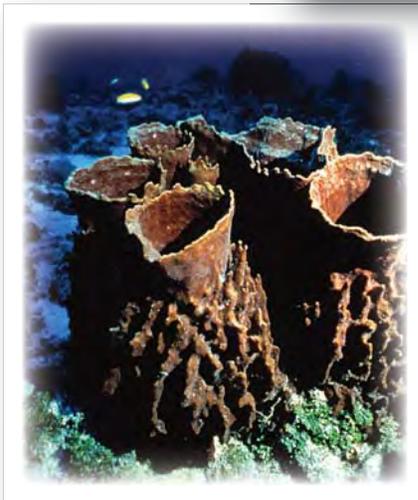
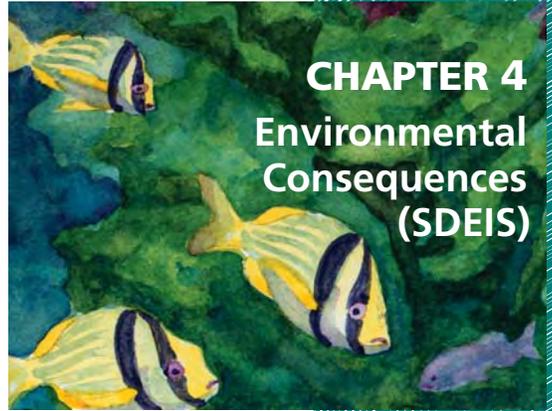


CHAPTER 4
Environmental
Consequences
(SDEIS)



INTRODUCTION

The National Environmental Policy Act requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if a proposed action is implemented. In this case, the proposed federal action would be the adoption of a general management plan for Biscayne National Park. The following portion of this document analyzes the environmental impacts of implementing the original alternative 1 (no action) and the two new alternatives (alternatives 6 and 7) on natural resources, cultural resources, visitor experience, socioeconomic environment, and park operations. The analysis is the basis for comparing the beneficial and adverse effects of implementing the alternatives.

Because of the general, conceptual nature of the actions described in the alternatives, the impacts of these actions are analyzed in general qualitative terms. Thus, this environmental impact statement should be considered a programmatic analysis. If and when site-specific developments or other actions are proposed for implementation subsequent to this General Management Plan, appropriate detailed environmental and cultural compliance documentation will be prepared in accord with NEPA and NHPA requirements.

This chapter begins with a description of the methods and assumptions used for each topic. Impact analysis discussions are organized by alternative and then by impact topic under each alternative.

Each alternative discussion also describes cumulative impacts and presents a conclusion. At the end of each alternative, there is a brief discussion of unavoidable adverse impacts; irreversible and irretrievable commitments of resources; the relationship

of short-term uses of the environment and the maintenance and enhancement of long-term productivity, energy requirements, and conservation potential. The impacts of each alternative are briefly summarized in table 5, at the end of the “Alternatives, Including the Preferred Alternative” section.

CUMULATIVE IMPACT ANALYSIS

A cumulative impact is described in CEQ regulation 1508.7 as follows:

Cumulative impacts are incremental impacts 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 action. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

To determine potential cumulative impacts, other projects within and surrounding Biscayne National Park were identified. The area included Miami-Dade County and the state of Florida. Projects were identified by discussions with the park, federal land managers, and representatives of county and town governments. Potential projects identified as cumulative actions included any planning or development activity that was currently being implemented or would be implemented in the reasonably foreseeable future. Impacts of past actions were also considered in the analysis.

These actions are evaluated in conjunction with the impacts of each alternative to determine if there are any cumulative effects

on visitor use or a particular natural, cultural, or socioeconomic resource. Because most of these cumulative actions are in the early planning stages, the qualitative evaluation of cumulative impacts was based on a general description of the project.

Past Actions

Tree cutters from the Bahamas logged mahogany trees on the keys for ships. Early settlers on Elliott Key cleared the native forests to plant key limes and pineapples. When Biscayne Bay was being considered for national monument designation, many of the keys were privately owned. At one time, the owner of Elliott Key bulldozed a road down the length of the key. This became known as “Spite Highway.” The owner of Boca Chita Key built a 65-foot-tall structure resembling a lighthouse although it never held a light. Other keys also contain remains of past ownership, such as the Jones Homestead on Porgy Key and the Sweeting Homestead on Elliott Key.

Establishment of Biscayne National Monument and the subsequent expansion as Biscayne National Park have allowed the majority of the waters and keys of Biscayne Bay to be protected as part of the national park system. Likewise, several marine protected areas in the immediate vicinity have also been established by various agencies and organizations. This has resulted in beneficial impacts on terrestrial and marine communities and recreational experience opportunities.

