet of manatees and turtles, and provide habitat for smalltooth sawfish. However, pre- and post-construction erosion control BMPs would minimize impacts, including the installation and inspection of silt fences, straw bale barriers, temporary earthen berms, sediment traps, or other equivalent measures; and the revegetation of disturbed areas. The use of spill prevention, control, and countermeasure procedures, as well as stormwater pollution prevention measures, would reduce the potential for petroleum products from leaking equipment or vehicles reach surface waters.

Taking into consideration the impacts and the proposed mitigation measures, construction activities described above would have short-term, localized, negligible to minor adverse impacts to federal listed species and their habitat.

Visitor use levels in the Flamingo area would continue to be constrained by the current facilities and level of services available. However, some impacts associated with visitor use would occur, including off-trail use that has the potential to trample adjacent habitat and introduce non-natives, as well as noise generated by boats and gathering of people near use areas, including areas in the expanded study area that are accessible by boats and the chickees. This could affect the listed mammals, birds, and reptiles, as well as the thoroughwort and tree snail discussed above, but is not expected to affect nest sites or critical habitat for the American crocodile. Although crocodiles are present at the marina, they are able to exist in conjunction with the level of activity expected there. There could be impacts to the Cape Sable thoroughwort from off-trail use, but visitors are told to stay on trails, and the surrounding landscape is often inhospitable and inaccessible. Signage at the proposed chickees would identify that the nearby keys are closed to landing. Therefore, the likelihood of visitor use directly impacting listed species is remote, although indirect impacts due to noise and presence of humans could occur.

Outboard engines can have impacts on the aquatic habitat or forage provided by seagrass and other submerged vegetation, as well as directly affect listed aquatic wildlife as a result of propeller strikes. This could affect species such as the manatee, sea turtles, and smalltooth sawfish that occur in the Flamingo area and near the chickee locations. In addition, mangrove habitat and the federal listed species it supports (wood storks, smalltooth sawfish, and American crocodile) are affected by activities associated with pruning for boater safety. However, precautions would be taken to avoid important habitat or critical periods for these species, including surveys prior to pruning. As a result, these visitor use-related

activities would have long-term, minor effects on threatened and endangered species that use seagrass, other submerged vegetation, or mangrove wetlands in the Flamingo area.

Allowing the footprint of the lodge and cottages proposed for demolition to return to native conditions would provide approximately 27 acres of additional habitat that could potentially support wildlife. However, this area is not expected to attract many of the federally listed species to a great extent because it is located in the midst of the Flamingo developed area. The restored soil and vegetation would help filter surface runoff and any associated pollutants (as described for water resources) before they are discharged to Florida Bay, which would have a beneficial effect on aquatic species, such as the manatee, smalltooth sawfish, and the sea turtles. The removal of any fill materials may also reduce the potential for exotics to become established. The NPS would allow for the natural restoration of Eco Pond, which would enhance habitat for species such as the wood stork. As a result, there would be long-term, localized, minor, beneficial effects on federal listed species and their habitat.

### ***State-listed Species***

As construction and demolition activities would occur in previously disturbed areas, and surveys for plants listed by the state or considered species of special concern would be conducted prior to undertaking any such activities, direct impacts to these plants are not expected. Indirect impacts from the potential for erosion and sedimentation and for non-native species to be introduced could occur; however, this potential would be minimized using the methods described previously for federal listed species. As a result, adverse impacts from construction on state-listed plants or plant species of special concern would be short-term, localized, and negligible.

Of the nine birds listed by the state or considered species of special concern with the potential to occur in the Flamingo area, only one, the osprey, nests in the area. However, the nests are located across Buttonwood Canal near the potable water treatment plant, and are not likely to be disturbed by any construction activities under alternative A. The wading birds (spoonbill, herons, egrets) either feed or roost in the area, primarily along the shoreline and at Eco Pond, and could temporarily be displaced or avoid the area during construction activities. The brown pelican, known to feed in the area and roost in coastal mangroves, could also be temporarily displaced or avoid the area. The white-crowned pigeon and the white ibis are the bird species most likely to be affected by construction activities because they occur throughout the Flamingo area, on artificial high ground such as road shoulders, berms, and fill areas, and in mowed lawns.

Indirect impacts from the potential for non-native species to invade the area and alter the composition of the habitat for these birds could occur. In addition, erosion and sedimentation could have the potential to reduce visibility for birds that feed in coastal areas (such as the brown pelican). However, this potential would be minimized using the methods described previously for federal listed species. Therefore, adverse impacts from construction on state-listed birds or bird species of special concern would be short-term, localized, and negligible.

Construction of the backcountry chickees would include installation of pilings and platforms/docks in general proximity to Rankin and Johnson Keys in the subtidal zone. Noise from construction equipment, especially the pile driver, would temporarily disturb birds using the nearby islands or flats, and some of these may be state-listed wading birds. Birds may flush from the area, but would be expected to return once construction was completed. Impacts from construction would be short-term (except for the piling location itself), limited to daylight hours, minor, and adverse. Use of the chickees may also have adverse impacts to state-listed birds, since boats and campers would be in close proximity to the sensitive resources of the nearby islands. The islands are home to many shore birds, wading birds and ospreys, and some flushing of birds on the islands or using nearby flats could be expected from human disturbance, even the presence of relatively non-intrusive paddlers. To prevent adverse impacts by chickee users, informational signage would be posted indicating that the keys themselves would remain closed to landings. The chickees would be located at least 500 feet (and most likely 1000 feet or more) from the

keys and in deep enough water so groundings would not occur. The park would provide improved education, signage, and enforcement to prevent the public from accessing the keys and other sensitive resources in the vicinity (Herling, pers. comm., 2007f). With these measures, adverse impacts would be short-term, seasonal, and minor.

Impact from visitor use with the potential to affect the plants and birds listed by the state or considered species of special concern is primarily limited to the trampling of vegetation that results from off-trail use, and indirect effects of disturbance from noise generated by visitor use. Trampling has the potential to have a greater effect on the plants than birds, given that none of the birds that build nests on the ground (brown pelican and tricolored heron) are known to nest in the area, and most feed on aquatic organisms. Noise impacts would dissipate with distance from the area of use, and it is likely that birds would quickly leave the area and return later. As a result, long-term localized, negligible to minor adverse impacts to these plants and birds would occur from visitor use.

Allowing the footprint of the lodges and cottages proposed for demolition to return to native conditions would provide approximately 27 acres of additional habitat that could potentially support state-listed plants and birds or those considered species of special concern, especially wading birds that frequent the Florida Bay shoreline. The removal of any fill materials may also reduce the potential for exotics to become established. The NPS would allow for the natural restoration of Eco Pond, which would restore native vegetation and associated bird communities. As a result, there would be long-term, localized, minor, beneficial effects on state-listed species, species of special concern, and their habitat.

**Cumulative Impacts.** Federal and state-listed species, as well as species of special concern have all been affected by the continued development of the facilities, campgrounds, infrastructure, trails, parking, and roads in the Flamingo area. In addition, visitor use in the area, which had increased until the recent hurricane events, has also had impacts. Maintenance activities such as ongoing exotic plant control, fire management, and landscape management have also contributed to impacts (both adverse and beneficial) on federal and state-listed species, as well as species of special concern.

Other activities with the potential to affect federal and state-listed species, as well as species of special concern, include the removal of underground storage tanks, resurfacing of roads and parking areas, and infrastructure upgrades (wastewater treatment plant, potable water system) at Flamingo. However, the impacts from these activities would be temporary, only lasting the duration of the construction activity. Plans for restoring the Everglades ecosystem would have longer-term, beneficial effects, while some of the planned regional transportation projects may indirectly contribute to visitor-use related impacts, if they contribute to increased visitation to Flamingo over time.

Alternative A would contribute some short- and long-term, negligible to minor adverse impacts, as well as long-term, minor, beneficial effects from restoration of disturbed areas. Taking these factors into consideration, the cumulative impacts to federal and state-listed species, as well as species of special concern, are expected to be long-term, negligible to minor, and adverse.

**Conclusion.** Construction, demolition, and grading activities under alternative A would have short-term, localized, negligible to minor adverse impacts on federal and state-listed species, as well as species of special concern which would equate to a finding of “is not likely to adversely affect” under Section 7 of the Endangered Species Act. Long-term impacts from visitor use would occur from possible off-trail use and noise, and the effects of outboard engines on seagrass and other submerged vegetation, as well as propeller strikes, having negligible to minor adverse impacts throughout the Flamingo area. There would also be long-term, minor, beneficial effects from the restoration of the current lodge and cottage areas.

Alternative A would not produce major adverse impacts on Federal and state-listed species, as well as species of special concern whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park

Service planning documents. Consequently, there would be no impairment of these resources as a result of the implementation of alternative A.

### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN**

#### **Analysis.**

##### ***Federally-listed Species***

As with alternative A, the lodge and cottages would be demolished and graded, trails would be reopened, and the amphitheater and other structures would be rebuilt. In addition, several other developments would be built, as described in the analysis of alternative B for wildlife and wildlife habitat. The impacts during construction discussed under alternative A (such as displacement of threatened and endangered wildlife due to noise and the presence of people, the potential for the introduction of exotic species, and the potential for erosion/sedimentation and other water quality impacts) would also occur during construction under alternative B, and could affect the listed mammals (the fox squirrel and Florida panther), reptiles (the American crocodile, the eastern indigo snake, and sea turtles), and birds (the wood stork). However, most of these species are considered transient in the Flamingo area, and critical periods would be avoided for species such as the American crocodile, which are known to nest in the project area, as well as the sea turtles, which are also known to nest occasionally on the beaches in the greater Flamingo area. Impacts to the thoroughwort and Stock Island tree snail would be similar to those described under alternative A. Because there are many more construction-related activities under this alternative, the impacts to all of these species are likely to occur over a longer period of time and over a greater area when compared to alternative A. Therefore, impacts of construction would be short-term, minor, and adverse.

Although the number of camping sites would be scaled back under this alternative as compared to alternative A, visitor use levels in the Flamingo area would likely increase over alternative A given the increase in the facilities and level of services that would be available (described in the analysis of alternative B for wildlife and wildlife habitat). More visitors in the area could translate to greater impacts for federal listed species from the associated increases in noise, vehicle traffic, and the presence of people; trampling of vegetation from increased off-trail use; the potential for exotic species introductions (from vehicles and people); and the increased number of boats with outboard engines that could affect habitat or forage provided by seagrass and other submerged vegetation, or cause propeller strikes. This could affect the listed mammals, birds, and reptiles, as well as the thoroughwort and tree snail, discussed above, but is not expected to affect nest sites or critical habitat for the American crocodile. Although crocodiles are present at the marina, they are able to exist in conjunction with the level of activity expected there. There could be impacts to the Cape Sable thoroughwort from off-trail use, but visitors are told to stay on trails, and the surrounding landscape is often inhospitable and inaccessible. Therefore, the likelihood of visitor use impacting this species is remote. In addition, there would be an increase in environmental awareness and interpretive programs (e.g., guided boat tours) that would help educate visitors with the intent of reducing impacts on federal listed species or their habitat.

More boats could increase the effects of outboard engines on aquatic habitat as described for alternative A. This could affect species such as the manatee, sea turtles, and smalltooth sawfish that occur in the Flamingo area and at the chickee locations. In addition, mangrove habitat and the federal listed species it supports (wood storks, smalltooth sawfish, and American crocodile) could be affected by activities associated with increased requests for pruning for boater safety. However, precautions described under alternative A would be taken. As a result, these visitor use-related activities would have long-term, minor effects on threatened and endangered species that use seagrass, other submerged vegetation, or mangrove wetlands, or the chickee locations in the Flamingo area.

Operation of the new visitor facilities could affect night skies by introducing new sources of light, which can affect some of the federal listed birds that rely on the moon and stars for navigation, as well as sea

turtle hatchlings. Increased lighting can also deter certain animals (e.g., the Florida panther) from using the area. However, as per NPS *Management Policies 2006*, artificial lighting would not be used in locations where its presence will disrupt wildlife dependent on the dark; minimal-impact lighting techniques would be used (possibly including consideration of yellow versus white lights, use of timers); and artificial lighting will be shielded and directed where necessary with regard for natural night sky conditions. As a result, visitor use-related activities, including operation of the new facilities, would have long-term, minor, adverse effects on federal listed species throughout the Flamingo area.

Under alternative B, the NPS would provide facilities and services in a more compact, efficient siting layout that fits into the landscape, and reduces the footprint of what is currently disturbed. The majority of the old lodge site and cottages, as well as the campground's B and C Loops, would be restored to natural conditions. Allowing the footprint of these areas to return to native conditions would restore approximately 50 acres of potential habitat for federal listed species, a large portion of which is located adjacent to undisturbed habitat on the west side of the Flamingo area, where visitor use is low. This would provide more of a buffer between the Flamingo developed area and the surrounding habitat and would be especially beneficial with regard to noise impacts to species using the surrounding areas, such as the American crocodile. Native plantings may benefit the Miami blue butterfly. The restored soil and vegetation would help filter surface runoff and any associated pollutants (as described for water resources) before they are discharged to Florida Bay, which would have a beneficial effect on aquatic species, such as the manatee, smalltooth sawfish, and the sea turtles. The removal of any fill materials may also reduce the potential for exotics to become established.

In addition, Eco Pond would be allowed to revert back to natural coastal prairie conditions, which could benefit species such as the wood stork. Native vegetation would be used in all manicured or landscaped areas. New structures would be raised to protect them against the forces of hurricanes, which would also help reduce the surface area that is permanently covered with buildings. As a result, alternative B would have long-term, minor to moderate, beneficial effects for federally-listed species.

### ***State-listed Species***

As construction activities would occur in previously disturbed areas, and surveys for plants listed by the state or considered species of special concern would be conducted prior to undertaking any such activities, direct impacts to these plants are not expected. Indirect impacts from the potential for erosion and sedimentation and for non-native species to be introduced could occur; however, this potential would be minimized using the methods described previously for federal listed species under alternative A. As a result, adverse impacts from construction on state-listed plants or plant species of special concern would be short-term, localized, and minor.

Construction activities are not expected to affect the osprey, the only bird listed by the state or considered a species of special concern that nests in the area. Wading birds (spoonbill, herons, egrets), the brown pelican, the white-crowned pigeon, and the white ibis could be displaced or avoid the area during construction. Impacts from the potential for non-native species to invade the area and alter the composition of the habitat for these birds could occur. In addition, erosion and sedimentation could have the potential to reduce visibility for birds that feed in coastal areas (such as the brown pelican). However, this potential would be minimized using the methods described previously. Therefore, adverse impacts from construction on state-listed birds or bird species of special concern would be short-term, localized, and minor.

Although camping sites would be scaled back under this alternative as compared to alternative A, visitor use levels in the Flamingo area would likely increase over alternative A given the increase in the facilities and level of services (as described under the analysis of alternative B in the "Wildlife and Wildlife Habitat" section). More visitors in the area could translate to more impacts on birds and plants listed by the state or considered species of special concern, as described for federal listed species under alternative A. Roadkill along the main entrance road may increase with the increased visitation expected. There

would be more boats with outboard engines originating in Flamingo but using the expanded study area that could affect habitat at islands and along shorelines that is frequented by shore birds and wading birds. Indirect impacts from boating and visitors could increase impacts to wildlife of the keys near the backcountry chickees. In addition, more recreational users could result in more requests for pruning mangrove trees to improve passage for boats. However, there would be an increase in environmental awareness and interpretive programs that would help educate visitors with the intent of reducing impacts on vegetation.

As with federal listed species, operation of the new visitor facilities could also affect night skies by introducing new sources of light, which can affect some of the birds listed by the state or considered species of special concern. However, mitigation measures (as described for federal listed species) would be applied to reduce the effects of lighting on night skies. As a result, visitor-use related impacts, including operation of the new facilities, would have long-term, minor, adverse effects on state-listed species and species of special concern throughout the Flamingo area.

Under alternative B, the NPS would provide facilities and services in a more compact, efficient siting layout that fits into the landscape, and reduces the footprint of what is currently disturbed. The majority of the old lodge site and cottages, as well as the B and C Loops in the campground, would be restored to natural conditions. Allowing the footprint of these areas to return to native conditions would restore approximately 50 acres of potential habitat for state listed species and species of special concern, a large portion of which is located adjacent to undisturbed habitat on the west side of the Flamingo area, where visitor use is low. This would provide more buffer between the Flamingo developed area and the surrounding habitat and would be especially beneficial with regard to noise impacts to species using the surrounding area. Other areas slated for restoration would benefit wading birds that frequent the Florida Bay shoreline. The removal of any fill materials may also reduce the potential for exotics to become established. In addition, Eco Pond would be allowed to revert back to natural coastal prairie conditions. Native vegetation would be used in all manicured or landscaped areas. New structures would be raised to protect them against the forces of hurricanes, which would also help reduce the surface area that is permanently covered with buildings. As a result, alternative B would have long-term, minor to moderate, beneficial effects for state listed species and species of special concern.

**Cumulative Impacts.** The cumulative impacts under alternative B would be similar to those described for alternative A, although alternative B would contribute some short- and long-term, minor adverse impacts, there would also be long-term, minor to moderate, beneficial effects from restoration of disturbed areas. Taking these factors into consideration, the cumulative impacts to federal and state-listed species, as well as species of special concern, are expected to be long-term, negligible, and adverse.

**Conclusion.** Construction activities under the alternative B would have short-term, localized, minor adverse impacts on federal and state-listed species, as well as species of special concern which equates to a finding of “is not likely to adversely affect” under Section 7 of the Endangered Species Act. Long-term impacts from visitor use would occur from off-trail use and the effects of outboard engines on seagrass and other submerged vegetation, as well as propeller strikes, having minor adverse impacts throughout the Flamingo area. There would also be long-term, minor to moderate, beneficial effects from the restoration of previously disturbed areas.

Alternative B would not produce major adverse impacts on federal and state-listed species, as well as species of special concern, whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park Service planning documents. Consequently, there would be no impairment of these resources as a result of the implementation of alternative B.

**IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON THREATENED AND ENDANGERED SPECIES, SPECIES OF SPECIAL CONCERN****Analysis.*****Federally-listed Species***

As with alternative B, this alternative would involve demolition activities and construction of a variety of new facilities (described for alternative C in the “Wildlife and Wildlife Habitat” section), in addition to reopening trails and rebuilding the amphitheater and other structures. The impacts of construction discussed under alternatives A (no action) and B would also occur under alternative C and the mitigation measures identified would also apply. Construction would cover more sites within the developed area and would last longer, which could affect species for a longer time due to noise-related effects. As a result, construction activities under alternative C are expected to have short-term, minor to moderate, adverse impacts on federal listed species, including mammals (the fox squirrel, Florida panther, and manatee), reptiles (the American crocodile, the eastern indigo snake, and sea turtles), and birds (the wood stork), as well as the smalltooth sawfish, thoroughwort, and Stock Island tree snail.

Although camping and RV sites would be scaled-back under this alternative as compared to alternative A, visitor use levels in the Flamingo area would likely increase over alternative A given the increase in other facilities and level of services that would be available (as described under alternative C in the “Wildlife and Wildlife Habitat” section). More visitors in the area and operation of the new visitor facilities could translate to more impacts on federal listed species, as discussed for alternative B. However, the measures identified in alternative B to offset some of the impacts (e.g., increased environmental awareness, greater emphasis on interpretive programs that discuss ecology and species conservation, and considerations for lighting) would also be applied under alternative C. As a result, visitor use-related activities, including operation of the new facilities, would have long-term, minor, adverse effects on federal listed species throughout the Flamingo area.