Maritime Heritage Trail. The park has recently developed a new cultural history component to its interpretive programs. The Maritime Heritage Trail (an underwater snorkeling/scuba experience) will facilitate visitor access to six historic shipwreck sites within the waters of the park’s proposed Maritime National Historic District. Mooring buoys have been installed under the guidance of the Mooring Buoy and Marker Plan (in progress) to reduce visitor impacts. Historic

documentation and interpretive materials for each site will be produced. In the future, the park may consider adding additional historic shipwrecks and other maritime sites (such as Fowey Rocks Lighthouse) or even terrestrial maritime sites such as docks and wharfs.

Present Actions

Fishing. Both recreational and commercial fishing is allowed in the park. The park would continue monitoring fish populations, as identified in the Fishery Management Plan. All actions concerning fishing in the park would be implemented in accordance with the Fishery Management Plan and after consulting with the Florida Fish and Wildlife Conservation Commission regarding all areas except the marine reserve zone where fishing would not be allowed.

Alternative Energy. The park has completed the installation of solar power equipment on Adams Key that has reduced the need for diesel-engine generated power by 90%. The park is seeking funding to install solar panels on Elliott Key to reduce the use of diesel-powered generators.

Black Point Jetty. Adjacent to Black Point Marina County Park, the Black Point Jetty is owned by Biscayne National Park. A memorandum of agreement with the county outlines each party’s responsibilities for facility maintenance.

Turkey Point Power Plant. This electrical generating plant operates just outside park boundaries on the mainland south of Convoy Point. Although it has its own cooling canals, some heated water may be released into Biscayne Bay and park waters. The cooling canals evaporation may result in the use of water from Biscayne Aquifer, reducing the availability of fresh water to coastal and bay communities in the park. It is not known what level of effect this is having on plant and animal communities in the southwest portion of the park. The current plans for Turkey Point Power Plant include the addition of

two new reactors – the National Park Service is a cooperating agency for environmental compliance. However, no impact analysis has yet been completed on this expansion, so potential effects to park resources cannot be analyzed at this time.

Recreational Boating. Both motorized and nonmotorized boating is recognized as an appropriate and popular use of the park's waters. Some management issues are associated with this activity. Unintentional groundings and propeller scars cause damage to marine environments when boats are driven into water that is too shallow. There are also some conflicts between motorized and nonmotorized (paddling or sailing craft) boaters. Motorized boating also has impacts on the soundscapes of the park. Many agencies and organizations, including the park and the State of Florida, have boater education programs in place to minimize these impacts.

Park Actions. There are many actions being undertaken at the park that are improving natural resources, visitor experience opportunities, and park facilities. Examples of funded projects include maintenance of navigational buoys; development of a fishery management plan, and wildland fire plan; implementation of a multipark exotic plant management plan; rehabilitation of aged infrastructure; scientific studies, and trail work.

Park infrastructure has been and continues to be built in such a manner as to minimize impacts to the area's rich natural and cultural resources and to contribute to their conservation. One example is the minimal footprint of the Convoy Point grounds for visitor use.

Interagency initiatives are also being supported—such as the South Miami-Dade Watershed Study and Plan, the Biscayne Bay Surface Water Improvement and

Management Plan, the Lower East Coast Regional Water Supply Plan, the Biscayne Bay Partnership Initiative, the Southeast Florida Coral Reef Initiative, the Biscayne Bay Coastal Wetlands Plan, the U.S. Fish and Wildlife Service Multispecies Recovery Plan, and reintroduction of rare butterflies.

Future Actions

Long-range actions that are beginning to be implemented would have future impacts on natural resources. The Comprehensive Everglades Restoration Plan would restore more natural flows of fresh water in southern Florida when completed. Part of this is the Biscayne Bay Coastal Wetlands Project that would concentrate on preserving or restoring the wetlands along the shore of Biscayne Bay. The Coral Reef Initiative would protect corals and coral reefs throughout the region.

The developed area of Miami-Dade County is continuing to grow according to city and county plans, especially north and west of the park. Such development would continue to reduce the availability of natural habitats in the geographic region outside park boundaries. Adjacent development also increases the potential for hydrologic alterations and increases the potential for urban runoff and associated effects on the water quality of Biscayne Bay. It is also expected that that this growth would lead to additional demand for recreation in the park, including increases in fishing and boating activities as well as their associated impacts to park fisheries, endangered sea life, submerged aquatic resources (including corals and seagrass beds), and submerged cultural resources. An increase in recreational use could result in increased levels of conflict between recreational user groups and increased demands on park operations to manage an increasing number of visitors.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

Methods and assumptions for analyzing the impacts for natural resources, cultural resources, visitor experience, socioeconomic environment, and NPS operations and facilities are included here for ease of reference and are the same as described on pages 188–195 in the 2011 Draft GMP/EIS accessed online at: <http://parkplanning.nps.gov/documentsList.cfm?parkID=353&projectID=11168>.

The planning team based the impact analysis and the conclusions in this chapter largely on the review of existing literature and studies, information provided by experts in the National Park Service and other agencies, and park staff insights and professional judgment. The team’s method of analyzing impacts is further explained below. It is important to remember that all the impacts have been assessed assuming mitigating measures have been implemented to minimize or avoid impacts. If mitigating measures described in “Chapter 2: Alternatives” were not applied, the potential for resource impacts and the magnitude of those impacts would increase.

Director’s Order 12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, presents an approach to identifying the duration (short or long term), type (adverse or beneficial), and intensity or magnitude (e.g., negligible, minor, moderate, or major) of the impact(s), and that approach has been used in this document. Where duration is not noted in the impact analysis, it is considered long term. Direct and indirect effects caused by an action were considered in the analysis. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by the action and occur later in time or farther removed from the place, but are still reasonably foreseeable.

The impacts of the action alternatives describe the *difference between* implementing the no-action alternative and implementing the action alternatives. To understand a complete picture of the impacts of implementing any of the action alternatives, the reader must also take into consideration the impacts that would occur under the no-action alternative.

The impacts of climate change on the park are not expected to differ among the alternatives, and the lack of qualitative information about climate change effects adds to the difficulty of predicting how these impacts might be realized in the park. For example, mangroves may be impacted by sea level rise and storm frequency and intensity may impact cultural resources and visitor amenities. Likewise, global scale stressors such as climate change and ocean acidification can affect coral reefs in many ways, including altering calcification rates and increasing prevalence of bleaching and disease. Few NPS management actions exist that would directly reduce the effects of climate change and ocean acidification. However, taking actions to protect coral reefs from other pressures such as overfishing; land-based sources of pollution; and physical damage from fishing gear, anchoring, and vessel groundings might increase reef resiliency, potentially delaying the effects of global stressors. Thus protection of coral reefs is an important management action incorporated into all action alternatives to varying degrees based on zoning schemes.

The range of variability in the potential effects of climate change is large in comparison to what is known about the future under an altered climate regime in the park in particular, even if larger-scale climatic patterns have been accurately predicted for South Florida and the Atlantic Coast (Loehman and Anderson 2009; NPS 2009c).

Therefore, the potential effects of this dynamic climate on park resources were included in “Chapter 3: Affected Environment.” However, they will not be analyzed in detail in “Chapter 4: Environmental Consequences” with respect to each alternative because of the uncertainty and variability of outcomes and because these impacts are not expected to differ among the alternatives.

NATURAL RESOURCES

The analysis of natural resources was based on research; knowledge of park resources; and the best professional judgment of planners, biologists, hydrologists, and botanists who have experience with similar types of projects. Information on the park’s natural resources was gathered from several sources, including the U.S. Fish and Wildlife Service (USFWS), and site-specific resource inventories for wetlands, wildlife, water quality, and fisheries. As appropriate, additional sources of data are identified under each topic heading.

Where possible, map locations of sensitive resources were compared with the locations of proposed developments and modifications. Predictions about short-term and long-term site impacts were based on previous studies of visitor and facilities development impacts on natural resources.

For each natural resource impact topic, the description of impacts includes duration and type as described here:

Duration. The duration of the impact considers whether the impact would occur for a short term and be temporary in nature and associated with transitional types of activities and associated impacts, or if the impact would occur over a long term and have a permanent effect on the resource.

Type of Impact. Impacts are evaluated in terms of whether they are beneficial or adverse to the resource. Beneficial impacts

would generally be expected to result in improved conditions while adverse impacts would generally be expected to result in deteriorated conditions or the perpetuation of existing conditions that are less than the desired condition.

The impact intensity definitions below assume that mitigation would be implemented.

Fisheries and Seabottom Communities

Negligible — Impacts would be at the lowest levels of detection and would have no appreciable effect on resources, values, or processes.

Minor — Impacts would be perceptible, but slight and localized.

Moderate — Impacts would be readily apparent and widespread and would result in a noticeable change to resources, values, or processes.

Major — Impacts would be readily apparent and widespread and would result in a substantial alteration or loss of resources or processes if adverse.

Special Status Species

Through coordination with the U.S. Fish and Wildlife Service and NOAA Fisheries, species of special concern were identified that were generally in or near the park. This included information on each species, including preferred habitat, prey, and foraging areas. Park staff then collected more specific information such as the absence or presence of each species within park boundaries. For special status species, including federally listed species, the following impact intensities were used.