Under alternative C, the NPS would provide facilities and services in a more compact, efficient siting layout that fits into the landscape, and reduces the footprint over what is currently disturbed. The old lodge site and cottages would be used for a combination of RV camping and the new lodge and cottages; some previously disturbed areas of this site would also be restored, as would the B, C, and T Loops in the campground. Allowing these areas to return to native conditions would restore approximately 87 acres of potential habitat for federal listed species. A large portion of the reclaimed areas would be located adjacent to undisturbed habitat on the west side of the Flamingo area, where visitor use is low. This would provide a sizeable buffer between the Flamingo-developed area and the surrounding habitat and would be especially beneficial with regard to noise impacts to species using the surrounding area, such as the American crocodile. Native plantings may benefit the Miami blue butterfly.

The 87 acres of restored soil and vegetation would help filter surface runoff and any associated pollutants (as described for water resources) before they are discharged to Florida Bay, which would have a beneficial effect on aquatic species, such as the manatee, smalltooth sawfish, and the sea turtles. In this alternative, there would be active restoration of the former coastal prairie habitat in and around Eco Pond, including the wetland located between Eco Pond and the walk-in camping, where natural hydrology would also be restored. Native vegetation would be used in all manicured or landscaped areas. New structures would be raised to protect them against the forces of hurricanes, which would also help reduce the surface area that is permanently covered with buildings. As a result, alternative C would have long-term, moderate, beneficial effects for federal-listed species.

***State-listed Species***

Construction activities under alternative C would occur in previously disturbed areas, and surveys for plants listed by the state or considered species of special concern would be conducted prior to undertaking any such activities. As a result, direct impacts to these plants are not expected under alternative C.

Indirect impacts from the potential for erosion and sedimentation and for non-native species to be introduced could occur; however, this potential would be minimized using the mitigation measures described previously for federal listed species under alternative A (no action). Therefore, adverse impacts from construction on state-listed plants or plant species of special concern would be short-term, localized, and minor.

As with alternative B, construction activities are not expected to affect the osprey, the only bird listed by the state or considered a species of special concern that nests in the area. Impacts on wading birds (spoonbill, herons, egrets), the brown pelican, the white-crowned pigeon, and the white ibis would be similar to alternative B. However, the potential impacts would be minimized using the methods described previously. Therefore, adverse impacts from construction on state-listed birds or bird species of special concern would be short-term, localized, and minor.

Although camping and RV sites would be scaled-back under this alternative as compared to alternative A, visitor use levels in the Flamingo area would likely increase over alternative A given the increase in the facilities and level of services (as described under alternative C in the “Wildlife and Wildlife Habitat” section). More visitors in the area and more tours could translate to more impacts on birds and plants listed by the state or considered species of special concern, as discussed for alternative B. Roadkill along the main entrance road may increase with the increased visitation expected. There would be more boats with outboard engines originating in Flamingo but using the expanded study area that could affect habitat at islands and along shorelines that is frequented by shore birds and wading birds. Indirect impacts from boating and visitors could increase impacts to wildlife of the keys near the backcountry chickees. In addition, more recreational users could result in more requests for pruning mangrove trees to improve passage for boats. However, educational and interpretive programs described previously would be implemented to help educate visitors with the intent of reducing impacts.

As with federal-listed species, operation of the new visitor facilities could also affect night skies by introducing new sources of light, which can affect some of the birds listed by the state or considered species of special concern. However, mitigation measures (as described for federal-listed species under alternative A) would be applied to reduce the effects of lighting on night skies. As a result, visitor use related impacts, including operation of the new facilities, would have long-term, minor, adverse effects on state-listed species and species of special concern throughout the Flamingo area.

Under alternative C, the NPS would provide facilities and services in a more compact, efficient siting layout that fits into the landscape, and reduces the footprint of what is currently disturbed. The majority of the old lodge site and cottages, as well as the campground’s B, C, and T Loops, would be restored to natural conditions. Allowing the footprint of these areas to return to native conditions would restore approximately 87 acres of potential habitat for state listed species and species of special concern, a large portion of which is located adjacent to undisturbed habitat on the west side of the Flamingo area, where visitor use is low. This would provide a sizable buffer between the Flamingo developed area and the surrounding habitat and would be especially beneficial with regard to noise impacts to species using the surrounding area. The removal of any fill materials may also reduce the potential for exotics to become established. Native vegetation would be used in all manicured or landscaped areas. New structures would be raised to protect them against the forces of hurricanes, which would also help reduce the surface area that is permanently covered with buildings. Eco Pond would be actively managed to restore coastal prairie habitat, which would remove any open water in that area and have a minor adverse effect on state-listed wading birds that frequent this area. Overall, however, actions under alternative C would have long-term, moderate, beneficial effects for state-listed species and species of special concern.

**Cumulative Impacts.** The cumulative impacts under alternative C would be similar to those described for alternative A, although alternative C would contribute some short- and long-term, minor adverse impacts, as well as long-term, moderate, beneficial effects from restoration of disturbed areas. Taking

these factors into consideration, the cumulative impacts to federal- and state-listed species, as well as species of special concern, are expected to be long-term, negligible, and adverse.

**Conclusion.** Construction activities under the alternative C would have short-term, localized, minor adverse impacts on federal and state-listed species, as well as species of special concern which equates to a finding of “is not likely to adversely affect” under Section 7 of the Endangered Species Act. Long-term impacts from visitor use would occur from off-trail use, noise, and the effects of outboard engines on seagrass and other submerged vegetation, as well as propeller strikes, having minor adverse impacts throughout the Flamingo area. There would also be long-term, minor to moderate, beneficial effects from the restoration of previously disturbed areas.

Alternative C would not produce major adverse impacts on federal- and state-listed species, as well as species of special concern whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park’s master plan or other National Park Service planning documents. Consequently, there would be no impairment of these resources as a result of the implementation of alternative C.

## CULTURAL RESOURCES

The NPS defines cultural resources as archeological resources, structures, cultural landscapes, ethnographic resources, and museum collections. Under the National Historic Preservation Act, “historic properties” are sites, structures, buildings, districts, and objects that are listed in, or eligible for listing in, the National Register of Historic Places. This EA assesses potential impacts to archeological resources, structures and districts, cultural landscapes, and ethnographic resources.

### AFFECTED ENVIRONMENT

Archeological resources, cultural landscapes, historic structures and districts, and ethnographic resources are discussed in the following paragraphs.

#### ARCHEOLOGICAL RESOURCES

The chronology of human occupation of southern Florida can be broken down into the following periods:

- Paleoindian period (10,000 to 8000 B.C.);
- Archaic period [Middle Early, and Late sub-periods] (8000 to 750 B.C.);
- Glades period [Glades I, II, and III sub-periods] (750 B.C. to A.D. 1500);
- Historic Contact period (A.D. 1500 to 1750); and
- Historic period (A.D. 1750 to 1930) (NPS 2007d).

Occupation in the Flamingo area may date back as far as 5,600 years (Schwadron, pers comm., 2007). The presence of black earth middens (soil and cultural debris mounds), shell mounds, evidence of transient camps, and features containing stone tools and implements indicate that humans have used this area for many centuries. Artifacts found in these locations include ceramics, bone tools and ornaments, and food debris (shell and bone) that reflect the diet of these early inhabitants. Modern exploration and documentation of prehistoric resources indicate that the area was continuously occupied by humans during the Glades period, from approximately A.D. 400 to 1400 (NPS 2002a, 2003). In many instances, these archeological sites have been used as historic hunting camps, farmed, and been sites of artifact collection, looting and vandalism.

Much of Everglades National Park, including portions of the Flamingo area, has been surveyed for archeological sites. Taylor (1985) lists two prehistoric middens several miles from the project area. The closest, the Bear Lake Mounds, are located approximately three miles north of the project area near the Homestead Canal. The second, the Coot Bay Middens, lie between Coot Bay and Mud Lake, approximately four miles to the northeast of Flamingo (Taylor 1985). This report also includes the finding of cultural material on two outlying Florida Bay keys. Both of these sites are outside the area of potential effect.

In March 2006, the NPS Southeast Archeological Center conducted a cultural resources survey of approximately 9.5 acres of land south and east of the campground loop road at Flamingo (SEAC 2006). The survey was conducted in advance of a project during which the area will be used as a containment field to hold dredge spoil from the nearby Flamingo Bay Marina. The survey found no evidence of intact significant archeological resources in this limited project area. Artifacts potentially associated with a late 19th/early 20th-century occupation of the community and evidence of a road or trail, probably associated with the same occupation, were found. The remains of a pier, seawall, and septic culvert were also documented offshore, south of the proposed dredge containment area within 20 meters of the high tide line of the Florida Bay.

## **HISTORIC STRUCTURES AND DISTRICTS**

Early mariners recorded the location of Cape Sable, located just west of Flamingo. Several attempts were made to settle the area in the 1800s, but environmental conditions and conflict with Native Americans prevented the success of early white settlement.

The U.S. Government transferred much of the land in South Florida to state control in 1850. Over the next 50 years, non-Indian settlers arrived by boat to the area that is now the western portion of Everglades National Park. The community of Flamingo was established in 1898, when about 50 families gathered into a community and engaged in fishing, hunting and farming. Residents hoped the railroad line to Key West would pass through their small town. When this did not happen, the community declined. In 1919, there were about half a dozen structures in Flamingo, including a school and three houses. In 1921, a road to the town of Homestead was opened, but this did not foster economic growth (Paige 1986).

All of the early buildings constructed at Flamingo have been destroyed over the decades by hurricanes and park development. The area was struck by storms in 1909, 1910, 1926, and again in 1935, with each storm delivering considerable damage. Hurricane Donna damaged the one remaining building at Flamingo in 1960 (Paige 1986), which was subsequently removed by the park. Hurricanes Katrina and Wilma devastated the area in 2005.

Most of the structures that exist today at Flamingo were constructed as part of the Mission 66 program. Mission 66 was a 10-year NPS program from 1955 to 1966 to address deteriorating park resources during a boom in domestic travel after World War II. Mission 66 involved the construction of roads, camping and picnic areas, sanitary facilities, housing, and visitor centers. Museum exhibits, informational pamphlets, and audio-visual programs also were developed as a result of Mission 66. By 1966, no historic buildings remained in Flamingo.

The Flamingo visitor center was built in 1956 to 1957, along with other Everglades National Park visitor centers, as part of the Mission 66 program. Cecil John Doty provided a conceptual site design for the design firm to use to guide their facility designs for Everglades National Park at Flamingo. The architect was EODC/Harry Keck Jr. of Coral Gables, Florida. The building is of concrete construction with cochina stone façade and 1950s Modernist touches.

Unlike the adjacent visitor center with its unique profile and modernist touches, the long, gable-roofed concrete block motel lodge buildings seem unrelated to the visitor center except for the use of cochina stone facing on the ends of some of the buildings. The motel was run and managed by concessioners since its inception.

Architecturally, the motel lodge buildings are extremely utilitarian, and exhibit no identifiable architectural style. The motel lodge buildings are less than 50 years old, but because the buildings were constructed as part of the Service-wide Mission 66 program, a Determination of Eligibility was prepared by the NPS on July 14, 2006. The NPS concluded that these structures are not eligible for inclusion in the NRHP. They are neither “exceptionally important” in terms of architecture or in their relationship to important persons or events, nor do they retain physical integrity as originally constructed examples of Mission 66 design. The Florida SHPO concurred on May 3, 2007.

The twelve wood-frame, single-story gable roof cottages were constructed between 1962 and 1964 as “Low Cost Overnight Accommodations” for the Flamingo developed area. Each cottage was a duplex consisting of two units, each unit with a bedroom, a living room/kitchen, and a bathroom. The cottages underwent extensive demolition/rehabilitation between 1983 and 1987. The cottages do not retain the historical and architectural integrity necessary to be eligible as contributing features of a “Mission 66 District.” The SHPO concurred on July 14, 2006, and these structures, severely damaged during hurricane Katrina, have been removed.

Before the 2005 storms, the NPS Southeast Region had advocated a National Register Historic District status for Flamingo based on the history of the locale, its role in the development of the park, and the Mission 66 program structures. The visitor center, the gas station, possibly the maintenance shed, and some of the Modernist housing units may still be eligible for inclusion in a historic district.

Other potential nominations to the National Register of Historic Places include areas of the park to the Underground Railroad network. The prehistoric Mud Lake Canal was designated a National Historic Landmark (NHL) on September 20, 2006. Adjacent to Flamingo is the historic Ingraham Highway, Homestead Canal and East Lake Canal, which are currently proposed for listing in the National Register of Historic Places. In 1916, Royal Palm State Park was established and a road was barely completed from Homestead to the state park in time for the dedication. This highway, eventually named the Ingraham Highway, was the first to cross the Everglades. This location is now part of Everglades National Park and these historic structures can be seen at the Royal Palm visitor center.

### **CULTURAL LANDSCAPES**

No cultural landscape has been designated for Flamingo; thus, there is no cultural landscape report available for the project area. Although now damaged by storms, the modern-day, pre-storm Flamingo included a marina, visitor center and museum, motel accommodations, and park housing. All structures were built since the park was established in 1947 and some were a part of the Mission 66 renovations. Most buildings are of concrete and cinder block, built for function and to withstand environmental conditions. However, the buildings, lawns, and palm trees, set against the backdrop of the lush and exotic Everglades environment, convey a special sense of place to the visitor. The Flamingo area is potentially eligible as a cultural landscape with respect to the Mission 66 construction.

### **ETHNOGRAPHIC RESOURCES**

When Europeans began arriving in southern Florida around A.D. 1500, they found a thriving population of about 20,000 Native Americans. There were five tribes, two of which – the Tequesta and Calusa – inhabited the area that is now Everglades National Park. When the English gained control of Florida in 1793, only a few hundred members of these tribes remained.

Two tribes presently reside in South Florida. The Seminole and Miccosukee are largely descendants of Maskokí Indians who immigrated to the area during the A.D. 1600s to 1800s. These groups resisted relocation to the reservations of Oklahoma and retreated into the far reaches of what is today Everglades National Park and Big Cypress National Preserve (NPS 2001a).

The Seminole Tribe incorporated in 1957, and the Miccosukee incorporated in 1962. Many members of the Seminole Tribe now occupy the Big Cypress Seminole Reservation. Presently, the Miccosukee have three reservations in Florida: Tamiami Trail, Alligator Alley, and Krome Avenue. The Trail Miccosukee, or Traditional Miccosukee, occasionally establish roadside villages and provide concession services to park visitors. Members of both groups remain unaffiliated and politically independent. Fishing for subsistence and profit has occurred at Flamingo since the early 1900s and may be considered an ethnographic use.

The park sent letters to both the Miccosukee and Seminole tribes on October 30, 2006, requesting government-to-government consultation for the CSP/EA. A response letter dated December 18, 2006 was received from the Miccosukee Tribe of Indians; it stated that no further government-to-government consultation was necessary at this time (see Appendix B).

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

The primary act related to cultural resources is the National Historic Preservation Act of 1966, as amended. Section 106 of this act requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register of Historic Places. Other acts and executive orders relevant to this section include:

**36 CFR 800 – Protection of Historic Properties. Regulations implementing Section 106 of the National Historic Preservation Act.**

**Executive Order 11593 – Protection and Enhancement of the Cultural Environment.** This Executive Order directs federal agencies to support the preservation of cultural properties and to identify and nominate to the NRHP cultural properties in the park and to “exercise caution... to assure that any NPS-owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”

**Executive Order 13007 – Indian Sacred Sites.** Federal agencies shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites on federal lands.

**NPS Director’s Order 28 and NPS 28.** Cultural Resource Management Guideline is intended to aid managers, planners, staff, and cultural resource specialists. It outlines the basic principles and ingredients of a good park cultural resource management program.

**NPS Management Policies 2006.** Chapter 5, Section 5.3.1 Protection and Preservation of Cultural Resources states that the National Park Service will employ the most effective concepts, techniques, and equipment to protect cultural resources against theft, fire, vandalism, overuse, deterioration, environmental impacts, and other threats without compromising the integrity of the resources.

### ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

In this EA, impacts to archeological resources, historic structures and districts, cultural landscapes, and ethnographic 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 NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). In accordance with the Advisory Council on Historic Preservation’s regulations implementing Section 106 of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts to archeological resources, historic structures and buildings, ethnographic resources, and cultural landscapes were 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 (NRHP); (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the NRHP; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council’s regulations a determination of either *adverse effect* or *no adverse effect* must also be made for affected, NRHP-eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualify it for inclusion in the NRHP, e.g., diminishing the integrity of the resource’s location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is

an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

CEQ regulations and the National Park Service's Director's Order 12 also call for a discussion of the appropriateness 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 NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary for archeological resources, historic buildings and districts, cultural landscapes, and ethnographic resources is included at the end of the impact analysis sections. The Section 106 summary is intended to meet the requirements of Section 106 and addresses the potential effect of the undertaking (implementation of the alternatives) on cultural resources, based upon the criteria of effect and adverse effect found in the Advisory Council's regulations.

The following impact thresholds were used for the types of cultural resources assessed in this EA. Although they are similar, there are some variations:

#### ARCHEOLOGICAL RESOURCES

- Negligible:* Impact would be at the lowest levels of detection - barely measurable with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Minor:* Adverse impact – disturbance of a site(s) would result in little, if any, loss of significance or integrity and the NRHP-eligibility of the site(s) is unaffected. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Beneficial impact – Action would result in protection, maintenance and preservation of a site(s). For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Moderate:* Adverse impact – There would be disturbance of a site(s) that does not diminish the significance or integrity of the site(s) to the extent that its data potential is compromised. For purposes of Section 106, the determination of effect would be *adverse effect*.
- Beneficial impact – Stabilization, limited data recovery, or increased protection of a site(s) would occur. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Major:* Adverse impact – Disturbance of a site(s) would occur that diminishes or destroys the significance and integrity of the site(s) to the extent that it is no longer eligible to be listed in the NRHP. For purposes of Section 106, the determination of effect would be *adverse effect*.
- Beneficial impact – Active intervention to preserve a site(s) would occur. For purposes of Section 106, the determination of effect would be *no adverse effect*.

#### HISTORIC STRUCTURES AND DISTRICTS

- Negligible:* Impact(s) would be at the lowest levels of detection - barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be *no adverse effect*.

- Minor:*        Adverse impact – Impact would not affect the character defining features of a NRHP-eligible or listed structure or building. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Beneficial impact – Stabilization/ preservation of character defining features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* would occur. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Moderate:*    Adverse impact – Impact would alter a character defining feature(s) of the structure or building but would not diminish the integrity of the resource to the extent that its NRHP-defining elements are diminished. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Beneficial impact – Rehabilitation of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* would occur. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Major:*        Adverse impact – Impact would alter a character defining feature(s) of the structure or building, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the NRHP. For purposes of Section 106, the determination of effect would be *adverse effect*.
- Beneficial impact – Restoration of a structure or building in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* would occur. For purposes of Section 106, the determination of effect would be *no adverse effect*.