Note: To fulfill NPS obligations under the Endangered Species Act, determinations of

effect for the listed species retained for analysis are included below using additional language that corresponds to the Endangered Species Act for the purposes of review by the U.S. Fish and Wildlife Service and NOAA Fisheries.

Negligible — The action could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to “may affect, not likely to adversely affect” determination.

Minor — The action could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable but small and localized and not outside the range of natural variability. This impact intensity equates to a “may affect, not likely to adversely affect” determination.

Moderate — Impacts on special status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Breeding animals of concern are present; animals are present during particularly vulnerable life stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park. This impact intensity equates to a “may affect, likely to adversely affect” determination.

Major — The action would result in a noticeable effect to viability of a population or individuals of a species or resource or designated critical habitat. Impacts on a special status species, critical habitat, or the natural processes sustaining them would be detectable. Loss of habitat might affect the viability

of at least some special status species. Impacts of this intensity may equate to a determination of “take” of individuals or “may affect, likely to jeopardize the continued existence of a species or adversely modify critical habitat for a species.”

As explained in detail in “Chapter 3: Affected Environment,” climate change is anticipated to alter water and air temperature, water quality, severe weather events, and vegetation and wildlife. The National Park Service is required to protect federally listed species, and by policy, supports species listed by the State of Florida. Climate change may cause alterations in listed species’ habitat, breeding and nesting timing and success, predator-prey relationships, and the food web that supports these species. Some of these changes may be difficult to distinguish from other natural processes such as barrier island migration. The park will work with the U.S. Fish and Wildlife Service, NOAA Fisheries, and appropriate state agencies to determine and implement new mitigation or management actions to support species health and population stability as the dynamic effects of climate change become apparent over the life of this General Management Plan.

Terrestrial and Submerged Aquatic Vegetation

Negligible — The impact on vegetation (individuals and/or communities) would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. Ecological processes and biological productivity would not be affected.

Minor — An action would not necessarily decrease or increase the area’s overall biological productivity. An action would affect the abundance or distribution of individuals in a localized area, but would not affect the viability of

local or regional populations or communities.

Moderate — An action would result in a change in overall biological productivity in a small area. An action would affect a local population sufficiently to cause a change in abundance or distribution, but it would not affect the viability of the regional population or communities. Changes to ecological processes would be of limited extent.

Major — An action would result in a change in overall biological productivity in a relatively large area. An action would affect a regional or local population of a species sufficiently to cause a change in abundance or in distribution to the extent that the population or communities would not be likely to return to its/their former level (adverse). Significant ecological processes would be altered.

Wetlands

Negligible — No measurable or perceptible changes in wetland size, integrity, or continuity would occur.

Minor — The impact would be measurable or perceptible but slight. A small localized change in size, integrity, or continuity could occur because of short-term indirect effects such as construction-related runoff. However, the overall viability of the resource would not be affected.

Moderate — The impact would be sufficient to cause a measurable change in the size, integrity, or continuity of the wetland or would result in a small, but permanent, loss or gain in wetland acreage.

Major — The action would result in a measurable change in all three parameters (size, integrity, and

continuity) or a permanent loss of large wetland areas. The impact would be substantial and highly noticeable.

Soundscapes

Context, time, and intensity together determine the level of impact of an activity. For example, noise for a certain period and intensity would be a greater impact in a highly sensitive context, and a given intensity would be a greater impact if it occurred more often, or for longer duration. In some cases, an analysis of one or more factors may indicate one impact level, while an analysis of another factor may indicate a different impact level according to the criteria below. In such cases, best professional judgment based on a documented rationale was used to determine which impact level best applies to the situation being evaluated.

Negligible — In all zones, effects on natural sound environment would be at or below the level of detection, and such changes would be so slight that they would not be of any measurable or perceptible consequence to visitor experience or to biological resources.

Minor — Effects on the natural sound environment would be detectable, although the effects would be localized, and would be small and of little consequence to visitor experience or biological resources. Natural sounds would predominate in zones where management objectives call for natural processes to predominate, with human-caused noise infrequent and at low levels. In zones where more human-caused noise is tolerated, human-caused noise would not be so constant that natural sounds could not be heard occasionally. Beneficial impacts would reduce the amount of noise or otherwise improve the natural soundscape by a similar degree.

Moderate — Effects on the natural sound environment would be readily detectable with consequences over a relatively large area. Beneficial impacts would reduce the amount of noise or otherwise improve the natural soundscape by a similar degree. In zones where management objectives call for natural processes to predominate, natural sounds would predominate, but human-caused noise could occasionally be present at low to moderate levels. In zones where human-caused noise is consistent with desired conditions, this noise would predominate during daylight hours, but would not be overly disruptive to visitor activities in the area. In such areas, natural sounds could still be heard occasionally.