#### CULTURAL LANDSCAPES

- Negligible:*    The impact would be at the lowest levels of detection or barely perceptible and not measurable. For purposes of section 106, the determination of effect would be *no adverse effect*.
- Minor:*        Adverse impact – The impact would not affect the character-defining features of a cultural landscape listed on or eligible for listing on the NRHP. For purposes of section 106, the determination of effect would be *no adverse effect*.
- Beneficial impact – Character-defining features would be preserved in accordance with the *Secretary of the Interior's Standards*, therefore maintaining the integrity of the cultural landscape. For purposes of section 106, the determination of effect would be *no adverse effect*.
- Moderate:*    Adverse impact – The impact would alter a character-defining feature or features of the cultural landscape but would not diminish the integrity of the landscape to the extent that its NRHP-defining elements are diminished. For purposes of section 106, the determination of effect would be *no adverse effect*.
- Beneficial impact – The landscape or its features would be rehabilitated in accordance with the *Secretary of the Interior's Standards* to make possible a compatible use of the landscape while preserving its character-defining features. For purposes of Section 106, the determination of effect would be *no adverse effect*.
- Major:*        Adverse impact – The impact would alter a character-defining feature(s) of the cultural landscape, diminishing the integrity of the resource to the extent that it would no longer

be eligible to be listed on the NRHP. For purposes of section 106, the determination of effect would be *adverse effect*.

Beneficial impact – The cultural landscape would be restored in accordance with the *Secretary of the Interior's Standards* to accurately depict the features and character of a landscape as it appeared during its period of significance. For purposes of section 106, the determination of effect would be *no adverse effect*.

## ETHNOGRAPHIC RESOURCES

*Negligible:* Impact(s) would be barely perceptible and would neither alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of Section 106, the determination of effect would be *no adverse effect*.

*Minor:* Adverse impact – Impact(s) would be slight but noticeable but would neither appreciably alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. For purposes of Section 106, the determination of effect would be *no adverse effect*.

Beneficial impact – Action would allow access to and/or accommodate a group's traditional practices or beliefs. For purposes of Section 106, the determination of effect would be *no adverse effect*.

*Moderate:* Adverse impact – Impact(s) would be apparent and would alter resource conditions. Something would interfere with traditional access, site preservation, or the relationship between the resource and the affiliated group's practices and beliefs, even though the group's practices and beliefs would survive. For purposes of Section 106, the determination of effect would be *adverse effect*.

Beneficial impact – Action would facilitate traditional access and/or accommodate a group's practices or beliefs. For purposes of Section 106, the determination of effect would be *no adverse effect*.

*Major:* Adverse impact – Impact(s) would alter resource conditions. Something would block or greatly affect traditional access, site preservation, or the relationship between the resource and the affiliated group's body of practices and beliefs, to the extent that the survival of a group's practices and/or beliefs would be jeopardized. For purposes of Section 106, the determination of effect would be *adverse effect*.

Beneficial impact – Action would encourage traditional access and/or accommodate a group's practices or beliefs. For purposes of Section 106, the determination of effect would be *no adverse effect*.

*Analysis area:* The study area for cultural resources is known as the area of potential effects (APE). The APE for all but archeological resources is the primary Flamingo study area. Since boaters and hikers accessing the bays and island around Flamingo could disturb artifacts, the APE for archeological resources is the expanded study area.

## IMPACTS OF ALTERNATIVE A – NO ACTION ON CULTURAL RESOURCES

**Analysis.** Activities associated with implementation of the no action alternative, including demolition and construction, would occur in areas that have all been previously disturbed, graded, or filled to accommodate construction of existing park facilities. New construction below the depth of current surface disturbance in this area would be monitored by a professional archeologist to minimize impacts. No monitoring would be done at the construction of the chickees, and there could be some disturbance of

sediments containing artifacts during piling installation, although this is highly unlikely. In the main area of Flamingo, because there would be no soil disturbance, excavation, or construction in previously undisturbed areas, continuation of existing conditions would not be likely to have any impact on archeological, historic, ethnographic, or cultural landscape resources. During any construction, any new exterior elements would need to be sympathetic with the existing architecture to retain the integrity of the historic Mission 66 structures.

Visitors under alternative A may access some of the surrounding area by boats and by hiking, and could inadvertently discover or disturb archeological sites. However, the inaccessible nature of most of the mainland would limit such access, and many of the islands are closed to visitors. The removal of the lodge and cottages would have long-term moderate adverse impacts to historic structures and a potential historic district, as well as the cultural landscape. Overall, the no action alternative would have minor adverse impacts on cultural resources at Flamingo.

**Cumulative Impacts.** Because there would be no disturbance in previously undisturbed areas associated with ongoing management, implementation of the no action alternative would not contribute either beneficially or adversely to cumulative impacts on cultural resources at Flamingo or in Everglades National Park. Removal of underground storage tanks at the marina system, which would include removal and replacement of tanks, and soil and groundwater sampling could have long-term adverse impacts on subsurface archeological resources. Resurfacing of the roads and parking facilities should have no adverse impacts to cultural resources if the same footprint is followed and no subsurface excavation is conducted. Installation of new water system and construction of new wastewater treatment plant within the Flamingo area could have long-term adverse impacts to subsurface archeological resources. The proposed nomination of the Mission 66 program structures to the National Register of Historic Places would have long-term minor beneficial impacts to the historic structures and cultural landscape because it would encourage the compatibility of renovations and construction. Any development in the Flamingo area would need to be compatible with the historic structures or any district that is proposed. Overall, with proper mitigation measures, there would be long-term minor adverse cumulative impacts to cultural resources as a result of the no action alternative.

**Conclusion.** Because there would be no excavation in previously undisturbed areas, there is little potential for this alternative to expose unknown archeological sites. In addition, other than artifacts associated with a late 19th/early 20th century occupation of the community and evidence of a road or trail, no known intact significant archeological resources are present in the project area. The removal of the lodge and cottages would have long-term moderate adverse impacts to historic structures and a potential historic district, as well as the cultural landscape. Overall, implementation of alternative A would have minor adverse impacts on cultural resources.

Alternative A would not produce major adverse impacts on cultural resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of cultural resources as a result of the implementation of alternative A.

### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON CULTURAL RESOURCES**

**Analysis.** Activities associated with implementation of alternative B, including demolition and construction, would occur in areas that have all been previously disturbed, graded, or filled to accommodate construction of existing park facilities. The construction of modernized overnight accommodations would be in the existing footprint of Flamingo with minimal subsurface soil disturbance, excavation, or construction. The placement of the lodge, restaurant, and cottages in close proximity would localize any subsurface impacts during any grading or excavation. There has been previous soil disturbance in the location of the structures, so there should be no adverse impacts on unknown

subsurface archeological sites. Construction of more soil-disturbing amenities, such as a below-ground screened swimming pool, could have long-term minor adverse impacts on unknown subsurface archeological sites. New construction below the depth of current surface disturbance in this area would be monitored by a professional archeologist to minimize impacts.

With more outfitter and back-country activities, there is the potential for direct and indirect impacts to archeological sites in Flamingo and in the expanded study area through use or vandalism. The reconfiguration and construction of new parking areas could have long-term minor adverse impacts on unknown subsurface archeological sites. Reconstruction or new construction could have long-term minor adverse impacts on cultural landscape resources. However, during any construction, any new exterior elements would need to be sympathetic with the existing architecture to retain the character of the integrity of historic structures. In addition, restoration of areas around the lodge and cottages and at the B and C Loops of the campground would have long-term minor beneficial impacts to the cultural landscape.

Fishing for subsistence and profit has occurred at Flamingo by both Indian tribes and European settlers since the early 1900s. An increase in commercial operations and visitor use could interfere with this ethnographic use. Overall, alternative B would have long-term minor adverse impacts on cultural resources at Flamingo.

**Cumulative Impacts.** Because there would be no disturbance in previously undisturbed areas associated with ongoing management activities, implementation of alternative B would not contribute either beneficially or adversely to cumulative impacts on cultural resources at Flamingo. However, other actions related to tank removal, road resurfacing, and other site construction would be as described under alternative A and result in negligible to minor adverse impacts on cultural resources. The proposed nomination of the Mission 66 program structures to the National Register of Historic Places would have a long-term minor beneficial impact to the historic structures and cultural landscape because it would encourage the compatibility of renovations and construction. Any development in the Flamingo area would need to be compatible with the historic structures or any historic district that is proposed. The proposed Ingraham Highway Historic District boundaries would touch the proposed Flamingo footprint. Overall, with proper mitigation measures, there would be long-term negligible adverse cumulative impacts to cultural resources as a result of alternative B.

**Conclusion.** Because there would be some excavation even in previously disturbed areas, there is potential for this alternative to expose unknown archeological sites. However, other than artifacts associated with a late 19th/early 20th century occupation of the community and evidence of a road or trail, no known intact significant archeological resources are present in the project area. With mitigation, there would be long-term minor adverse impacts to cultural resources as a result of implementation of alternative B.

Alternative B would not produce major adverse impacts on cultural resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of cultural resources as a result of the implementation of alternative B.

### IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON CULTURAL RESOURCES

**Analysis.** Activities associated with implementation of alternative C, including demolition and construction, would occur in areas that have all been previously disturbed, graded, or filled to accommodate construction of existing park facilities. Construction of more modernized overnight accommodations, such as semi-permanent ecotents plus a new RV camping area within the existing footprint of Flamingo would require surface grading in previously disturbed areas and should have no adverse impacts on undiscovered archeological sites. Construction of more soil-disturbing

accommodations and amenities, as well as boardwalks, could have long-term minor adverse impacts on unknown subsurface archeological sites.

With more outfitter and back-country activities, there is the potential for direct and indirect impacts to archeological sites in Flamingo and the expanded study area through use or vandalism. The reconfiguration and construction of new parking areas and adding a bicycle/pedestrian lane at the entrance could have long-term minor adverse impacts on unknown subsurface archeological sites. Reconstruction or new construction could have long-term minor adverse impacts on cultural landscape resources. However, during any construction, any new exterior elements would need to be sympathetic with the existing architecture to retain the integrity of historic structures. In addition, restoration of areas around the lodge and cottages and at the B, C, and T Loops would have long-term moderate beneficial impacts to the cultural landscape. Fishing for subsistence and profit has occurred at Flamingo by both Indian tribes and European settlers since the early 1900s. An increase in commercial operations and visitors could interfere with this ethnographic use. Overall, alternative C would have long-term minor adverse impacts on cultural resources at Flamingo.

**Cumulative Impacts.** Cumulative impacts would be similar to those described for alternative B. Because there would be disturbance in previously undisturbed areas associated with ongoing management activities, implementation of alternative C could have long-term minor adverse impacts on cultural resources at Flamingo. However, other actions related to tank removal, road resurfacing, and other site construction would be as described under alternative A and result in negligible to minor adverse impacts on cultural resources. The proposed nomination of the Mission 66 program structures to the National Register of Historic Places would have a long-term minor beneficial to the historic structures and cultural landscape because it would encourage the compatibility of renovations and construction. Any development in the Flamingo area would need to be compatible with the historic structures or any district that is proposed. The proposed Ingraham Highway Historic District boundaries would touch the proposed Flamingo footprint. Overall, with proper mitigation measures, there would be long-term negligible adverse cumulative impacts to cultural resources as a result of the alternative C.

**Conclusion.** Because there would be excavation in previously undisturbed areas, there is potential for this alternative to expose unknown archeological sites. However, other than artifacts associated with a late 19th/early 20th-century occupation of the community and evidence of a road or trail, no known intact significant archeological resources are present in the project area. With mitigation, there would be long-term minor adverse impacts to cultural resources as a result of implementation of alternative C.

Alternative C would not produce major adverse impacts on cultural resources whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of cultural resources as a result of the implementation of alternative C.

## SECTION 106 SUMMARY

A variety of researchers have visited the Flamingo/Cape Sable area to locate and document the historic resources of the area (Tebeau 1968, Taylor 1985, Paige 1986). Two prehistoric midden sites are located 2.5 to 4 miles north of the project area. These are the Bear Lake Mounds and Coot Bay Middens. These prehistoric sites were visited and documented as early as 1924. Excavation at the mounds has yielded potsherds, fiber sources, animal bones, and shell fragments. These sites were ground-truthed by the Southeast Archeological Center during February and March 1984. Their visit revealed that vandalism had occurred in the form of excavation of several small pits (Taylor 1985). Taylor also reports the occurrence of historic resources in the form of olive jar shards, pottery, and copper on Curry Key and Bradley Key, in Florida Bay. These were most likely left by early Spanish explorers. These sites are outside the area of

potential impact. The keys were visited by representatives from the Southeast Archeological Center in March 1984. No additional artifacts were seen and no *in situ* deposits were observed (Taylor 1985).

In March 2006, the NPS Southeast Archeological Center conducted a cultural resources survey of approximately 9.5 acres of land south and east of the campground loop road at Flamingo (SEAC Ref). The survey was conducted in advance of a project during which the area will be used as a containment field to hold dredge spoil from the nearby Flamingo Bay Marina. The survey found no evidence of intact significant archeological resources. Artifacts potentially associated with a late 19th/early 20th century occupation of the community and evidence of a road or trail, probably associated with the same occupation, were found. The remains of a pier, seawall, and septic culvert were also documented offshore, south of the proposed dredge containment area within 20 meters of the high tide line of the Florida Bay.

The Flamingo visitor center was built in 1956 to 1957, along with other Everglades National Park visitor centers, as part of the Mission 66 program. The motel lodge buildings are less than 50 years old, but because the buildings were constructed as part of the Service-wide Mission 66 program, a Determination of Eligibility was prepared by the NPS, in which the NPS concluded that these structures are not eligible for inclusion in the NRHP. The Florida SHPO concurred on May 3, 2007. The cottages do not retain the historical and architectural integrity necessary to be eligible as contributing features of a "Mission 66 District." The NPS concluded that the cottage structures are ineligible for the National Register of Historic Places, and the SHPO concurred on July 14, 2006. Before the 2005 storms, the NPS Southeast Region had advocated a National Register Historic District status for Flamingo based on the history of the locale, its role in the development of the park, and the Mission 66 program structures. The visitor center, service station, and some of the Modernist housing units may still be eligible for inclusion in a historic district.

To date, no cultural landscape has been designated for Flamingo. All structures were built since the park was established in 1947 and some were a part of the Mission 66 renovations. Most buildings are of concrete and cinder block, built for function and to withstand environmental conditions. However, the buildings, lawns, and palm trees, set against the backdrop of the lush and exotic Everglades environment, convey a special sense of place to the visitor. The Flamingo area is potentially eligible as a cultural landscape with respect to the Mission 66 construction.

No traditional cultural properties have been identified within the project area, but consultation with concerned tribes is continuing ("Consultation and Coordination" section of this document). Consultation with tribes, the Florida Division of Historical Resources Bureau of Historic Preservation, and the Advisory Council on Historic Preservation has been initiated in letters dated October 30, 2006 (Appendix B). A copy of this environmental assessment will be forwarded to tribes and the Florida State Historic Preservation Officer for review and comment.

This environmental assessment provides detailed descriptions of three alternatives (including a no action alternative), analyzes the potential impacts associated with possible implementation of each alternative, and describes the rationale for choosing the preferred alternative. Also contained in the EA are mitigation measures that would help avoid adverse impacts on cultural resources.

The area of the proposed Flamingo commercial services plan has been disturbed by man and the forces of nature. The Flamingo developed area has previously been excavated and filled to allow for construction of facilities and infrastructure. The Mission 66 Visitor Center and Service Station are considered potentially eligible, and plans for Flamingo development will avoid or mitigate impacts to these structures. Also, archeological reconnaissance has not been completed throughout the area. Therefore, any excavation that is deeper than current surface disturbance would be monitored by a professional archeologist. Known sites in the area are outside the area of potential effects and would not be affected. Given these conditions and mitigation measures, the assessment of effect for all alternatives in the EA would be *no adverse effect*.

## VISITOR USE AND EXPERIENCE

### AFFECTED ENVIRONMENT

Visitor use patterns at the Everglades are, in part, influenced by the more than 5.7 million people living within 100 miles, and more than 15.2 million people living within 300 miles of the park (ERA 2007). In addition to visitation from people living in the area, the park is also the recipient of visitation from vacationers in nearby urbanized areas. For example, more than 8 million people vacation in Miami-Dade County alone (USGS 2004), which could also include a trip to Everglades National Park.

In Spring 2002, a visitor study was conducted at the park that was completed by 623 respondents (Littlejohn 2002). Visitor group size to the park ranged from 1 to 45 people and was made of the following visitor groups: families, friends, those traveling alone, guided tours, school groups, and other. A summary of these groups, sex, and age of visitors is shown in table 3-7.

**Table 3-7 – Visitor Groups**

Size	Types		Sex		Age	
1 – 45 people	Family members	54%	Male	52%	46 – 76	49%
	Friends	22%	Female	48%	16 – 45	40%
	Alone	12%			Under 15	11%
	Guided tours	11%				
	School/educational	2%				
	Other	9%				

Source: Littlejohn 2002

This survey also gathered information on the ethnic and racial backgrounds of visitors, which was predominantly white (96%). International visitors to the park comprised 14 percent of the total visitation. The countries most often represented were England (36%), Canada (19%) and Germany (17%). The largest proportions of United States visitors were from Florida (34%), New York (7%), and Michigan (6%). Smaller proportions of U.S. visitors came from another 43 states and Washington, DC. As of 2006, the percentage of international visitors had climbed to 25 percent, and visitors from Florida had dropped to 30 percent (ERA 2007). Most of the visitors surveyed (74%) had visited once during the past 12 months, and for the majority (74%), this was the first visit in the past two to five years. The average length of stay for visitors to the park is shown in table 3-8.

**Table 3-8 – Length of Visitor Stay**

3 – 4 Hours	7 or more Hours	Less than 24 Hours	Two to Three Days
43%	21%	72%	19%

Source: Littlejohn 2002

In addition to visitation patterns, this survey addressed concession services and park facilities (parkwide) used by visitors. The most used services and facilities included restrooms (77%), gift shops (39%), and boat tours (34%). The least used service was the guided fishing tour (1%). Visitor groups were asked to rate the overall quality of the visitor services provided at the park during their visit. Most visitor groups (90%) rated services as “very good” or “good.” Less than 1 percent of visitor groups rated the overall quality of services provided at the park as “very poor.”

Visitor groups were asked about their willingness to use a shuttle bus or other public transportation system to travel to facilities and trailheads on a future visit to Everglades National Park. Forty-one percent of visitors said they would likely use a shuttle bus service on a future visit, while 40 percent said they were unlikely to use a shuttle bus service. Nineteen percent were “not sure.” When asked about their

willingness to pay a modest fee (approximately \$3/person) to ride a shuttle bus, 43 percent of visitor groups said they would likely be willing to pay to ride a shuttle bus on a future visit. Thirty-eight percent were not willing to pay a fee and 19 percent were "not sure."

Other comments for improvement of visitor experience or services at Everglades National Park made by visitors during the study included the following:

- Upgrade visitor center, facilities, and restrooms
- Visitor center should stay open longer
- Provide distances on road and trail signs
- Need more hiking and bike trails
- Provide more picnic areas
- Provide more shade
- Provide better wildlife observation towers
- Need better and cheaper food options
- Gift shop should sell more souvenirs
- Maintain visitor facilities
- Promote low impact use
- Keep park accessible to visitors
- Control visitor/vehicle noise—keep it quiet
- Tour boat too loud to hear guide
- Educate the public and visitors.

From 2000 to 2005, park-wide visitation was consistently about 1 million recreation visits per year. In 2005, the number of visitors was 1,233,837, an increase of 4.4 percent per year between 2000 and 2005. After the hurricanes, visitation to the park dropped to 954,022 recreation visits in 2006. Approximately 50 percent of visitation occurs between January and April. In 2006, the highest visitation month was March at 115,621 recreation visitors, while the lowest visitation month was June at 49,018 recreation visitors. Overnight lodging within the park declined steadily from a high of 140,000+ visitors in 1979 to 80,000+ in 2005, although the 2005 figure is influenced highly by the hurricanes of that year. During the same time period, overnight visitors using concessioner lodging remained relatively constant within the park at between 30,000 to 40,000 visitors, falling below 30,000 in 2005 (ERA 2007).

Although parkwide visitation provides a general sense of visitation, Flamingo is a destination in and of itself, and site-specific visitation patterns are most relevant to planning efforts in that area of the park. Flamingo has traditionally offered many different visitor services and experiences within its own boundaries, including RV and tent camping, hiking, boating, bicycling, wildlife viewing, birding, picnicking, and overnight stays and restaurant facilities. However, Flamingo also serves as a "jumping off" point for visitors who wish to fish, boat, or otherwise experience the surrounding bays, keys, shorelines, and backcountry. Many canoe and kayak trails originate at or include Flamingo as a key stopping point (see Figure 1-9). The Wilderness Waterway extends north from Flamingo into Whitewater Bay and beyond, while the Bear Lake Canoe Trail heads westward toward Cape Sable. Other nearby water trails include the West Lake Canoe Trail, Nine Mile Pond canoe trail, and Hell's Bay canoe trail. Florida Bay and the backcountry chickees located near various keys are accessed by many visiting Flamingo. (See Appendix E for Park boating and fishing regulations, and hiking and canoe trail maps)

According to park staff, approximately 38 percent of yearly park users visited Flamingo before the 2005 storms. Park public use reports maintained to track visitation at Flamingo include several years of complete

records for day use facilities such as the visitor center and boat ramps, and overnight use of the lodge and campgrounds (NPS unpublished data; Carmichael, pers. comm. 2007). Between 2001 and 2004, boat ramp use increased varied from 20,659 (2001) to 18,096 (2004), with a drop in the 2005 and 2006 numbers to 12,060 and 9,354, respectively, which reflects the effects of the hurricanes. Backcountry use stayed relatively steady over the years at around 9,000 permits issued annually, dropping after 2005, when hurricanes hit the area. Reported overnight stays at the lodge between 2001 until 2005 ranged from a high of 39,654 in 2001 to a low of 25,741 in 2005. Tent camping overnight stays between 2001 and 2004 ranged from 12,416 in 2001, to 12,443 in 2004, and increased to 15,907 in 2005, perhaps as overnight guests were forced to use the campgrounds instead of the previously available overnight accommodations. Recreational vehicle overnights were down from 2001 to 2004, from 14,362 to 13,512, and even further in 2005 to 8,962 (NPS unpublished data). Total park visitor demand for tours (for example, 1% of visitors for kayak/canoe rental, 3% for sailing cruises, 0.5 to 0.7% for bicycles tours, 0.3% for fishing charters) (ERA 2007), shows that active recreation with concessioners is part of the visitor experience for some visitors to Flamingo.

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

**NPS Management Policies 2006.** Chapter 9, Section 9.3 Visitor Facilities addresses items from signage and restrooms to overnight accommodations and recreation facilities. It provides guidance on interpretive displays to hostels and shelters. The policy is to provide aesthetically pleasing and energy efficient visitors facilities that are necessary, appropriate, and consistent with the conservation of park resources and values.

**NPS Management Policies 2006.** Chapter 10 Commercial Visitor Services contains concession policies and dictates that park visitors be provided with high-quality facilities and services. The policy is to ensure that commercial use authorization or concession contracts provide commercial visitor services that are necessary and appropriate for public use and enjoyment.

**Architectural Barriers Act Accessibility Standards (ABAAS).** As of May 8, 2006 the relevant law for NPS regarding visitors with disabilities is the ABAAS. The Architectural Barriers Act requires that buildings and facilities covered by the law meet standards for accessibility for such things as walks, ramps, curb ramps, entrances, elevators, and rest rooms.

### ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

General information on visitors to southern Florida, Everglades National Park, and Flamingo was collected from NPS visitor statistics, from previous studies, ESRI data, and recent visitor counts at Flamingo. These data were used to make a qualitative evaluation of the potential impacts to visitor use and experience under each alternative.

The following thresholds were used to assess impacts to visitor use and experience:

- Negligible:* Visitors would not be affected and/or changes in the experience would be below levels of detection. Visitors would likely be unaware of any effects associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.
- Minor:* Changes in visitor use and/or experience would be slight but detectable. The changes would not appreciably limit or enhance critical characteristics of the visitor experience. Visitors would be aware of the effects associated with the alternative, but the effects would be slight.

- Moderate:* Some 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.
- Analysis Area:* The area of analysis for visitor use and experience is the expanded study area, since Flamingo is used to as an access point for many surrounding areas.

### IMPACTS OF ALTERNATIVE A – NO ACTION ON VISITOR USE AND EXPERIENCE

**Analysis.** Under alternative A, the current facilities and amenities at Flamingo would continue to be available to visitors. There would be some replacement of lost services (tour boats, bikes, canoes, kayaks), and new backcountry chickees would be built in proximity to Johnson and Rankin Keys to replace the Carl Ross Key campsite destroyed by the 2005 hurricanes and the Shark Point campsite that is often inundated with water, respectively. Tent camping would continue; public restrooms, showers and gathering areas would have current or similar use; the marina store and other facilities would have limited use during the year. The lodge and cottages that were damaged by the 2005 storms would be demolished and removed. Overnight accommodations at Flamingo would continue to be limited to those experiences provided by the campground and in the backcountry. No formal food service (restaurant, lounge) would be provided at Flamingo, limiting the amount of time visitors can spend at the site due to its remoteness from other areas. Because these accommodations and services would not be available, visitors would need to seek these opportunities in other areas. Since the closest area providing overnight accommodations and food services is over an hour's drive from Flamingo, visitation under the no action alternative would likely be limited to day trips of relatively short duration or trips made to launch boats from Flamingo. Outfitters and fishing charters would continue to operate at somewhat reduced levels.

Under alternative A, the continuation of a reduced level of service at Flamingo would change both the characteristics of the visitor experience as well as the number of visitors to the site. This change would be noticeable and visitors would be expected to express concerns with the conditions and services offered. The replacement of the backcountry campsites with new chickees would provide benefits to those looking for that type of experience, and, although a few visitors may enjoy the simplistic, non-developed feel of Flamingo since the hurricanes, the majority would be adversely affected by the continued lack of services. This would be expected to result in a decline in visitor satisfaction, resulting in long-term moderate adverse impacts to visitor use and experience.

**Cumulative Effects.** Other actions could, in combination with alternative A, result in impacts to visitor use and experience. These include the Florida Circumnavigation Saltwater Paddling Trail, which would bring thousands of paddlers to various areas along the 26 segments that range from the Everglades to Fort Lauderdale. Other plans or projects include: a Comprehensive Interpretive Plan that would address plans for interpretation in the Flamingo area, improving visitor understanding and experience for those who wish to delve into the resources at the park; a Wayside Exhibit Plan that may include wayside exhibits in the Flamingo area, again improving the visitor experience for some; the Hurricane Response Plan that would improve the visitor experience (and safety) and require any new buildings to be hurricane-proof; the Mosquito Control Program, a regional planning effort, would not be directly beneficial to visitors since the NPS does not spray in visitor areas, but would indirectly benefit visitors since spraying will increase employee productivity and promote staff retention; and the Comprehensive Everglades

Restoration Plan (including a Manatee Management Plan) that would indirectly affect visitor experience because visitors may be able to enjoy more of the natural resources that would be restored.

While many of the above plans or projects would enhance visitor experience, alternative A would limit visitor opportunities in Flamingo and the surrounding area. The moderate adverse impacts of reduction of services at Flamingo, combined with the beneficial impacts of other projects, would result in long-term, minor adverse cumulative impacts in the area.

**Conclusion.** Visitors at Flamingo would continue to experience a noticeable reduction in available visitor experiences when compared to historic levels, resulting in long-term, moderate adverse impacts to visitor use and experience. Cumulative impacts would be long-term minor adverse.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON VISITOR USE AND EXPERIENCE**

**Analysis.** Under alternative B, visitor opportunities at Flamingo would increase, including the provision of overnight accommodations and food services, meeting or exceeding the opportunities provided at the site prior to the 2005 hurricanes. It is assumed that this increase in visitor opportunities would result in an increase in visitation. It is estimated that the number of visitors would initially increase approximately 5 percent from 2006 (post-storm) levels, with a stabilized 1.5 percent capture of Florida tourists park-wide under alternative B. Tent camping and RV sites, lodge and cottages, along with houseboat rentals, would provide modernized overnight accommodations at Flamingo including 40 lodge rooms, 36 cottage units (some two bedroom), 100 tent camping sites, 22 RV sites with hook-ups, 43 RV sites with no hook-ups, and 24 houseboat units. New active recreation facilities, such as a swimming pool, would be added. Restrooms, showers, common rooms, food service, and other amenities would be replaced or improved. New or improved recreational hiking and biking trails would provide recreational opportunities for land-based activities, and non-motorized boat trails would do the same for water-based activities. The Snake Bight Tram would be reinstated, and a boat transfer service would be provided to facilitate access to both bays. Backcountry excursion services would resume, and, as in alternative A, new backcountry chickees would be provided in the vicinity of Rankin and Johnson Keys. Night sky and wildlife viewing areas would be designated to enhance visitor enjoyment, and a relatively large area would be restored and provide additional wildlife viewing opportunities in an area close to Flamingo. The mix of commercial services would be available to all types of visitors, whether they are active or passive, young or old, recreational or educational. All of these components would have long-term moderate beneficial impacts to visitor use and experience for most visitors.

Some components, such as modernized overnight accommodations and common use areas, would contribute to the noise and artificial lightscape of the developed area, and the construction period would involve short-term minor adverse impacts to visitors due to the potential area closures, noise, traffic, dust, and the visual intrusion associated with construction activities. However, the advantages provided by the eventual services would overshadow these secondary impacts and there would be long-term beneficial impacts to the visitor experience.

**Cumulative Effects.** Projects with the potential to have a cumulative impact with the actions under alternative B are the same as those under alternative A. However, under alternative B, long-term moderate beneficial impacts would occur to visitor use at Flamingo, adding more visitor activities and amenities to the area. Combined with the other projects that are adding or improving visitor experiences, the cumulative impacts under alternative B would be long-term, moderate, and beneficial.

**Conclusion.** Visitors at Flamingo would experience a noticeable increase in available visitor experiences in the immediate Flamingo area, as well as opportunities to access surrounding areas, resulting in long-term, moderate beneficial impacts to visitor use and experience. Cumulative impacts would be long-term moderate beneficial.

**IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON VISITOR USE AND EXPERIENCE**

**Analysis.** Under alternative C, visitor opportunities at Flamingo would increase, exceeding the opportunities provided at the site prior to the 2005 hurricanes and with an emphasis on ecotourism. It is estimated that this increase in visitor opportunities and ecotourism focus would result in an increase in visitation. Overall, because of the wider range of visitor services, the number of visitors should increase slightly over the 5 percent (under alternative B) from 2006 (post-storm) levels if alternative C is implemented. Tent camping and more RV sites, lodge and cottages, a floating camp, along with houseboat rentals, would provide modernized overnight accommodations at Flamingo, including 30 lodge rooms, 24 cottage units, 130 tent camping sites, 40 RV sites with hook-ups, 40 ecotent sites, and 24 houseboat units. The floating camp would accommodate 20 units. New active and passive recreation facilities, such as screened gathering areas, would be added and alternative types of lodging not previously at Flamingo, such as ecotents, would be provided, along with a nearby canoe/kayak launch area. Restrooms, showers, bath houses, common rooms, food service, and other amenities would be replaced or improved. New or improved hiking and biking trails would provide recreational opportunities for land-based activities, and non-motorized boat trails would do the same for water-based activities. A boat transfer service would be provided to facilitate access to both bays. Backcountry excursion services and fishing charters would resume, and, as in alternative A, new backcountry chickees would be provided in the vicinity of Rankin and Johnson Keys. Night sky and wildlife viewing areas would be designated to enhance visitor enjoyment, and an even larger area (the former campground and Eco Pond sites) would be restored and provide additional wildlife viewing opportunities in an area close to Flamingo. Research visitors would benefit from workstations, equipment, and accommodations. A shuttle service and “Yellow Bike” service would be added at Flamingo to improve circulation and congestion at the site, improving the visitor experience, and the Snake Bight Tram would be available seasonally. The mix of commercial services would be available to all types of visitors, whether they are active or passive, young or old, recreational or educational. All of these components would have long-term moderate beneficial impacts to visitor use and experience for most visitors.

Some components, such as modernized overnight accommodations and common use areas, would contribute to the noise and artificial lightscape of the developed area, and the construction period would involve short-term minor adverse impacts to visitors due to the potential area closures, noise, traffic, dust, and the visual intrusion associated with construction activities. However, the advantages provided by the eventual services would overshadow these secondary impacts and there would be long-term beneficial impacts to the visitor experience.

**Cumulative Effects.** Projects with the potential to have a cumulative impact with the actions under alternative C are the same as those under alternative A. However, under alternative C, long-term moderate beneficial impacts would occur to visitor use at Flamingo, adding more visitor activities and amenities to the area. Combined with the other projects that are adding or improving visitor experiences, the cumulative impacts under alternative C would be long-term, moderate, and beneficial.

**Conclusion.** Visitors at Flamingo would experience a noticeable increase and diversity in available visitor experiences in the immediate Flamingo area, as well as provision of access to the surrounding bays and islands, resulting in long-term, moderate beneficial impacts to visitor use and experience. Cumulative impacts would be long-term moderate beneficial.

# NIGHT SKY

## AFFECTED ENVIRONMENT

National parks are some of the few places in this country where people can experience a night sky without the interference of artificial lights. A night sky monitoring program is being implemented in the National Park System to inventory light pollution. Light pollution is considered any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste. The NPS has a Night Sky Team that conducts inventory at park units nationwide. Many of the Team's 50 NPS Inventory & Monitoring Networks have identified night sky quality as a vital sign – a physical or biological element of a park that represents the overall condition or is a particularly valuable attribute (NPS 2007a).

To date, night sky monitoring has not been conducted at Everglades National Park. The developed area of Flamingo has artificial lightscapes associated with the visitor center, marina, services, and accommodations. Currently, there is outside lighting at the three parking areas around the boat ramps and visitor center, marina, maintenance compound, and staff housing. However, many visitors suggest that Flamingo is a place to camp and enjoy the dark night skies away from urban areas. The wilderness qualities of a back country experience within the southern portion of the park include the ability of visitors to enjoy an unpolluted dark night sky.

Many wildlife species also depend on dark night skies (Moore pers. comm. 2007). For example, nocturnal wetland amphibians, such as frogs and salamanders, are impacted by artificial lighting. Nesting and hatchling sea turtles are particularly sensitive or confused by artificial lighting on or near beaches. Migrating birds that navigate by the moon and stars are confused by lighting that appears to them to be navigational markers. Moths, fireflies, and other insects also depend on dark night skies. Large cats tend to avoid lighted areas. All of these species exist or travel within the study area for Flamingo.

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

**NPS Management Policies 2006.** Section 4.10 Lightscape Management states that the NPS will preserve, to the greatest extent possible, the natural lightscapes of parks. To prevent the loss of dark conditions and of natural night skies, the NPS will minimize light that emanates from park facilities, and also seek the cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of parks.

### ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

The International Dark-Sky Association has published criteria for measuring light pollution and what constitutes a dark night sky, based on the ability to observe astronomical features (such as the Milky Way) and constellations with the naked eye. The association uses a rating system with numbers 1 to 10, with 1 being the darkest night skies and 10 as having the most light pollution. No ratings have been done in the Flamingo area, and the NPS is currently formulating guidelines for dark night sky and lightscapes that will address visual aspects for visitors, wildlife considerations, and energy efficiency (Moore pers. comm. 2007). In the absence of specific guidelines, the following thresholds were used to assess impacts to night sky:

*Negligible:* Night sky would not be affected or an action would have no measurable impact on night sky in the park unit.

*Minor:* Effects would not be readily apparent and would be difficult to measure.

- Moderate:* Effects would be readily apparent and changes would be noticeable to park staff and visitors. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
- Major:* Effects would be readily apparent and would result in a substantial change to experiencing the night sky. The changes would be noticeable to park staff and visitors and be markedly different from existing night sky. Mitigation measures would be necessary to offset adverse effects, and their success could not be guaranteed.
- Analysis area:* The area of analysis is the primary Flamingo area that could be directly affected by the proposed actions; however, impacts relating to night sky in the expanded area of analysis from boaters originating at Flamingo are also discussed.

### IMPACTS OF ALTERNATIVE A – NO ACTION ON THE NIGHT SKY

**Analysis.** Visitors and staff at Flamingo can currently experience dark night sky with minimal light pollution. Implementation of alternative A would not impact dark night sky measurably above the current conditions. Tent camping would continue; public restrooms, showers and gathering areas would have current or similar lighting; the marina store and other facilities would have limited lighting after dark. Outfitters and fishing charters would not contribute to increased light pollution. The replacement housing and new maintenance facilities would contribute to lighting in the developed area, but these are replacements of facilities that had been there before, and are located away from areas used by visitors for night sky viewing, such as the rebuilt amphitheater. The new backcountry chickees would not contribute appreciably to night light sources, except for camping use, and would open up new opportunities for night sky viewing, a minor beneficial effect. Given the level of visitation and the minimal amount of outdoor lighting currently provided under alternative A, this alternative would have long-term negligible adverse impacts on dark night sky.

**Cumulative Impacts.** Backcountry camping, boating, and hiking in areas currently with few services would be impacted by actions planned for the park, including the Florida Circumnavigation Saltwater Paddling Trail, which could bring thousands of paddlers with campfires and lanterns to various areas along the 26 segments that range from the Everglades to Fort Lauderdale. Cumulatively, the reasonably foreseeable projects, in combination with alternative A, would have long-term negligible adverse impacts on the night sky at Flamingo if prescribed lighting practices (such as down-shielded lights) are followed.

**Conclusion.** Continuing operations at Flamingo would result in long-term negligible impacts on night sky at Flamingo.

Alternative A would not produce major adverse impacts on night sky whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of night sky as a result of the implementation of alternative A.

### IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON THE NIGHT SKY

**Analysis.** Visitors and staff at Flamingo would experience dark night sky with some additional light pollution. Alternative B would have long-term minor impacts to the night sky. Modernized overnight accommodations would contribute to the lightscape of the developed area, although any new lighting would be done to LEED standards and would be down-shielded and as unobtrusive as possible. The concentration of the lodge, restaurant, cottages, and swimming pool in one area would amplify the artificial lighting, although this would separate these sources of night lighting from the vicinity of the amphitheater and campgrounds, a long-term minor benefit. Public restrooms, showers and gathering areas would be augmented with stand-alone restrooms and a board game room needing lighting at night. The re-creation of a lounge, overnight accommodations, more livery and tour services, along with the existing

marina store, would require lighting for safety. All of these would have long-term minor adverse impacts to humans and animals. The restoration of several large areas to natural conditions and night sky viewing opportunities/areas away from lighted gathering areas (e.g. at the chickees and the amphitheater) would have long-term minor beneficial impacts.

**Cumulative Impacts.** Cumulative actions would be similar to those described for alternative A. Cumulatively, the reasonably foreseeable projects, in combination with alternative B, would have long-term minor adverse impacts on the night sky at Flamingo, even if prescribed lighting practices (such as down-shielded lights) are followed.