Major — Effects on the natural sound environment would be obvious and have substantial consequences to visitor experience or to biological resources in the region. Beneficial impacts would reduce the amount of noise or otherwise improve the natural soundscape by a similar degree. In zones where management objectives call for natural processes to predominate, natural sounds would be impacted by human-caused noise sources frequently or for extended periods of time. In zones where human-caused noise is more tolerated, the natural soundscape would be impacted most of the day and make enjoyment of activities in the area difficult.

Duration. A short-term impact occurs only during the construction period or up to three months. A long-term impact continues for more than three months.

CULTURAL RESOURCES

For each cultural resource impact topic, the description of impacts includes duration and type as described here:

Duration. The duration of the impact considers whether the impact would occur for a short term and be temporary in nature and associated with transitional types of activities and associated impacts, or if the impact would occur over a long term and have a permanent effect on the resource.

Type of Impact. Impacts are evaluated in terms of whether they are beneficial or adverse to the resource. Beneficial impacts would generally be expected to result in improved conditions while adverse impacts would generally be expected to result in deteriorated conditions or the perpetuation of existing conditions that are less than the desired condition.

Impacts on Cultural Resources and Section 106 of the National Historic Preservation Act

In this Supplemental Draft Environmental Impact Statement, impacts on cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement the National Environmental Policy Act. These impact analyses are intended, however, to comply with the requirements of both the National Environmental Policy Act and section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation (ACHP) regulations implementing section 106 of the National Historic Preservation Act (36 CFR Part 800, *Protection of Historic Properties*), impacts on cultural resources were also identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected national register-eligible or listed cultural resources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under ACHP regulations, a determination of either adverse effect or no adverse effect must also be made for affected national register-listed or eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the national register, e.g., diminishing the integrity (or the property's ability to convey its significance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, *Assessment of Adverse Effects*). A determination of no adverse effect means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the national register.

CEQ regulations and NPS Director's Order 12: *Conservation Planning, Environmental Impact Analysis and Decision-making* also require a discussion of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under the National Environmental Policy Act only. It does not suggest that the level of effect as defined by section 106 is similarly reduced. Cultural resources are nonrenewable resources, and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under section 106 may be mitigated, the effect remains adverse.

A section 106 summary is included in the impact analysis sections. The section 106 summary is an assessment of the effect of the undertaking (implementation of the

alternative) based on the criterion of effect and criteria of adverse effect found in ACHP regulations.

Archeological Resources

Negligible— Impact is at the lowest level of detection. Impacts would be measurable but with no perceptible consequences. For purposes of section 106, the determination of effect would be “no adverse effect.”

Minor — Disturbance of a site(s) results in little loss of integrity. The determination of effect for section 106 would be “no adverse effect.”

Moderate — Site(s) is disturbed but not obliterated. The determination of effect for section 106 would be “adverse effect.”

Major — Site(s) is obliterated. The determination of effect for section 106 would be “adverse effect.”

Historic Structures and Buildings

Negligible — Impacts would be at the lowest levels of detection—barely perceptible and measurable. For purposes of section 106, the determination of effect would be “no adverse effect.”

Minor — Impacts would affect character-defining features but would not diminish the overall integrity of the building or structure. For purposes of section 106, the determination of effect would be “no adverse effect.”

Moderate — Impacts would alter a character-defining feature(s), diminishing the overall integrity of the building or structure to the extent that its national register eligibility could be jeopardized. For purposes of section

106, the determination of effect would be “adverse effect.”

Major — Impacts would alter character-defining features, diminishing the integrity of the building or structure to the extent that it would no longer be eligible to be listed in the national register. For purposes of section 106, the determination of effect would be “adverse effect.”

Cultural Landscapes

Negligible — Impacts would be at the lowest levels of detection—barely perceptible and measurable. For purposes of section 106, the determination of effect would be “no adverse effect.”

Minor — Impacts would affect character-defining features or patterns but would not diminish the overall integrity of the landscape. For purposes of section 106, the determination of effect would be “no adverse effect.”

Moderate — Impacts would alter character-defining features or patterns, diminishing the overall integrity of the landscape to the extent that its national register eligibility would be jeopardized. For purposes of section 106, the determination of effect would be “adverse effect.”

Major — Impacts would alter character-defining features or patterns, diminishing the overall integrity of the landscape to the extent that it would no longer be eligible to be listed in the national register. For purposes of section 106, the determination of effect would be “adverse effect.”

VISITOR EXPERIENCE

Methodology for Analyzing Impacts

This impact analysis evaluated two primary aspects of visitor experience—diversity of visitor activities and visitor services and facilities (including information and education). Analysis is conducted in terms of how the visitor experience might vary by applying different management zones in the alternatives. Although some acreage numbers and percentages are used to provide a relative sense of the amount of area where visitor access and activities might be affected, analysis is primarily qualitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity and duration of potential impacts.