**Conclusion.** Under alternative B, there would be long-term minor adverse impacts on the night sky at Flamingo, with long-term minor beneficial effects due to the consolidation of uses with night lighting and the restoration of several large areas to natural conditions without artificial lighting.

Alternative B would not produce major adverse impacts on night sky whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of night sky as a result of the implementation of alternative B.

#### **IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON THE NIGHT SKY**

**Analysis.** Alternative C would have long-term minor impacts to the night sky similar to those of alternative B. Visitors and staff at Flamingo would experience dark night sky with some additional light pollution. Additional modernized overnight accommodations, such as more tent spaces and 40 ecotents with centralized bath facilities, would contribute to the lightscape of the developed area. The placement of the RV camping area close to the lodge and cottages would amplify the artificial lighting in that location, but remove these sources of night lighting from the less developed areas to the west, where more primitive uses are concentrated. Public restrooms, showers, and gathering areas would be augmented with stand-alone restrooms, semi-permanent bath houses, in-door meeting spaces, and a board game room needing lighting at night. The reconstruction of a lounge, overnight accommodations, more livery and tour services, along with the existing marina store, would require lighting for safety. All of these would have long-term moderate adverse impacts to humans and animals, but the arrangement of facilities under alternative C would have long-term benefits by keeping camping and the ecotents separated from the more concentrated light sources of the lodge and RVs. In addition, the creation of several large restored areas on the western side of the Flamingo area would enhance night sky viewing opportunities/areas away from lighted gathering areas and would have long-term minor beneficial impacts.

**Cumulative Impact.** Cumulative actions would be similar to those described for alternative B, but with both cumulative adverse and beneficial impacts based on the contribution of the redevelopment under alternative C. Cumulatively, the reasonably foreseeable projects, in combination with alternative C, would have long-term minor adverse impacts on the night sky at Flamingo, even if prescribed lighting practices (such as down-shielded lights) are followed.

**Conclusion.** Under alternative C, there would be long-term minor to moderate adverse impacts on night sky at Flamingo, with long-term minor beneficial effects due to the consolidation of uses with night lighting and the restoration of several large areas to natural conditions without artificial lighting, especially in the more undeveloped western portion of the area.

Alternative C would not produce major adverse impacts on night sky whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, or (3) identified as a goal in the park's master plan or other National Park Service planning documents. Consequently, there would be no impairment of night sky as a result of the implementation of alternative C.

## SOCIOECONOMICS

### AFFECTED ENVIRONMENT

The affected socioeconomic region of influence (ROI) for this analysis is defined as the area extending from the Southwest Miami-Dade County to the mid Florida Keys. Socioeconomic and demographic data, however, are generally available at the County level only; as a result, data used in this section are generally reported at the county level (for Miami-Dade and Monroe Counties). In some circumstances, data are reported at broader geographic levels, including the greater Miami region, the State of Florida, and the U.S. The greater Miami region in these circumstances is defined as the Miami-Fort Lauderdale-Pompano Beach Metropolitan Statistical Area (MSA), defined by the U.S. Office of Management and Budget in 2003 (OMB 2003), and includes principally the Miami-Dade County-Fort Lauderdale area, but does not include Monroe County, where Flamingo is actually located. Nevertheless, data for the MSA were included in these few circumstances to provide a broader metropolitan area context, which often drives key market trends in the vicinity of the park.

### POPULATION

Between 2000 and 2006, the population of the State of Florida increased 13.2 percent, more than double the national growth rate, making it one of the nation's fastest-growing states during the period. Growth in Miami-Dade County mirrored national growth rates, increasing 6.6 percent, from 2.25 million persons to 2.40 million. For Homestead, located in Miami-Dade County in the ROI, there is also additional development pressure based on its proximity to both Miami and the Everglades. As a result, Homestead has seen very high population growth in recent years, with its population increasing by approximately 68 percent between 2000 and 2006, from 31,909 to 53,767. Florida City's population also saw a substantial increase of approximately 20 percent, from 7,843 to 9,445 during that same period (US Census Bureau, 2007a). Monroe County's population, in contrast, declined by 6.1 percent, decreasing from 79,500 persons in 2000 to 74,700 persons in 2006 (Census 2007b). The County's decline is likely attributable to multiple factors, including "hurricane fatigue" (the 2005 hurricane season disrupted much of Monroe County), and cost of living factors. Monroe County and the Florida Keys have the highest cost of living in the state, due largely to restrictions on buildable land and the resulting increasing home prices in the Keys (KLREN 2006). Table 3-9 provides population trends occurring during this period.

*Table 3-9 – 2000 Census and 2006 Population Estimates*

Geographic Area	2000	2006 estimate
Homestead City	31,909	53,767
Florida City	7,843	9,445
Miami-Dade County	2,253,362	2,402,208
Monroe County	79,589	74,737
Florida	15,982,378	18,089,888
United States	281,421,906	299,398,484

*Source: U.S. Census, 2007a, U.S. Census, 2007b.*

The ethnic composition of the ROI varies, with Hispanic or Latino individuals representing the majority of the population in some areas and a minority elsewhere. Monroe County is predominantly non-Hispanic or Latino, with only 16 percent of persons reporting to be Hispanic or Latino in the 2000 Census. Miami-Dade County is mostly Hispanic or Latino, with 57 percent reporting Hispanic or Latino ethnicity in 2000. By contrast, the State of Florida was only 17 percent Hispanic or Latino, and the U.S. was 16 percent (Census 2000b). Hispanic or Latino, however, is an ethnic identification, not a racial one, and is therefore not indicative of race. For purposes of the U.S. Census, people who are Hispanic or

Latino are generally identified as “white”, unless another race is indicated; racial composition will be discussed below. Table 3-10 contains Hispanic ethnicity data from the 2000 Census.

**Table 3-10 – 2000 Population by Hispanic Ethnicity**

Geographic Area	Total:	Not Hispanic or Latino		Hispanic or Latino	
		Number	Pct.	Number	Pct.
Monroe County	79,589	67,036	84	12,553	16
Miami-Dade County	2,253,362	961,625	43	1,291,737	57
Miami-Fort Lauderdale-Pompano Beach, FL MSA	3,876,380	2,312,991	60	1,563,389	40
Florida	15,982,378	13,299,663	83	2,682,715	17
United States	281,421,906	246,116,088	87	35,305,818	13

Source: U.S. Census Bureau, 2000 Census, Data retrieved 10 May 2006 from [www.census.gov](http://www.census.gov)

In terms of racial composition of the population, both Miami-Dade and Monroe Counties are predominantly white. In 2000, Miami-Dade County’s population was 70 percent white, 20 percent black or African-American, and the remaining 10 percent was composed of persons of other races. Monroe County’s population was more than 90 percent white, 5 percent black or African American, and the remaining 5 percent was composed of persons of other races during the same period. The U.S. and State of Florida, for comparison purposes, each were about three-quarters white, followed by 12-15 percent black or African-American, and the remainder composed of persons of other races (Census 2000b). Tables 3-11 and 3-12 show the racial composition of the area.

**Table 3-11 –Population by Race, 2000**

Geographic Area	Total:	White alone	Black or African American alone	American Indian and Alaska Native alone	Asian, Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races
<b>Miami-Dade County</b>	2,253,362	1,570,558	457,214	4,365	32,552	103,251	85,422
<b>Monroe County</b>	79,589	72,151	3,795	301	692	1,232	1,418
<b>Miami-Fort Lauderdale-Pompano Beach, FL MSA</b>	3,876,380	2,715,845	790,518	8,232	70,049	151,893	139,843
<b>Florida</b>	15,982,378	12,465,029	2,335,505	53,541	274,881	477,107	376,315
<b>United States</b>	281,421,906	211,460,626	34,658,190	2,475,956	10,641,833	15,359,073	6,826,228

Source: U.S. Census Bureau, 2000 Census, Data retrieved 10 May 2007 from [www.census.gov](http://www.census.gov)

**Table 3-12 – Percent Population by Race, 2000**

Geographic Area	Total:	White alone	Black or African American alone	American Indian and Alaska Native alone	Asian, Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races
<b>Miami-Dade County</b>	100%	70%	20%	0%	1%	5%	4%
<b>Monroe County</b>	100%	91%	5%	0%	1%	2%	2%
<b>Miami-Fort Lauderdale-Pompano Beach, FL MSA</b>	100%	70%	20%	0%	2%	4%	4%
<b>Florida</b>	100%	78%	15%	0%	2%	3%	2%
<b>United States</b>	100%	75%	12%	1%	4%	5%	2%

Source: U.S. Census Bureau, 2000 Census, Data retrieved 10 May 2007 from [www.census.gov](http://www.census.gov)

## INCOME

Table 3-13 provides historical per capita income data for the affected region as well as the MSA, State of Florida, and U.S. for comparison purposes. The State of Florida and the nation had similar per capita income levels throughout the 15-year period (1990 – 2005). Miami-Dade County per capita income levels and growth rates tracked slightly lower than statewide and national trends, but Monroe County, by contrast, registered higher per capita income levels and faster growth in per capita income during the period. In fact, by 2005, per capita income in Monroe County was approximately 33 percent higher than those levels in the State and the U.S., and about 50 percent higher than those in neighboring Miami-Dade County.

Per capita income increased faster on an average annual basis between 1990 and 2000 than between 2000 and 2005 in all areas shown in table 3-13 except Miami-Dade County, which actually increased faster between 2000 and 2005, and the MSA, which had an unchanged growth rate during the two periods (BEA 2007).

**Table 3-13 – Per Capita Income**

Geographic Area	1990	2000	2005	Annual Percent Change		
				90-00	00-05	90-05
Miami-Dade County	18,374	25,622	31,347	3.9%	4.5%	4.7%
Monroe County	22,636	37,005	45,946	6.3%	4.8%	6.9%
Miami-Fort Lauderdale-Pompano Beach, FLMSA	22,251	31,220	37,507	4.0%	4.0%	4.6%
Florida	19,564	28,507	34,001	4.6%	3.9%	4.9%
United States	19,477	28,843	34,471	4.8%	3.9%	5.1%

Source: U.S. Bureau of Economic Analysis, Regional Economic Information System, Table CA1-3, April 2007

## UNEMPLOYMENT

Between 1990 and 2000, unemployment decreased nationwide and throughout the State of Florida, except in Monroe County, which experienced increased unemployment. Between 2000 and 2006, however, Monroe County experienced decreased unemployment along with other areas in Florida, while unemployment rates trended slightly upward nationwide. As a result, these decreases in unemployment

throughout Florida are indicative of the state's robust economy that has successfully absorbed a growing labor market throughout the state (Florida, 2007a). However, the cities of Homestead and Florida City are marked by higher unemployment, despite low unemployment in Miami-Dade County as a whole, with unemployment at 6.5 percent and 9.4 percent, respectively (U.S. Census Bureau, 2000). Table 3-14 contains unemployment for the labor force in the area potentially affected by the proposed action as well as in the MSA, the State of Florida, and the U.S.

**Table 3-14 – Unemployment Rate Trends (Percent)**

Geographic Area	1990	2000	2006
Miami-Dade County	7.8	5.1	3.8
Monroe County	2.7	2.9	2.5
Miami-Fort Lauderdale-Pompano Beach, FL MSA	7.1	4.4	3.5
Florida	6.3	3.8	3.3
United States	5.6	4.0	4.6

Source: State of Florida Local Area Unemployment Statistics Program, March 8, 2007

### EMPLOYMENT BY INDUSTRY (JOBS)

Tables 3-15 and 3-16 present at-place employment by industry, as classified by the North American Industry Classification System (NAICS), for 2001 and 2005, respectively. The total number of jobs is presented for each major industry as well as the share of the total jobs. Moreover, those industry shares for both Monroe and Miami-Dade Counties can be compared to the statewide industry share, which is also presented in these tables. The tables reflect that Florida is driven primarily by service-producing industries, and Miami-Dade and Monroe Counties mirror that fact. A key difference between the Monroe County and Miami-Dade as well as the state overall, is in the Leisure & Hospitality industry (NAICS 1026), which hosts a substantially larger share of jobs in Monroe than in Miami-Dade and the state overall, and a larger share of jobs among all major industries in those counties (Florida Agency for Workforce Innovation 2007b). This may be indicative of several things. Primarily, it points to the lower economic diversity found in Monroe County, and underscores the importance of travel and tourism there. As a much larger part of the regional economy with a much larger share of the population, Miami-Dade does not rely on tourism to the extent that less diverse areas may.

**Table 3-15 – Employment by Major Industry, 2001**

NAICS	Industry	2001				
		Monroe		Miami-Dade		State
		#	%	#	%	%
	<b>Goods Producing</b>					
1011	Natural Resources & Mining	178	0.5%	9273	0.9%	1.5%
11	Agriculture, Forestry, Fishing & Hunting	176	0.5%	8824	0.9%	1.4%
21	Mining	(D)	N/A	448	0.0%	0.1%
1012	Construction	2289	6.2%	38947	3.9%	6.0%
1013	Manufacturing	353	0.9%	60836	6.1%	6.0%
	<b>Services Producing</b>					
1021	Trade, Transportation & Utilities	8221	22.1%	266973	26.9%	21.6%
42	Wholesale Trade	517	1.4%	65436	6.6%	4.4%
44-45	Retail Trade	5986	16.1%	125135	12.6%	13.1%
48-49	Transportation & Warehousing	1049	2.8%	71836	7.2%	3.6%
22	Utilities	(D)	N/A	(D)	N/A	0.5%
1022	Information	440	1.2%	31682	3.2%	2.6%
1023	Financial Activities	1995	5.4%	64893	6.5%	6.5%
52	Finance & Insurance	969	2.6%	44220	4.5%	4.4%

53	Real Estate & Rental & Leasing	1026	2.8%	20673	2.1%	2.1%
1024	Professional & Business Services	2477	6.7%	136437	13.7%	17.1%
1025	Education & Health Services	4423	11.9%	193175	19.4%	18.1%
1026	Leisure & Hospitality	12204	32.8%	92541	9.3%	11.2%
1027	Other Services	1402	3.8%	37688	3.8%	3.3%
1028	Public Administration	3180	8.5%	60777	6.1%	6.0%
1029	Unclassified	34	0.1%	377	0.0%	0.1%

Source: Florida Agency for Workforce Innovation, Labor Market Statistics, Quarterly Census of Employment and Wages Program (QCEW), March 8, 2007.

**Table 3-16 – Employment by Major Industry, 2005**

NAICS	Industry	2005				
		Monroe		Miami-Dade		State
		#	%	#	Number	Pct.
	<b>Goods Producing</b>					
1011	Natural Resources & Mining	102	0.3	9474	0.9	1.3
11	Agriculture, Forestry, Fishing & Hunting	102	0.3	8896	0.9	1.2
21	Mining	0	0.0	578	0.1	0.1
1012	Construction	2230	6.2	46185	4.6%	7.6
1013	Manufacturing	286	0.8	48672	4.9%	5.2
	<b>Services Producing</b>					
1021	Trade, Transportation & Utilities	7631	21.3	251512	25.2%	20.9
42	Wholesale Trade	520	1.4	67222	6.7%	4.4
44-45	Retail Trade	5548	15.5	119776	12.0%	12.8
48-49	Transportation & Warehousing	988	2.8	61485	6.2%	3.3
22	Utilities	575	1.6	(D)	N/A	0.4
1022	Information	456	1.3	23135	2.3%	2.2
1023	Financial Activities	2365	6.6	69641	7.0%	6.8
52	Finance & Insurance	1220	3.4	46001	4.6%	4.6
53	Real Estate & Rental & Leasing	1145	3.2	23640	2.4%	2.2
1024	Professional & Business Services	2603	7.3	144776	14.5%	17.1
1025	Education & Health Services	4050	11.3	203175	20.4%	18.4
1026	Leisure & Hospitality	11542	32.2	99295	10.0%	11.6
1027	Other Services	1472	4.1	35091	3.5%	3.2
1028	Public Administration	3132	8.7	64732	6.5%	5.8
1029	Unclassified	25	0.1	1571	0.2%	0.1

Source: Florida Florida Agency for Workforce Innovation, Labor Market Statistics, Quarterly Census of Employment and Wages Program (QCEW), March 8, 2007.

## LOCAL EMPLOYERS

There are a number of local establishments in nearby communities that provide goods and/or services targeted specifically toward visitors to the park, which include visitors to Flamingo. Communities such as Homestead and Florida City serve as entry points to the park, which ties them closely to the park and presents them with unique challenges. Although these may be communities with core urban and suburban areas, they are set within an area with a strong rural and agricultural character, and they are communities subject to high tourism flow-through as a direct result of park visitation. These communities therefore have the potential to benefit economically from tourism, yet tourism may also place a strain on infrastructure and resources. It is essential for these cities to find a desirable balance between the preservation of its historic and rural character and environment, while gaining the economic benefits of

fast-growing South Florida in general, and the tourism benefits given their proximity to two national parks, more specifically.

In Monroe County, the Leisure and Hospitality industry remained the largest industry in the county from 2001 to 2005, with approximately 32 percent of the labor market. The retail sector was the third largest sector, providing approximately 16 percent of the employment. This indicates that tourism is vital to Monroe County, even more so than in neighboring Miami-Dade County, where Leisure and Hospitality and Retail Trade account for 10 percent and 12 percent of the employment, respectively. Although most areas of the ROI generally enjoy low unemployment, the dependence of local businesses on tourism is indicative of a level of susceptibility to economic fluctuations that occur as a result of changes in visitation to Flamingo and the park overall.

Local businesses and organizations have, in fact, seen reductions in demand and sales as a result of the 2005 hurricane season. Local establishments are especially sensitive to fluctuating visitation levels at the park and, as a result, are affected by park decisions and conditions that can influence visitation levels, such as hurricanes and severe weather cycles. Moreover, visitation levels at the park do influence the amount of expenditures at nearby establishments and therefore are important business considerations in the visitor-oriented market.

The Tropical Everglades Visitor Association (TEVA) is a non-profit organization dedicated to providing information services to travelers in the region. TEVA operates a Visitor Resource Center in Florida City, and reports that approximately 60 percent of their visitors are from the U.S., with the remainder being international travelers. They expressed visitor concerns with the condition of the lodge, pre-hurricane, and report that visitors would like to stay in the park, but voiced a desire for better accommodations. The Everglades Association is the official private, non-profit partner supporting the educational, interpretive, and historical and scientific research responsibilities of Everglades National Park. As part of their public education activities, done in conjunction with their efforts to support the park and its mission, the Everglades Association operates two bookstores in the park, the profits of which are returned to the park to support its programs. It reports pre-hurricane gross sales of approximately \$1,000,000, stating that post-hurricane sales have dropped to approximately \$750,000. Furthermore, historically the annual net income averages approximately 23 percent of Association revenues. Since the hurricanes, this is down by approximately 50 percent to 12 percent of revenues. They would also like to have a presence outside the park to further encourage visitation to the park (Lubin, pers. comm. 2007).

The Homestead and Florida City Vision Council reports that although the park is not necessarily considered the biggest tourist attraction in the local area, the true extent of its impacts are not well known by the local community. However, after the hurricanes, the connection between the park and the local hospitality, service, and retail industries became readily apparent (Lubin, pers. comm. 2007). No specific data are currently available regarding the economic impacts of park closures, but current unemployment rates for both Homestead and Florida City are significantly higher than those in the larger incorporated cities within the ROI, suggesting an acute economic impact resulting from the effects of hurricanes, subsequent park closures, and reduced services on a local economy that lacks economic diversity and is more heavily dependent on tourist-related income than neighboring communities.

Among those establishments that are located near the main park entrance west of Homestead and Florida City are the Robert Is Here outdoor market and produce stand, and the Everglades Alligator Farm. Robert Is Here specializes in tropical and exotic fruits, with their peak season occurring from December through July. The proprietors state that their visitor volume is directly proportional to visitation at the park, and that the park would need to have Flamingo fully re-opened for them to return to their normal business volume. The Everglades Alligator Farm has reported a general decline in visitation in recent years, with a

sharp drop of 15,000 to 20,000 visitors in the past two years, thought to be a result of reduced services and no lodging at Flamingo (Lubin, pers. comm. 2007).

## ENVIRONMENTAL CONSEQUENCES

### GUIDING REGULATIONS AND POLICIES

*NPS Management Policies 2006*. Chapter 8.0 Use of the Parks, Section 8.2.7, Tourism, states, "... [t]he Service will support and promote appropriate visitor use through cooperation and coordination with the tourism industry. As part of this effort, the Service will... collaborate with industry professionals to promote sustainable and informed tourism that incorporates socioeconomic and ecological concerns and supports long-term preservation of park resources and quality visitor experiences ..."

### ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS

For purposes of this analysis, it is assumed that implementation of the proposed action would be confined inside the park boundary, and limited primarily to the Flamingo area. To analyze the effects of the Proposed Action Alternatives on socioeconomic resources in the ROI, the IMPLAN input-output model was used. The result of expected revenues in the ROI were examined for both direct effects, such as employment and the income that employment provides to workers, and indirect effects, or the effect of those incomes and associated spending on the larger economy in the ROI. Subsequent changes in local economic activity are computed as the product of initial changes in sales volume, either increases or decreases, and a local impact multiplier. In total, the model was used to examine total value added to the ROI in terms of dollars added to the economy, employment impact, and tax impact in the ROI, accounting for the direct and indirect effects of the action.

In addition, the model was run to determine the impacts on Monroe County alone. The overall economy of Miami-Dade County is substantially larger than that of Monroe County, therefore even the alternative that required the most output and expenditure was very unlikely to have anything more than a negligible impact in the ROI. Running the model to isolate the effects on Monroe County allowed for a closer look at the localized impact of the proposed alternatives so that impacts in the ROI as a whole could be examined, while providing greater depth of analysis at a local level.

Intensity of impacts was assessed based on the following thresholds:

- |                    |   |
|--------------------|---|
| <i>Negligible:</i> | Effects on socioeconomic conditions or indicators would be below or at the level of detection.  |
| <i>Minor:</i>      | Effects on socioeconomic conditions (adverse or beneficial) would be slight but detectable. If mitigation is necessary to offset potential adverse effects, it would be simple and successful.  |
| <i>Moderate:</i>   | Effects on socioeconomic conditions would be readily apparent and result in either adverse or beneficial effects on socioeconomic conditions on a local scale. If mitigation is necessary to offset potential adverse effects, it could be expensive but would likely be successful.    |
| <i>Major:</i>      | Effects on socioeconomic conditions would be readily apparent, resulting in demonstrable adverse or beneficial effects on socioeconomic conditions in the region. Mitigation measures to offset potential adverse effects would be expensive and their success could not be guaranteed. |

**IMPACTS OF ALTERNATIVE A – NO ACTION ON SOCIOECONOMICS**

**Analysis.** Implementing alternative A would result primarily in the continuation of present management and operations that focus on day users and provide the campground for overnight use. Implementing this alternative would not require changes in staffing levels or other park resources, and current visitation trends would be expected to remain the same. Nevertheless, current operations expected under this alternative would continue to result in visitor use and park maintenance and operations, all of which would result in continued beneficial socioeconomic activities in the region. It is anticipated that visitors to Flamingo would continue to patronize local business that support park visitors' needs and recreation interests.

Minor construction would be necessary to demolish and remove existing uninhabitable or unusable structures, as well as the construction of housing for the concessioner and NPS employees and reconstruction of the amphitheater and maintenance facilities and backcountry chickees. This would result in a minor, short-term beneficial impact to contractors who would be needed to perform these services. These demolitions and subsequent removals and rebuilding, however, would be completed in a relatively short period, resulting in a brief injection of spending into the local and regional economy. The total value added impact of the construction phase associated with alternative A would be approximately \$642,000, based on the maximum estimated construction expenditure for just concessioner-related expenditures. Furthermore, approximately 11 total jobs would be created, seven of which would be directly related to alternative A. In addition, NPS would rebuild some employee housing, build a maintenance facility, and rebuild the backcountry camping sites, as mentioned in Chapter 2. This additional construction would result in further input into the economy of the ROI. Nevertheless, this injection would be miniscule as a percent of the larger regional economy that is present in South Florida, and would result in negligible socioeconomic effects to the ROI resulting from alternative A.

Operational impacts of alternative A would generate negligible beneficial impacts throughout the ROI. Total revenue generation at Flamingo is expected to exceed \$1,700,000, with \$273,000 expected in total lodging revenues, \$542,000 expected in total retail revenues, \$289,000 expected in food and beverage revenues, \$903,000 expected in tour revenues, and \$222,000 expected in total marina revenues. These revenues from existing facilities and services would have a negligible impact on the economy of the ROI.

The ROI would see a year-round average of approximately 47 total additional jobs resulting from the continued operation and maintenance of facilities as they presently exist, 34 of which would be directly related to the Proposed Action. The total labor income impact is estimated at \$1,800,000, with \$1,216,000 of that resulting directly from alternative A. This would indicate a long-term, positive negligible impact on local employment. The impact to taxes in the ROI would be approximately \$773,500 between Federal, state, and local taxes. The greatest federal revenues would come from personal income taxes, employer and employee contributions to Social Security, and corporate profits taxes. State and local government taxes would rise primarily due to increases in sales tax revenues and property taxes for business. These impacts would be long-term and negligible in the context of the regional economy.

The majority of these project impacts would, however, be felt in Monroe County. Approximately 95% of jobs created by alternative A would come from Monroe County, as would 84% of the total value added to the local economy. In addition, 82% of Federal tax revenues collected will come from Monroe County, and 82% of the state and local tax revenues collected will be done by Monroe County or municipalities therein. Although these inputs will provide a benefit for Monroe County, it would be long-term and minor.

The total value added impact of alternative A would be seen primarily in the retail trade, administrative and waste services, entertainment and recreation, and accommodation and food services industries. Total impact would be approximately \$2,594,600, or an extra \$2.6 million injected into the local economy, approximately \$1,595,000 of which would be directly related to the Proposed Action. This would

provide a negligible beneficial impact. However, the continued lack of services under alternative A would have long-term adverse impacts on the local businesses in nearby communities, whose sales are especially sensitive to fluctuating visitation levels at the park.

**Cumulative Impacts.** The majority of the projects considered for cumulative impacts analysis deal most substantively with park operations or species/habitat management; these projects would be expected to have negligible socioeconomic impacts, individually and cumulatively. Other projects, such as the regional transportation projects, would potentially have either a negligible or minor beneficial impact on the economy of the ROI. Local and regional population growth, especially that occurring in local communities close to the park, would result in both adverse and beneficial local socioeconomic effects, depending on the level of growth and the ability of the communities to provide needed services. When considering the effects of implementing alternative A in the context of other substantial regional effects in and around Flamingo, impacts would be expected to be long-term and minor, because its cumulative socioeconomic effect would be very slightly beneficial.

**Conclusion.** Implementing alternative A would result in continued opportunities for visitors to access the resources of Flamingo for their use, resulting in short-term and long-term minor beneficial impacts because of the continued opportunity for contributing to the local economy and for the continued opportunity for social interaction among park visitors and between visitors and park personnel. However, the limited services under alternative A would have long-term adverse impacts on the local businesses in nearby communities, whose sales are especially sensitive to fluctuating visitation levels at the park.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON SOCIOECONOMICS**

**Analysis.** Estimated construction spending associated with the commercial services under alternative B of approximately \$17,500,000 would result in the creation of approximately 311 jobs, 187 of which would be a direct result of alternative B. The total value added impact to the economy of the ROI would be approximately \$18,000,000. This construction investment figure includes the construction of concessioner housing, however it does not include the costs that would be incurred by NPS construction. These costs, and the resulting injection of cash into the ROI, would have a negligible impact in the ROI. Slight job growth in areas of retail trade and health and social services would be seen as an indirect or induced result of alternative B. Unlike alternative A, gains to the entertainment and recreation sector would be modest in comparison to job growth seen in other industries resulting from alternative B, comprising less than 5 percent of new jobs resulting from alternative B, either directly or indirectly. Although these impacts would be beneficial, they would be negligible in the context of the ROI.

Implementing alternative B would result in modernized facilities, accommodations for more overnight users, a wider variety of amenities for overnight visitors, and increased services for day users. It would represent an effort by the park to restore Flamingo to a similar look and feel that was present before the storms struck the area in 2005 but with a modern twist. As a result, visitor levels and interest in Flamingo would be expected to experience a resurgence in popularity, equaling or exceeding what occurred there before the storms.

Additional overnight and day-use visitors would be expected, prompting a requirement for additional park resources that would include facilities and personnel needed to support the more substantial operations. Moreover, increases in the number of visitors, park personnel and concessioner personnel would likely result in increased expenditures by Flamingo visitors at Flamingo itself as well as at nearby local businesses that cater directly to park visitors.

It is estimated that alternative B will yield approximately \$2,100,000 in total lodging revenues, \$1,500,000 in total food and beverage revenues, \$1,600,000 in total retail sales revenues, \$3,000,000 in tour revenues, and \$291,000 in total marina revenues on an annual basis. The total estimated value added impact resulting from alternative B would be approximately \$9,700,000, \$6,000,000 of which would be directly related to revenues from alternative B. On average, approximately 173 jobs would be created,

122 of which would be the direct result of alternative B, and would occur in such industries as accommodation and food services, retail trade, entertainment and recreation, and administrative and waste services. This would provide a long-term beneficial impact to the ROI, but this impact would be negligible.

The total tax impact between Federal, state, and local taxes would be approximately \$2,870,000. Federal tax revenues would be primarily from corporate profits tax revenues, personal income taxes, and Social Security contributions. State and local tax revenues would be derived largely from sales and business property taxes. Although these increases in tax revenues would be beneficial for economic development, the beneficial impacts of alternative B on tax revenues in the ROI would be negligible.

As with alternative A, the majority of the benefits accrued as a result of the operation of alternative B in the form of increased revenue to the local economy would go to Monroe County, as the impacts are proportional from alternative A to alternatives B and C. These beneficial impacts to Monroe County specifically would also be both long-term and minor.

Several local businesses stated that their revenues are directly tied to visitation at the park, therefore improvements at the park designed to boost visitation would proportionately affect local businesses tied to the tourism industry, such as those associated with the Leisure and Hospitality industry as well as the Retail Trade industry. These local businesses could see increases in revenues as a result of increased visitation resulting from alternative B, a long-term beneficial impact.

**Cumulative Impacts.** Cumulative impacts would be similar to those described for alternative A. Although increases in revenues and expenditures would be anticipated as a result of more visitors and personnel and the facilities to accommodate them, these increases would continue to be minor in the context of the regional economy and other large regional projects and population dynamics in and around Flamingo. Furthermore, increases in revenues from local businesses would be beneficial to the health of the local economy, increasing employment and spending. Regarding economic concerns of replacing commercial facilities such as a lodge and cottages in a floodplain area that is subject to sea level rise and possibly more intense hurricanes over time (see discussion under Issues in chapter 1), all structures would be elevated and sited so that any reasonably foreseeable impacts would be mitigated by the type of construction and ability to relocate the structures easily on higher ground. The replacement would not be expected to have a long-term adverse economic impact related to any potential loss of structures.

**Conclusion.** Alternative B would result in both short- and long-term minor beneficial impacts. Restoring Flamingo to a level of accommodations and services in place before the 2005 storms and having this restoration result in a modernized array of accommodations and services would serve to underscore Flamingo's return as a key destination within the park to both local and regional residents and business operators, as well as to visitors who travel to Flamingo from areas outside of the region. The effects on the economic development in the ROI from construction spending and revenue generation from operations would be negligible, but would result in an increase in employment, spending, and tax revenues. Increases in visitors would result in increased economic activity by these visitors, and this would also result in increased park resources being provided to support the increased activity. These increases would result in higher revenues for local businesses that cater to park visitors and personnel, and these increased revenues themselves would prompt beneficial secondary impacts throughout the local economy.

### IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON SOCIOECONOMICS

**Analysis.** Estimated construction spending associated with the commercial services under alternative C of approximately \$21,600,000 would result in an increase in local employment of approximately 374 jobs averaged year-round, 226 of which would be directly attributable to alternative C. This job creation would occur, as in the other scenarios, primarily in the industries of retail trade, administrative and waste services, and accommodation and food services, with entertainment and recreation representing a small

portion of all jobs created, comprising less than 3 percent of all jobs created either directly or indirectly from alternative C, similar to the alternative B scenario. The effects of alternative C on employment in the ROI would be long-term, beneficial, and negligible. Further analysis shows that the majority of jobs created will be in Monroe County, thereby having a greater, but still minor, beneficial effect within the single county.

Implementing alternative C would result in modernized facilities, accommodations for more overnight users, a wider variety of amenities for overnight visitors, and increased services for day users, compared to alternatives A and B. It would have the effect of revamping Flamingo's look and feel, or "brand," and potentially attract a wider range of visitor preferences to the area. By attracting a wider variety of visitors, an increased opportunity to create enthusiasm on a broader scale among a wider array of potential users could result a new visitor base, or "market" for the area that had not been present before. This would be particularly true for the ecotourism market segment that could view Flamingo under this alternative as a desirable destination that would not be available to them in either alternatives A or B. Visitor levels and interest in Flamingo could be expected to return to and eventually exceed those levels in place prior to the storms as broader interest is generated and a new potential market is reached.

Additional overnight and day-use visitors would be expected, prompting a requirement for even more park resources, such as facilities and personnel needed to support the augmented operations, than in either alternative A or alternative B. Moreover, increases in the number of visitors, park personnel and concessioner personnel would likely result in increased expenditures by Flamingo visitors at Flamingo itself as well as at local businesses that cater directly to park visitors. This would result in even higher revenues in the local economy than under either alternative A or alternative B.

It is estimated that alternative C would generate total annual lodging revenues of \$2,510,000, total annual retail revenues of \$1,700,000, total annual food and beverage revenues of \$1,800,000, total annual tour revenues of \$4,900,000, and total annual marina revenues of \$308,000. The total estimated value added impact on the economy of the ROI would be approximately \$13,000,000, of which approximately \$8,000,000 would be directly attributable to alternative C. Industries that would see the greatest gains are the same that would see the greatest gains in employment: accommodation and food services, administrative and waste services, and retail trade. These impacts would be beneficial, long-term, and negligible in the context of the ROI. Total impacts to Federal, state, and local taxes would exceed \$3,800,000, with the majority of Federal taxes collected in the form of income tax, Social Security tax, and corporate profits taxes. State and local taxes are primarily generated through sales tax, business property tax, and other business-related taxes. Although this increase in tax revenues would be beneficial, the effects on the overall ROI would be negligible.

As mentioned previously, impacts to Monroe County alone are proportional among the alternatives examined. Therefore, Monroe County would gain 183 new jobs as a result of alternative C, 129 of which would be directly related. The total value added impact would be approximately \$9,300,000, which would provide a benefit to the economy of Monroe County, yet that beneficial impact would still be long-term and minor. Likewise, the local tax base would increase by more than \$1 million, however the beneficial impact would be minor.

Several local businesses stated that their revenues are directly tied to visitation at the park, therefore improvements at the park that would boost visitation would proportionately affect local businesses tied to the tourism industry, such as those associated with the Leisure and Hospitality industry as well as the Retail Trade industry. These local businesses could see increases in revenues as a result of increased visitation resulting from alternative C, a long-term beneficial impact. However, increases in tourism to the area are expected to have no effect on demographics in the ROI, as there would be no permanent immigration associated with alternative C. Therefore alternative C would have no effects on demographics in the ROI.

Having a greater number of visitors, park personnel and concessioner personnel return to Flamingo as a result of implementing alternative C would also lead to increased opportunities for social interaction among visitors and between park personnel, and create a new interest in the area among a potential national and international community of ecotourists who would be attracted to Flamingo. Moreover, traditional visitors to Flamingo would not be precluded from their continued visitation because traditional facilities like RV sites, lodge and cottage units, and campground sites would be provided along with the new eco-friendly accommodations provided in this alternative. Consequently, this alternative would result in retaining a traditional visitor base while expanding that base to include a new market segment previously not directly served at Flamingo.

**Cumulative Impacts.** Cumulative impacts would be similar to those described for alternatives A and B. Like alternative B, short and long-term negligible beneficial impacts would be expected in the ROI as a whole, with minor long-term beneficial impacts expected in Monroe County. Increases in visitors would result in increased economic activity by these visitors, and this would also result in increased park resources being provided to support the increased activity. These increases would result in higher revenues for local businesses that cater to park visitors and personnel, and these increased revenues themselves would prompt beneficial secondary impacts throughout the local economy. Like alternative B, the replacement of commercial facilities in a high hazard flood area would not be expected to have a long-term adverse economic impact related to any potential loss of structures.

**Conclusion.** Alternative C would result in both short and long-term minor beneficial impacts to the ROI. Redesigning Flamingo in a manner that provides for greater levels of visitation and a wider variety of visitor preferences could lead to the “branding” of Flamingo as a key ecotourist destination within the park and in the southeastern U.S. to both local and regional residents and business operators, as well as to visitors who travel to Flamingo from areas outside of the region. The effects on the economic development in the ROI from construction spending and revenue generation from operations would be negligible, but would result in an increase in employment, spending, and tax revenues. The minor, beneficial impacts related to visitation would be greater in magnitude than those in alternative B, because it is anticipated that visitation levels would be greater under alternative C. Greater increases in visitors would result in increased economic activity by these visitors, and this would also result in increased park resources being provided to support the increased activity. These increases would result in higher revenues for local businesses that cater to park visitors and personnel, and these increased revenues themselves would prompt beneficial secondary impacts throughout the local economy.

## ENERGY CONSUMPTION

### AFFECTED ENVIRONMENT

The major energy source used for lodging and visitor service facilities at Flamingo is electricity. Electricity is supplied by the Florida Power and Light Company and distributed to all facilities within the study area, from the housing area through the camping loops. Electric power is delivered underground to Flamingo, with the utility lines running along the main park road. Electrical consumption figures for Flamingo are currently unavailable.

Cars and boats also contribute to energy consumption at Flamingo. Vehicles are used by the NPS and concessioner for law enforcement, interpretation, and maintenance operations, which include eight pieces of special purpose equipment for structural fire, medical emergencies, grounds-keeping and construction. Visitors also use cars to access different areas of Flamingo. Additionally, boats used by day visitors, the concessioner, and the boats used by the park staff for enforcement consume fuels. Fuel sales within Flamingo from April 2006 through March 2007 amounted to \$107,221 (36,738 gallons sold) (Jester, pers. comm. 2007d).