Diversity of Visitor Activities. The analysis of effects on activities is based on whether there was a complete loss, addition, expansion, or a change in access to or availability of a recreational opportunity and how proposed management actions and zones would affect visitor opportunities for social interaction, solitude, challenge, adventure, and access throughout the park.

Visitor Services and Facilities. This analysis is based on whether there would be a change in the availability of visitor services or facilities provided by the National Park Service and commercial services, including information, education, recreation, transport, or other visitor support services resulting from proposed management zone application or other actions.

Intensity. The intensity of the impact considers whether the impact on visitor experience would be negligible, minor, moderate, or major.

Negligible impacts are effects considered not detectable to the visitor and would have no discernible effect.

Minor impacts are effects that would be slightly detectable but not expected to have an overall effect on the visitor experience.

Moderate impacts would be clearly detectable by the visitor and could have an appreciable effect on visitor experience.

Major impacts would have a substantial and noticeable effect on the visitor experience or could permanently alter substantial aspects of the visitor experience.

Duration. The duration of the impact considers whether the impact would occur for a short term and be temporary in nature and associated with transitional types of activities, or if the impact would occur over a long term and have a permanent effect on visitor experience such as no fishing in the marine reserve zone.

Type of Impact. Impacts are evaluated in terms of whether they are beneficial or adverse to visitor experience. Beneficial impacts would provide greater availability of a recreational opportunity or educational program or other services and types of experiences. Adverse impacts would reduce access or availability to these facets of visitor experience.

SOCIOECONOMIC ENVIRONMENT

The National Park Service applied logic, experience, professional expertise, and professional judgment to analyze the impacts on the social and economic situation resulting from the implementation of each alternative. Economic data, historic visitor use data, expected future visitor use, and future developments of the park were all considered in identifying, discussing, and evaluating expected impacts.

Assessments of potential socioeconomic impacts were based on comparisons between

the no-action alternative and each of the action alternatives.

Methodology for Analyzing Impacts

Duration of Impact. The evaluation of impacts also included an assessment of duration. Distinguishing between short-term and long-term duration was necessary to understand the extent of the identified effects. In general, short-term impacts are temporary in duration and typically are transitional effects associated with implementation of an action (e.g., related to construction activities) and are less than one year. In contrast, long-term impacts might have a permanent effect on the socioeconomic environments, and their effect extends beyond one year (e.g., operational activities).

Intensity of Impact. The evaluation of impacts includes an assessment of the intensity of the impacts, as follows:

Negligible — Effects on socioeconomic conditions would be below or at the level of detection. There would be no noticeable change in any defined socioeconomic indicators.

Minor — Effects on socioeconomic conditions would be slight but detectable.

Moderate — Effects on socioeconomic conditions would be readily apparent and result in changes to socioeconomic conditions on a local scale.

Major — Effects on socioeconomic conditions would be readily apparent, resulting in demonstrable changes to socioeconomic conditions in the region.

Type of Impact. With respect to economic and social effects, few standards or clear definitions exist as to what constitute beneficial changes and those considered adverse. For example, rising unemployment

is generally perceived as adverse, while increases in job opportunities and average per capita personal income are regarded as beneficial. In many instances, however, changes viewed as favorable by some members of a community are seen as unfavorable by others. For example, the impact of growth on housing markets and values may be seen as favorable by construction contractors and many homeowners, but adverse by renters and by local government officials and community groups concerned with affordability. Consequently, some of the social and economic impacts of the alternatives may be described to allow the individual reviewer to determine whether they would be beneficial or adverse (impact is indeterminate with respect to “type”).

NPS OPERATIONS AND FACILITIES

Methodology for Analyzing Impacts

The impact evaluation was based on a qualitative evaluation of the effects on park operations and facilities from changes in providing visitor and administrative facilities, services, or programs under each of the alternatives. Impacts were determined by examining the effects of changes on staffing, infrastructure, facilities, and services. The analysis is more qualitative rather than quantitative because of the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity, duration, and type of potential impact.

Duration of Impact. Short-term impacts would be less than one year in duration. Long-term impacts would extend beyond one year.

Intensity of Impact. The intensity of the impact considers whether the impact would be negligible, minor, moderate, or major. Impact intensities for park operations and facilities are defined as follows:

Negligible — Park operations and facilities would be affected at or below the lower levels of detection, or there would be no measurable change in park operations or facilities.

Minor — Changes in park operations and facilities would be perceptible, although the changes would be slight and localized and would not be expected to have an appreciable effect on the ability of the park or concessioner to provide desired services and facilities.