### ENVIRONMENTAL CONSEQUENCES

#### GUIDING REGULATIONS AND POLICIES

Many laws, policies, regulations, and orders deal directly with energy consumption and conservation within federal government agencies. Those most relevant to the Flamingo project are summarized below:

**April 1999 Memorandum of Understanding between the U.S. Department of Energy and the U.S. Department of the Interior.** This document promotes the use of energy-efficient and renewable energy technologies and practices in national parks. This initiative helps to fulfill stipulations of the Energy Policy Act of 1992, which directs the use of energy-efficient building designs and equipment, and Executive Order 12902, "Energy Efficiency and Water Conservation at Federal Facilities".

**Executive Order 12902, "Energy Efficiency and Water Conservation at Federal Facilities," March 8, 1994.** This executive order requires (1) a 30% reduction in per gross square foot energy consumption by 2005 compared to 1985 to the extent that these measures are cost effective; (2) a 20% energy efficiency increase in industrial facilities by 2005 compared to 1990 to the extent that these measures are cost effective; (3) the implementation of all cost-effective water conservation projects; and, (4) the procurement of products in the top 25% of their class in energy efficiency where cost-effective and where they meet the agency's performance requirements. In addition to available appropriations, agencies shall utilize innovative financing and contracting mechanisms including, but not limited to, utility demand-side management (DSM) and energy savings performance contracts (ESPCs) to meet the goals and requirements of the Energy Policy Act of 1992 and this order.

**Executive Order 13031, "Federal Alternative Fueled Vehicle Leadership," December 13, 1996.** This executive order acknowledges that the use of alternative fueled motor vehicles will, in many applications, reduce the nation's dependence on oil, and may create jobs by providing an economic stimulus for domestic industry, and may improve the nation's air quality by reducing pollutants in the atmosphere.

**Executive Order 13148, "Greening the Government through Leadership in Environmental Management," April 21, 2000.** This executive order states that the head of each federal agency is responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes, across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of federal government policies, operations, planning, and management.

**NPS Management Policies 2006 9.1.1.6 – Sustainable Energy Design.** Any facility development, whether it is a new building, a renovation, or an adaptive reuse of an existing facility, must include improvements in energy efficiency and reduction in greenhouse gas emissions for both the building envelope and the mechanical systems that support the facility. Maximum energy efficiency should be achieved using solar thermal and photovoltaic applications, appropriate insulation and glazing strategies, energy-efficient lighting and appliances, and renewable energy technologies. Energy-efficient construction projects should be used as an educational opportunity for the visiting public.

**NPS Management Policies 2006 9.1.4.2 – Acquisition of Environmentally Preferable and Energy-Efficient Products.** In carrying out its maintenance responsibilities, the NPS will acquire environmentally preferable and energy-efficient products. The Service will consider a variety of attributes when purchasing products, including cost, energy efficiency, biodegradability, toxicity, recovered material content, packaging, transport cost, and other life-cycle environmental impacts, such as disposal. The Service will actively pursue opportunities to test and demonstrate environmentally preferable and energy-efficient products, consistent with its goal of demonstrating sustainable practices that avoid or minimize environmental impacts.

**NPS Management Policies 2006 9.1.5 – Utilities.** Energy, water, and wastewater systems will be sited outside park boundaries whenever possible. In-park, utilities will be as unobtrusive as possible and have the least possible resource impact. The NPS will use municipal or other utility systems outside parks whenever economically and environmentally practical, and it may participate, when authorized, in cost-sharing with municipalities and others in meeting new, expanded, or replacement park utility needs. The Service will use the least polluting power supply options, either through on-site generation or through power purchases, where appropriate, available, and cost-effective, or where such purchase helps meet federal or state emissions goals or alternative energy goals.

**NPS Management Policies 2006 9.1.5.3 – Utility Lines.** Where feasible, NPS utility lines will be placed underground, except where such placement would cause substantial damage to natural or cultural resources (such as historic structures or cultural landscapes).

**NPS Management Policies 2006 9.1.7 – Energy Management.** The NPS will conduct its activities in ways that use energy wisely and economically. Park resources and values will not be degraded to provide energy for NPS purposes. The Service will adhere to all federal policies governing energy and water efficiency, renewable resources, use of alternative fuels, and federal fleet goals as established in the Energy Policy Act of 1992. The Service will also comply with applicable executive orders, including Executive Order 13123 “Greening the Government through Efficient Energy Management,” and Executive Order 13149 “Greening the Government through Federal Fleet and Transportation Efficiency.”

All facilities, vehicles, and equipment will be operated and managed to minimize the consumption of energy, water, and non-renewable fuels. Full consideration will be given to the use of alternative fuels. Alternative transportation programs and the use of bio-based fuels will be encouraged, where appropriate. Renewable sources of energy and new developments in energy efficiency technology, including products from the recycling of materials and waste, will be used where appropriate and cost-effective over the life cycle. However, energy efficiencies will not be pursued if they will cause adverse impacts on park resources and values. To conserve energy, park personnel and visitors may be provided with opportunities for in-park public transportation or trails and walks for non-motorized transport. As an environmental leader, the Service will interpret for the public the overall resource protection benefits from the efficient use of energy, and will actively educate and motivate park personnel and visitors to use sustainable practices in conserving energy.

**Leadership in Energy and Environmental Design (LEED) Green Building Rating System.** In addition to the above regulations and policies, future development within Flamingo would follow standards set out in the LEED Green Building Rating System. The LEED Green Building Rating System is a “voluntary, consensus-based, market-driven building rating system based on existing proven

technology.” This rating system is arranged into five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. A sixth element, Innovation and Design Process, allows project and design teams to earn additional recognition for exceeding the requirements set by the LEED Green Building Rating System (USGBC 2006).

The objective of LEED for New Construction is to “assist in the creation of high performance, healthful, durable, affordable and environmentally sound commercial and institutional buildings” (USGBC 2006). The LEED Green Building Rating System for New Construction and Major Renovation focuses on the design, construction, and operational phases of commercial and institutional buildings, as well as high-rise residential buildings.

### **ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS**

Current energy sources and requirements were assessed through consultation with the Everglades National Park staff. Assessments of potential impacts on energy consumption were based on a comparison between existing conditions and anticipated future conditions associated with implementation of the alternatives, based on current technologies available. As actual projects to be implemented are not known at this time, impacts to energy resources are described qualitatively to provide an order of magnitude comparison between alternatives.

Thresholds of impacts are defined below:

- Negligible:* No effects would occur or the effects on energy requirements and conservation potential would be below or at the level of detection.
- Minor:* Effects on energy requirements and conservation potential would be detectable but small and the initiatives applied or mitigation measures used would be inexpensive, simple and successful.
- Moderate:* Effects on energy requirements and conservation potential would be readily apparent, and on a local scale. Initiatives applied or mitigation measures used would require funding, be relatively simple and likely be successful.
- Major:* Effects on energy requirements and conservation potential would be readily apparent and on a regional scale. Initiatives applied or mitigation measures used would require extensive funding, be relatively complex and success could not be guaranteed.
- Analysis area:* The study area for energy resources is the primary Flamingo area consisting of the Flamingo developed area and immediate surroundings.

### **IMPACTS OF ALTERNATIVE A – NO ACTION ON ENERGY CONSUMPTION**

**Analysis.** Under alternative A, electricity would continue to be the main source of power for Flamingo. Energy consumption for overnight accommodations would remain minimal as a result of eliminating the cottages and the lodge, although there would be short-term increase in demand for energy (fuels) during the demolition of the buildings. The replacement housing and maintenance facilities would follow sustainable design concepts for energy consumption, but would not necessarily meet all LEED requirements for certification. The fueling station for boats would remain, and boat use by visitors and existing boat tours would continue the consumption of gas and diesel fuels. The reconstruction of the amphitheater and other structures would contribute to minimal additional energy consumption, in both the reconstruction and operational phases. Visitors would continue to use their vehicles to go from one area of Flamingo to another, such as from the campground and RV loops to the marina and visitor center area. Additionally, the park staff and the concessioner would continue to use their vehicles for law enforcement, interpretation, and maintenance operations. Overall, continued operation of the Flamingo area would have a long-term, minor adverse impact on energy conservation.

**Cumulative Impacts.** Energy consumption in the area would continue and increase slightly, based on the small increase in visitation expected annually over the life of this plan. Energy would continue to be consumed by actions other than commercial and visitor services, including the operation of the water and wastewater treatment plants and maintenance activities (grounds mowing, repairs, etc.). Resurfacing of the interior roadways and parking facilities and the removal of underground storage tanks would all have short-term, minor adverse impacts on energy consumption due to construction. Under alternative A, energy consumption associated with the current and future uses would have a long-term, minor adverse impact on energy consumption.

**Conclusion.** Alternative A would not result in more than minor changes to current energy consumption patterns at Flamingo and would have a long-term, minor adverse impact to energy consumption within Flamingo.

### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON ENERGY CONSUMPTION**

**Analysis.** Under alternative B, additional construction would occur to replace the damaged lodges and cottages, and more visitors would be expected at Flamingo. Overnight accommodations and a full-service food establishment would be reconstructed, including 22 RV sites outfitted with electrical hookups, and 43 sites without electricity. The lodge and cottages would be redesigned to meet LEED design standards and equipped with energy efficient technologies, which would include compact fluorescent light bulbs, energy efficient heating and cooling systems, and design features to maximize shading and cross ventilation and minimize heat gain. Energy Star rated appliances, windows, doors, lighting, and heating, ventilating and air conditioning (HVAC) equipment would be selected to ensure energy efficiency (Jester, pers. comm. 2007b). Restrooms and conventional hot showers would be provided. The use of ambient lighting and ventilation in many visitor and administrative buildings would continue.

Using environmentally sensitive and local building materials would be emphasized in the reconstruction of the lodge and cottages. This can reduce energy consumption and enhance conservation potential. Natural materials are less energy intensive and polluting to produce. Using local materials reduces energy needs from the transportation of these materials. Using durable materials can save on energy costs for maintenance as well as for production and installation of replacement.

The marina store would be redesigned with modifications to comply with the State of Florida’s “Clean Marina” program, or equivalent environmental standards, which stipulates for hurricane preparedness, a petroleum spill recovery plan, and other compliance procedures (Clean Marina Program 2007). Based on the increased visitation expected, vehicle use in general would increase in the area, increasing fuel consumption. Visitors at the campground and RV areas would still use vehicles to access the marina, but the proposed site placement of the lodge and cottages next to the visitor center would decrease the need for these overnight guests to use their vehicles. The Snake Bight tram would offer alternative transportation to that destination. Boat tours and 6 houseboats would be added, which would increase diesel fuel and gasoline consumption. However, new walking, biking, canoe and kayak trails would also be provided under alternative B, decreasing the necessity to use cars to access different areas of Flamingo, and increasing the opportunity to use non-motorized boats. These actions would create long-term, minor adverse and beneficial impacts on energy consumption within Flamingo.

Energy would be required to produce new materials and transport new and old building materials during demolition and new construction. Energy would also be consumed in the removal of any unused materials and the grading of areas to be restored. This consumption would have a short-term, negligible, adverse impact on energy requirements for the duration of the project.

**Cumulative Impacts.** Based on increased visitation expected, vehicle use in general would increase over the life of the plan, increasing fuel consumption. Overall energy consumption in the area would continue and increase slightly, based on the increase in visitation expected annually over the life of this plan. Energy would continue to be consumed by actions other than commercial and visitor services, including

operation of the water and wastewater treatment plants and maintenance activities (lawn mowing, repairs, etc). Resurfacing of the interior roadways and parking facilities and the removal of underground storage tanks would all have short-term, minor adverse impacts on energy consumption due to construction. Under this alternative, energy consumption associated with the current and future uses would have a long-term, minor cumulative adverse impact on energy consumption.

**Conclusion.** Due to the construction that is planned, Flamingo would experience short-term minor adverse impacts to energy consumption. Expanded operations under alternative B would consume energy and create long-term, minor adverse impacts on energy consumption within Flamingo, while incorporation of sustainable development technologies in new structures would have long-term minor beneficial effects on the potential to conserve energy.

### IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON ENERGY CONSUMPTION

**Analysis.** Under alternative C, the standards set by the USGBC’s LEED Green Building Rating System would be used in all new public lodging construction and would be more emphasized than in alternative B. More attention would be given to redesigning Flamingo as an ecotourism destination, with the new accommodations meeting at least a LEED Certified designation, which would result in noticeable reductions in energy consumption.

Alternative C would provide a total of 40 RV sites, all with solar-powered electrical hookups. The lodge would be comprised of fewer rooms than under alternative B, and would cover less surface area. In addition to the lodge, tent camping site and other low impact accommodations would meet or exceed the LEED Certified standards. This would include ecocottages and up to 40 ecotents. All of the hot showers within Flamingo would be solar heated, and solar photovoltaics would be used as much as possible to provide electricity to rooms, laundry, and food service.

Under alternative C, based on the increased visitation expected, vehicle use in general would increase in the area, increasing fuel consumption. Additional boat tours, 6 houseboats, and one floating camp would be added, which would increase diesel fuel and gasoline consumption, a minor adverse impact. However, the transportation network would be modified to meet energy efficiency standards. For instance, under alternative C, a Flamingo area seasonal shuttle service and a free “Yellow Bike” service (for overnight guests) would be provided, which would reduce visitors’ fuel consumption within the park, especially for single-occupancy vehicles. Further energy reductions would be expected from a more compact development, which would bring the RVs closer to the marina and reduce vehicle dependency and energy use for internal circulation. All these actions to reduce car dependency would result in long-term moderate beneficial impacts.

Under alternative C, some changes in energy requirements and conservation potential would occur within Flamingo. Energy requirements would likely decrease as a result of the more efficient design practices, such as utilizing compact fluorescent light bulbs, natural ventilation for cooling, and other renewable energy technologies. This reduction in energy consumption would result in increased energy conservation possibilities. In addition, electrical and thermal energy would be saved through facility design that incorporates day lighting and other passive-energy strategies appropriate to the climate at the park and function of the facility. Using environmentally sensitive building materials can also reduce energy consumption and enhance conservation potential. Natural materials are less energy intensive and polluting to produce. Using local materials reduces energy needs from the transportation of these materials. Using durable materials can save on energy costs for maintenance as well as for production and installation of replacement materials. As a result, Flamingo would experience long-term, moderate beneficial impacts due to the energy conservation potential under alternative C.

Energy would be required to produce new materials and transport new and old building materials during demolition and construction. Energy would also be consumed in the removal of any unused materials and

the grading of areas to be restored. This consumption would have a short-term, minor, adverse impact on energy requirements for the duration of the project.

**Cumulative Impacts.** Under this alternative, energy consumption would as compared to alternatives A and B due to an increase in commercial services, overnight accommodations, and construction measures, but numerous energy-saving practices and devices would be incorporated. Based on increased visitation expected, vehicle use and boat use in general would increase over the life of the plan, increasing fuel consumption. Energy would continue to be consumed by actions other than commercial and visitor services, including operation of the water and wastewater treatment plants and maintenance activities (lawn mowing, repairs, etc). Resurfacing of the interior roadways and parking facilities and the removal of underground storage tanks would all have short-term, minor adverse impacts on energy consumption due to construction. However, with the improvements made by meeting LEED standards, under this alternative energy consumption associated with the current and future uses would have an overall long-term, minor cumulative beneficial impact on energy consumption.

**Conclusion.** Short-term, minor, adverse impacts to energy consumption at Flamingo would continue due to construction of facilities and reclamation activities. Continued power and fuel consumption would have long-term minor adverse effects. However, incorporation of sustainable development technologies and LEED standards in new structures, as well as an internal circulator shuttle and bike service, would have long-term, minor to moderate beneficial impacts on energy consumption and potential energy conservation. Depending on how and where the redesigned amenities receive their energy, Flamingo may have an opportunity to produce most of its own energy. This would effectively lower the cost of purchasing power from Florida Power and Light Company, and also create a niche for energy efficient ecotourism.

## **PARK MANAGEMENT AND OPERATIONS**

### **AFFECTED ENVIRONMENT**

Park management and operations at Everglades National Park is overseen by the superintendent, who is responsible for managing the staff, concessioners and residents, and park programs (NPS 2002). Being a unique visitor destination point, Flamingo has a number of park resources that would influence park management and operations both at the site and at the park as a whole. The discussion of park management and operations at Flamingo can be broken down into the following program areas: interpretation, maintenance, and enforcement.

### **INTERPRETATION**

Many of the visitor experiences provided at Flamingo are under the direction of the park's interpretation staff. Currently, within the Division of Interpretation and Visitor Services, two full-time permanent interpretive staff, including the District Interpreter and an Interpretive Park Ranger, are stationed at Flamingo. Four to six seasonal staff supplement the permanent interpretive staff at Flamingo, typically from November to mid-April. In addition to paid staff, the interpretive staff at Flamingo are assisted by up to five volunteers from approximately November to mid-April. At the highest staffing levels, the interpretive division had up to six seasonal, two permanent, and five volunteer employees at Flamingo during the winter season (McGee-Ballinger, pers. comm., 2007a).

General responsibilities of the interpretive staff at Flamingo include presenting canoe programs, walks, and talks; working at the visitor center front desk; writing backcountry camping permits; and maintaining the park's publications, museum, canoes, and boats. These activities are overseen by the District Interpreter who is responsible for supervising the interpretive staff, reviewing interpretive materials, and assisting in presenting programs and working at the visitor center desk. Historically, the majority of the interpretive staff have lived at Flamingo, although currently a few staff members live outside the park and commute in (McGee-Ballinger, pers. comm., 2007a).

The interpretive staff at the park have much interaction with the concession operations, because many of their activities are linked. Examples of this interaction include the interpretive staff working with concessioners to discuss canoe rentals with visitors purchasing backcountry permits. The interpretive staff also provide visitors with information about concession-provided services, such as boat tours. The concession operations assist the interpretive division in the summer, providing visitors with information about the park and park programs. The concessioner provides amenities to the park staff that they would otherwise need to travel more than 100 miles to reach, such as the small convenience store (McGee-Ballinger, pers. comm., 2007a).

### **MAINTENANCE**

Everglades National Park currently has 48 staff in the Maintenance Division, 10 of which are dedicated to operations at Flamingo, with other park maintenance staff available to assist on special projects or provide other occasional assistance. Of the 10 staff members permanently assigned to Flamingo, two live at the site, while the other eight commute at least an hour each way from outside the park each day. Each of the 10 staff at Flamingo works a five-day work week to cover the seven-day work schedule (Jester, pers. comm., 2007a).

Maintenance requirements at Flamingo are dictated in part by the number and type of facilities, recreational amenities available, and the level of visitor use. Facilities requiring the majority of maintenance support at Flamingo include the wastewater treatment plant, water supply plant, campground, recreation facilities, and visitor center and other park owned buildings (Jester, pers. comm.,

2007a). The maintenance division lost storage buildings and equipment during the 2005 hurricanes, resulting in large maintenance requirements being contracted out (Dietz, pers. comm., 2006).

The operation of the wastewater and water supply plants at Flamingo are the responsibility of the maintenance staff and includes maintenance of all underground piping systems, lift stations, tanks, and other associated infrastructure. These operations require a plant manager to oversee operations. Prior to 2005, the position of plant manager and some of the fixed costs associated with the plant, such as the amortization of equipment, were supplemented by revenue from the concession operation. Since 2005 when these operations were scaled back, there has been an additional cost to the park maintenance division of approximately \$100,000 per year to keep these operations running (Jester, pers. comm., 2007a). Further, the decrease in visitation has required maintenance staff to modify these plants to adjust to the lower flow levels. If visitation were to increase from current levels, maintenance staff would be required to adjust the system again (Jester, pers. comm., 2006).

Maintenance activities related to the campground include general grounds keeping (mowing and trimming of trees, edging, weed control), litter pick up, sign installation, campground equipment installation and maintenance, a portion of the solid waste removal, custodial maintenance of the restrooms and shower rooms, and maintenance of housing and campsites associated with administrative uses (i.e., housing for volunteers that assist with fee collection or running the campground) (Jester, pers. comm., 2007a).

For the visitor center and other NPS-run facilities (employee housing, docks, marinas, trails, backcountry camping sites, etc), the maintenance staff are responsible for exterior and interior building maintenance, maintenance of utilities, and general upkeep, the majority of which is maintenance of utilities. Large maintenance projects (painting, roofing, etc) are usually contracted using franchise fees or recreation fees. The maintenance staff at Flamingo also oversees the marine repair shop that provides service to the entire park (Jester, pers. comm., 2007a).

Although not operated by the NPS, the maintenance staff also have duties related to concessioner-run facilities. At these facilities, NPS maintenance staff are responsible for grounds keeping, exterior building maintenance, and maintenance of all utility lines exterior to the building up until the utility meets with the fixture (i.e., the pipe meets the sink) inside the building. The decommissioning of these facilities at Flamingo after the 2005 hurricanes reduced demand on NPS maintenance staff in relation to exterior maintenance (Jester, pers. comm., 2007a). In some aspects, the 2005 hurricanes shifted more responsibilities to the Flamingo maintenance staff as more than 30 buildings were closed, many of which were concessioner assigned assets. The responsibility for maintenance of those facilities that were closed and not demolished was transferred from the concessioner to NPS (Jester, pers. comm., 2006).

## **LAW ENFORCEMENT**

In the Flamingo District of Everglades National Park, the Division of Resource Management and Visitor Protection is programmed to have eight full-time law enforcement rangers, but due to funding constraints, currently has six full-time rangers (supplemented by one seasonal ranger) who are responsible for conducting boat patrols in Florida Bay. All rangers assigned to the Flamingo District live at Flamingo in park housing in order to be able to respond to emergency situations (Foist, pers. comm., 2007a).

The rangers stationed at Flamingo are responsible for patrolling the frontcountry and backcountry recreation areas, which includes boat patrols of Florida Bay and the west coast of Florida and some of the interior waterway and the Gulf of Mexico. These patrols include the approximately 100-mile canoe/small boat trail that leads to backcountry campsites. Frontcountry sites are accessed by the main park road and include a patrol of the campground and enforcement of the park rules and regulations throughout Flamingo (Foist, pers. comm., 2007a). Many law enforcement activities at Flamingo have historically focused on natural resource protection and include addressing wildlife poaching and preventing visitors from removing natural resources from the park (Terry, pers. comm., 2006).

In addition to patrol responsibilities, park rangers have been or will be trained as emergency response technicians to assist in emergency response. These incidences include medical emergencies as well as search and rescue operations as park visitors frequently get lost in backcountry areas (Foist, pers. comm., 2007a).

When the Flamingo concession operations were at a greater capacity, there was an increase in both daytime and overnight visitors that brought more activity to the area. While the duties for law enforcement were not different, this increase in activity required more staff time (Foist, pers. comm., 2007a).

## **ENVIRONMENTAL CONSEQUENCES**

Park management and operations refers to the current staff available to adequately protect and preserve vital park resources and provide for an effective visitor experience. This topic also includes the operating budget necessary to conduct park operations.

### **GUIDING REGULATIONS AND POLICIES**

Direction for management and operations at Everglades National Park is set forth in the park's enabling legislation, Strategic Plan (2000), the Superintendent's Compendium (NPS 2006a), and the General Management Plan (in development).

Specifically related to the provision of commercial services at the park, the Strategic Plan details the following long-term goals (NPS 2006a):

- Visitors safely enjoy and are satisfied with availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities. Specifically, ensuring visitors to Everglades National Park have the opportunity to experience the park's unique subtropical wilderness values;
- Park visitors and the general public understand and appreciate the preservation of parks and their resources for this and future generations. The public understands and appreciates Everglades National Park and its role in the South Florida ecosystem and provides support in achieving the park's purpose; and
- The National Park Service uses current management practices, systems, and technologies to accomplish its mission. Specifically that Everglades National Park has a diverse, motivated, and professional workforce allowing it to be a responsive, efficient, safe, and accountable organization.

The Superintendent's Compendium sets forth public use limits, closures, permit requirements, and other general regulations to be enforced at the park that influence the level of park operations. An example of the regulations applicable in considering commercial services at Flamingo includes Section 2.10 Camping, which details how long visitors may camp, types of equipment that may or may not be used, and camping activities that require permits, among other things (NPS 2006a). Regulations related to fishing, boating, public assemblies, swimming, and biking are also included in the compendium.

### **ASSUMPTIONS, METHODOLOGY, AND IMPACT THRESHOLDS**

Park management and operations, for the purpose of this analysis, refers to the quality and effectiveness of park staff to maintain and administer park resources and provide for an effective visitor experience. This includes an analysis of the projected need for NPS staff time and materials in relation to the visitor services provided under each of the alternatives. Some of the proposed activities would be the responsibility of the concessioner, a designation that would be made in this analysis. The analysis also considers possible staff changes necessary to address the actions proposed under the alternatives and details the adverse or beneficial impacts that may occur. Park staff from each of the divisions were

members of the planning team, and were consulted regarding expected staffing and funding needs under each alternative.

The following thresholds for evaluating impacts on park operations and management were defined and applied to beneficial and adverse impacts:

- Negligible:* Park operations would not be affected or an action would have no measurable impact on operations in the park unit.
- Minor:* Effects to park operations would not be readily apparent and difficult to measure. The impacts on park operations and budget would have little material effect on other ongoing park operations.
- Moderate:* Effects to park operations would be readily apparent and would measurably affect park operations. The changes would be noticeable to park staff and visitors. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
- Major:* Effects to park operations would be readily apparent and would result in a substantial change to park operations. The changes would be noticeable to park staff and visitors and be markedly different from existing operations. Mitigation measures would be necessary to offset adverse effects, and their success could not be guaranteed.

*Analysis area:* The study area for park management and operations is the primary Flamingo study area.

#### **IMPACTS OF ALTERNATIVE A – NO ACTION ON MANAGEMENT AND OPERATIONS**

**Analysis.** Under alternative A, visitor services would remain essentially unchanged from current conditions, with the same level of interpretation provided to park visitors. Interpretive staff would continue to staff the visitor center, provide programs for visitors, such as presenting various walks and programs, and issue backcountry permits. Maintenance of interpretive programs at their current level would not require any changes in funding or staffing for the interpretive division and would result in short- and long-term negligible adverse impacts. Although the reconstruction of the amphitheater would create an additional need for interpretive services, this need would not have a measurable impact on park operations. Under alternative A the current housing shortage would be addressed by the reconstruction of employee housing, and the maintenance shop and boat repair operations would be relocated to the new facility, a moderate beneficial impact.

In the maintenance division, staff would continue to be responsible for maintenance and upkeep of buildings that previously were run by the concessioner. Some facilities, such as the lodge and cottages, would be demolished, relieving a portion of the facilities maintenance requirements. Maintenance of other visitor facilities, such as the campground and trails, would continue at current levels. The maintenance division would also retain responsibility for the management of the wastewater and water supply plants. Without the prior supplement of concession revenues to help amortize costs and support the one staff position at the plant, the NPS would need to pay these costs and support this staff position into the future. Continuing to fund this position, which was previously funded by other sources, would have a long-term minor adverse impact, because the funding of this one position would not create changes noticeable to park staff and visitors. Although an extra position would need to be funded, the reduction in maintenance requirements would have long-term minor beneficial impacts resulting in long-term negligible adverse impacts overall to the maintenance division under alternative A.

Under alternative A, law enforcement requirements would not increase from their current levels. No overnight accommodations would be provided except for camping, resulting in the majority of law enforcement activities occurring during the day. Law enforcement officers would still be required to patrol backcountry areas, where visitation can occur 24 hours a day. Maintenance of current law enforcement activities might include hiring additional staff, but not beyond the level currently

programmed. The current housing shortage would be addressed by the reconstruction of employee housing, a moderate beneficial effect for operations, since this would allow the law enforcement division to provide services in the evening.

For staff that live at Flamingo, no new services would be provided and the only amenity available would be the marina store. The lack of amenities or activities other than work require staff living at Flamingo to drive over an hour each way to the nearest city to obtain groceries or engage in social activities. Lack of amenities at Flamingo for park staff could impact employee recruitment and retainment, and possibly result in long-term minor adverse impacts to park operations and management.

**Cumulative Impacts.** Under alternative A (no action), the park would continue with plans for ongoing exotic plant control, mosquito control, fire management, landscape management, and continued facility maintenance, all of which would be responsibilities of the maintenance division. Visitors would continue to visit the site without overnight accommodations, and interpretive programs throughout the park would continue, including development of a wayside exhibit plan and the development of other recreational facilities in the area such as the Saltwater Paddling Trail and the Biscayne-Everglades Greenway. These projects would include the involvement of all divisions of Everglades National Park. Although these projects would require staff time and effort to implement, when considered with the negligible to minor adverse and moderate beneficial impacts under alternative A, the cumulative impact would be long-term, minor, and adverse

**Conclusion.** Impacts to park operation and maintenance would be long-term negligible for the interpretive and maintenance divisions. The replacement of employee housing and the maintenance facility would have a long-term moderate beneficial impact on park staff. The reduced infrastructure at the site would result in long-term minor beneficial to the maintenance division, with long-term minor adverse impacts to staff living on-site due to lack of amenities.

#### **IMPACTS OF ALTERNATIVE B – “FLAMINGO REBUILT” ON MANAGEMENT AND OPERATIONS**

**Analysis.** Under alternative B, lodging and visitor activities would be restored and enhanced (compared to pre-hurricane operations), which would impact staffing responsibilities and requirements across the interpretive, maintenance, and law enforcement divisions.

Under this alternative, the overall responsibilities of the interpretive division would increase as visitors would be encouraged to stay at the site longer. Specific additional duties could include guided tours of Eco Pond or other restored areas, facilitating night sky viewing opportunities, and issuance of additional backcountry permits. To address this increase in workload, additional seasonal interpretive staff would be required at Flamingo. An estimated four additional seasonal staff and five additional volunteers would be needed (see table 3-17). To support these staff, at least six to seven additional housing units would be required to house four seasonal employees and two to three volunteers. In addition to housing, the interpretive division would also require two additional vehicles for staff travel to programs. Funding for four additional seasonal staff would be approximately \$68,000 a year, with an additional \$8,000 a year required for cars and other support materials (McGee-Ballinger, pers. comm., 2007b). It is anticipated that an increase in base funding levels would occur and that impacts to interpretation from alternative B would be long-term minor adverse with minimal impact on other park operations. However, if an increase in base funding does not occur, the impacts to the interpretive division would be long-term moderate and adverse, since it would result in reducing services in other areas of the park to accommodate activities at Flamingo.

**Table 3-17: Flamingo District Employees Under Each Alternative**

<b>Division</b>	<b>Alternative A (no action or current management)</b>	<b>Alternative B</b>	<b>Alternative C</b>
Interpretation	2 full-time 4-6 seasonal 5 volunteers	<b>Same as A, PLUS:</b> 4 seasonal 5 volunteers	<b>Same as A, PLUS:</b> 1 full-time 6 seasonal 6 volunteers
Maintenance	10 full-time	<b>Same as A, PLUS:</b> 1 full-time (Architect/Engineer) 3 full-time (maintenance mechanics)	<b>Same as B</b>
Law Enforcement	6 full-time 1 seasonal	<b>Same as A, PLUS:</b> 3 seasonal	<b>Same as B</b>

Activities would also increase in the maintenance division as overnight accommodations and other amenities, such as gathering areas would be added to Flamingo. In the short-term, the maintenance division would be involved in the reconstruction of Flamingo including planning design and construction management activities related to site development. Specifically, the division would be involved in preparation of development concept plans, preparing project cost estimates and funding requests, design reviews, and construction supervision. This increased workload related to redevelopment activities would last one to five years and require one additional engineering/architectural position, costing approximately \$96,000. In addition, an estimated \$5,000 per year would be expected for non-personnel, administrative costs (Jester, pers. comm., 2007c). Funding sources for maintenance activities would be expected from utility revenue, concessions franchise fees, and a request for an increase in base funding. However, a request for increase in base funding for maintenance activities would not occur immediately and during the time period of this request, maintenance would be deferred in other areas of the park to accommodate activities at Flamingo. This deferred maintenance would result in short-term moderate impacts, since effects to park operations would be readily apparent and would measurably affect park operations.

Over the long-term, under alternative B a number of new structures and other amenities would be added to Flamingo, which would increase the responsibilities of maintenance personnel. Under this alternative, the maintenance division would be responsible for the operation and maintenance of the exterior of buildings and other facilities run by the concessioner including underground utilities, roads, building exteriors, and the water and wastewater treatment plants at Flamingo. These added facilities and amenities would result in an increase in visitation to Flamingo, which would result in a corresponding increase in demand on the water treatment activities. It is expected that the additional cost associated with increased operation and maintenance of water treatment activities would be reimbursed to NPS by the concessioner for use of the utility. This increase in use would also result in an increase in ongoing maintenance of facilities at Flamingo and the need to respond to emergency repairs or to complete regular maintenance on both concession and park owned assets. The maintenance division would also require additional administrative support for the preparation of funding requests for asset maintenance and the completion of annual condition assessments and design and development documents for contracted maintenance activities. Overall, in the long-term it is expected that the maintenance division would require three additional maintenance and/or mechanic staff at an estimated cost of \$180,000 per year. Non-personnel, administrative-related costs would be approximately \$320,000 a year with about \$100,000 reimbursed from the concession operation for water and wastewater treatment (Jester, pers. comm., 2007c). No additional housing would be required for maintenance staff under alternative B, as staff would commute by van-pool from the local communities. During the long-term, funding would be obtained for these

operations from the sources described above, including an increase in base funding. Since anticipated funding sources would be expected to cover the increase in staff and materials for the maintenance division, any adverse impact would be long-term and minor. If anticipated funding were not received, impacts would be long-term, moderate, and adverse.

Alternative B would increase activity at Flamingo and, therefore, require an increase in law enforcement to respond to incidents and emergency situations. More housing would be provided (see Elements Common to All Alternatives in Chapter 2: Alternatives) so staff could live on-site and be more effective in emergency response. To address this workload, an additional three seasonal positions are required, at a cost of approximately \$75,000. Also, to support these positions, two patrol vehicles would be needed at an approximate cost of \$17,000 (Foist, pers. comm., 2007b). It is anticipated that an increase in base funding levels would occur and that impacts to law enforcement from alternative B would be long-term minor adverse with minimal impact on other park operations. However, if an increase in base funding does not occur, the impacts to the law enforcement division would be long-term moderate adverse as it would result in reducing services in other areas of the park to accommodate activities at Flamingo.

Alternative B would add a variety of amenities to the Flamingo area such as a screened gathering area, picnic areas, a swimming pool, board game room, and lounge area. These amenities would be accessible to park staff. Providing these amenities to park staff reduces the necessity to travel to points outside the park for recreation. Added amenities would improve working conditions as well as staff recruitment and retention and would have a long-term moderate beneficial impact as the change would be noticeable to park staff.

**Cumulative Impacts.** Visitation to the site would likely increase as visitors would be offered more opportunities at Flamingo, including overnight accommodations. Other actions that would contribute to cumulative impacts under alternative B would be the same as those described for alternative A, including landscaping and facility maintenance and interpretive programs. These projects would include the involvement of all divisions of Everglades National Park. Assuming that funding is available for all of these projects, when combined with the actions occurring at Flamingo under alternative B, the cumulative impacts would be long-term, minor, and adverse. If funding is not received, impacts could be long-term moderate adverse, because the impact would be felt in other areas of the park.

**Conclusion.** Implementation of alternative B would require approximately \$419,000 in additional funding to accommodate needed staff increases and \$250,000 (assuming \$100,000 is reimbursed by the concessioner) in support services such as vehicles, operation of the water and wastewater treatment plants, interpretive supplies, etc. There would be short-term moderate adverse impacts to the maintenance division as some deferred maintenance would occur while waiting for funding increases. For all divisions, the impacts under alternative B would be long-term minor adverse, assuming an increase in base funding occurs with long-term moderate beneficial impacts occurring for the employees living at Flamingo. If no increase in base funding occurs, impacts to all divisions would be long-term moderate adverse as services would need to be reduced in other areas of the park to accommodate Flamingo.

### IMPACTS OF ALTERNATIVE C – “FLAMINGO REDESIGNED” ON MANAGEMENT AND OPERATIONS

**Analysis.** Under alternative C, operations for interpretation would increase slightly over those in alternative B as additional visitor opportunities are added. The addition of multiple tours such as multi-day backcountry trips, educational hikes, and presenting a wider variety of interpretive themes would require additional staff to handle the workload. To address this workload, additional seasonal interpretive staff would be required at Flamingo. An estimated extra six seasonal staff and six volunteers would be needed (compared to alternative A), exceeding the level of seasonal employees from past peak years, as well as the addition of one permanent interpretive staff position. To support these staff, at least 10 to 11 housing units would be required to house one permanent staff member, six seasonal employees and three to four volunteers. The interpretive division would also require three more vehicles to support staff travel

to programs. Funding for the one permanent staff member and six additional seasonal staff would be approximately \$160,000 a year, with an additional \$12,000 a year required for cars and other support materials (McGee-Ballinger, pers. comm., 2007b). It is anticipated that an increase in base funding levels would occur and that impacts to interpretation from alternative C would be long-term, minor, and adverse with minimal impact on other park operations. However, if an increase in base funding does not occur, the impacts to the interpretive division would be long-term moderate adverse as it would result in reducing services in other areas of the park to accommodate activities at Flamingo.

Compared to alternative B, alternative C would increase maintenance responsibilities though the addition of a shuttle within Flamingo, which would be operated by the concessioner. However, the number of staff, for both the short- and long-term, and other associated costs would be approximately the same as alternative B, resulting in short-term, moderate adverse impacts and long-term, minor adverse impacts to the maintenance division.

Impacts for law enforcement under alternative C are expected to be the same as those under alternative B. Both alternatives are expected to create a similar level of visitor activity, resulting in similar requirements for law enforcement presence and response. Therefore, impacts to law enforcement would be long-term, minor-to-moderate adverse, depending on the availability of funding to staff additional positions and supplies.

As is the case under alternative B, alternative C would add a variety of amenities to the Flamingo area that would improve working conditions as well as staff recruitment and retention and would have a long-term moderate beneficial impact as the change would be noticeable to park staff.

**Cumulative Impacts.** Cumulative impacts under alternative C would be the same as those under alternative B and would result in long-term, minor-to-moderate adverse cumulative impacts.

**Conclusion.** Implementation of alternative C would require approximately \$511,000 in additional funding to accommodate needed staff increases and \$254,000 (assuming \$100,000 is reimbursed by the concessioner) in support services such as vehicles, operation of the water and wastewater treatment plants, interpretive supplies, etc. Short-term moderate adverse impacts would occur to the maintenance division as some deferred maintenance would occur while waiting for funding increases. For all divisions, the impacts under alternative C would be long-term minor adverse, assuming an increase in base funding occurs with long-term moderate beneficial impacts occurring for the employees living at Flamingo. If no increase in base funding occurs, impacts to all divisions would be long-term, moderate and adverse as services would need to be reduced in other areas of the park to accommodate Flamingo.