Moderate — Changes in park operations and facilities would be readily apparent and would have appreciable effects on park operations that are noticeable to the staff and the public.

Major — Changes in park operations and facilities would be readily apparent and result in substantial changes in park operations that are noticeable to the staff and public and are markedly different from existing operations.

Type of Impact. Beneficial impacts would improve park operations and facilities. Adverse impacts would negatively affect park operations and facilities and could hinder the park’s ability to provide adequate services, equipment, and facilities to visitors and staff. Some impacts could be beneficial for some operations or facilities and adverse or neutral for others.

IMPACTS OF IMPLEMENTING THE NO-ACTION ALTERNATIVE

NATURAL RESOURCES

Fisheries

Fisheries management in the park would continue to be governed by state- and park-specific regulations, NPS mandates, and legislation. Commercial and recreational fishing would continue throughout the park. Fisheries management in Biscayne National Park would continue to manage fishing in park waters with its mandate and responsibility to manage fishery resources in a way that such resources remain unimpaired.

Under the no-action alternative, fishing would continue to be managed according to state regulations in conjunction with park, NPS mandates, and legislation. In addition to state regulations, there would continue to be a ban on lobster harvest within the waters of the bay and a reduced bag limit for lobsters in waters outside the bay during the two-day sport season. Harvesting sponges, ornamental fish, and invertebrates would continue to be banned in all waters throughout the park.

Species in both the bay and the reefs would continue to experience substantial pressures from both commercial and recreational fishing. Some species would continue to be subject to overfishing. These impacts would continue to be adverse and minor to moderate in the long term.

Under this alternative, there would be no change in management of boating in the park. The 1,000-foot slow speed zone along a portion of the mainland would continue to provide some protection to the seagrass beds, which are an important habitat area for both juvenile and adult fish populations. Boating would continue to have an adverse impact on seagrass beds in all other areas of the park. The adverse impacts include seagrass bed

scarring. The long-term adverse impacts on fisheries habitat would likewise have an adverse impact on fish populations. These impacts on habitat would continue to long-term, minor to moderate, and adverse.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. In 2002, the National Park Service and the Florida Fish and Wildlife Conservation Commission initiated a Fishery Management Plan and Environmental Impact Statement. The draft plan was presented to the public in 2009, and the final plan is expected in 2014.

Once completed, the Fishery Management Plan would involve changes in current management strategies for both recreational and commercial fishing activities. These changes could include establishment of a permit system for both recreational boating and commercial fishers, limits on the type of spearfishing equipment that can be used in the park, a moderate decrease in fisheries take, and elimination of the lobster sport season. With implementation of the Fishery Management Plan, the park anticipates the current condition of fisheries stocks would improve and the adverse impact of fishing on habitat within the park would be reduced. The long-term impacts of the Fishery Management Plan on fisheries in the park would be beneficial. The adverse impacts on fish habitat associated with current management of boating in the park would continue. Under this alternative the beneficial impacts on fisheries associated with the Fishery Management Plan could be limited to what the plan proposes, without auxiliary benefits anticipated from other alternatives proposed in this General Management Plan.

The population of communities and cities around the park is expected to continue to increase. This could cause additional fishing pressure on fish populations in the park—a long-term adverse impact.

The United States Coral Reef Task Force created in 1998 was established to lead U.S. efforts to protect, restore, and promote the sustainable use of coral reef ecosystems. These efforts include but are not limited to reducing and mitigating coral reef degradation from pollution, overfishing, and other causes. The task force has identified fundamental themes to guide immediate and sustained national action. These themes include quickly reducing the adverse impacts of human activities on coral reefs and associated ecosystems. Specific actions that could be taken have not been proposed. However if the initiatives of the task force are fully implemented, the impacts of these activities would probably be beneficial for the coral reef system in the park. Full implementation of the task force’s recommendations would also probably cause the park to modify current management approaches to incorporate the recommendations. Until any recommendations take effect, coral reefs would still be subject to recreational activities that are harmful to the ecosystem. These impacts would continue to be long term, adverse, and minor to moderate.

The no-action alternative would result in the continuation of adverse impacts on fish and fish habitats, but would not result in any new/additional impacts. Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Under the no-action alternative, impacts on fisheries and fish habitat caused by boating and fishing in the park would continue to be adverse, minor to moderate, and long term, but there would be no additional impacts caused by implementing this alternative. There would be no project-related cumulative impacts.

Threatened and Endangered Species

Management actions under the no-action alternative would continue to support populations of threatened and endangered species in the park. The park would continue to coordinate with the U.S. Fish and Wildlife Service and NOAA Fisheries regarding management actions related to the following threatened and endangered species, as necessary.

Manatee. The 1,000-foot-wide slow speed zone that extends along the mainland shoreline from Black Point County Park south to Turkey Point would remain as a manatee protection area. This setback distance was established in cooperation with the state and Miami-Dade County and is consistent with setback distances outside park boundaries. Slow speed zones are designed to provide boat operators sufficient time to react when manatees are observed, reducing the potential of striking the animals. The slow speed zone would continue to have a long-term, beneficial impact on the population of manatees in the park.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Section 7 Determination of Effect: Protection measures already in place have minimized potential impacts to manatee from boat strikes. The determination of effect is “may affect, not likely to adversely affect” for manatee under a continuation of the no-action alternative.

Sea Turtles. Existing impacts include potential for collisions with boats, strangulation and entanglement with marine debris (including lobster and crab traps), hook and line fishing, and vessel groundings on sea turtle foraging habitat (coral and seagrass), which may adversely affect sea turtles, particularly green, hawksbill, and loggerhead species. Leatherback and Kemp’s Ridleys would be less likely to be affected because they are rarely in the park. Existing

long-term, moderate, adverse impacts to sea turtles in park waters would continue.

Known sea turtle nesting beaches on Elliott Key would not be closed, but these beaches receive little use during nesting season. Park staff would continue to install mesh screening over nests to protect the nests from predation, particularly by raccoons. These management activities would continue to have a long-term, beneficial impact on nesting turtles in the park.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Section 7 Determination of Effect: Sea turtles continue to be impacted by boating, fishing, and marine debris. Green, hawksbill, and loggerhead species are more likely to experience these impacts because they are more frequently found in park waters. The determination of effect is “may affect, likely to adversely affect” for sea turtles under a continuation of the no-action alternative.

American Crocodile. Most of the mangrove shoreline would continue to be managed primarily to protect wildlife habitat areas including crocodile habitat. Visitor services and infrastructure would continue to be concentrated at Convoy Point and would remain at or near current levels with the visitor center, designated paths, boardwalk, and jetty. These areas are outside the designated critical habitat. No development within the designated critical habitat would be proposed under this alternative. Impacts on crocodiles from current management approaches, development, and visitation patterns would continue to be adverse but negligible in the long term.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Section 7 Determination of Effect: Shoreline mangrove habitat within the park is well protected. The determination of effect is

“may affect, not likely to adversely affect” for American crocodile under a continuation of the no-action alternative.

Smalltooth Sawfish. Under this alternative, relatively unrestricted boating and fishing would continue throughout most of the park and their related impacts to smalltooth sawfish would persist including potential for entanglement in marine debris and bycatch. These impacts would be expected to continue to have a long-term, minor to moderate, adverse impact on smalltooth sawfish.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Section 7 Determination of Effect: Smalltooth sawfish and their habitat would continue to be impacted by fishing. The determination of effect is “may affect, likely to adversely affect” for sea smalltooth sawfish under a continuation of the no-action alternative.

Schaus Swallowtail Butterfly and Miami Blue Butterfly. Habitat for these two species is primarily focused on Adams Key and Elliott Key. Adams Key would continue to have a developed area that includes a dock, trail, picnic and restroom facilities, a ranger station, and park residential area. The developed area would remain on the southern shore and largely outside the hardwood hammock and away from preferred butterfly habitat. On Elliott Key, the trail that runs the length of the island also runs through the hardwood hammock. Under this alternative, no development would be proposed that would impact butterfly habitat on Elliott Key. Existing long-term, negligible adverse impacts would persist on Adams Key and Elliott Key due to previous modifications of the natural environment and visitor uses.

Old Rhodes and Totten keys would continue to be managed to preserve natural resources with minimal human-caused impacts. Swan Key would continue to be a sensitive resource

area and managed to protect critical ecosystems, habitats, and natural processes. Access to Swan Key would be tightly controlled and limited to permitted research activities. These natural habitats would continue to be a long-term, beneficial impact to the listed butterfly species.

The continued potential for disturbance to either the butterfly or its habitat throughout the park would be negligible. Weather-related phenomena would remain the greatest risk to the butterfly under this alternative.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Section 7 Determination of Effect: Hardwood hammock habitat within the park is well protected. The determination of effect is “may affect, not likely to adversely affect” for Schaus swallowtail butterfly and Miami blue butterfly under a continuation of the no-action alternative.

Stony Corals. Fishing and recreational boating would continue in coral habitat in most of the park, allowing for the possibility of ecological and physical stress to corals from overfishing, fishing debris, anchoring, and/or vessel groundings. The use and maintenance of navigational markers and mooring buoys would continue to protect corals from unintentional vessel and anchor damage. Legare Anchorage would continue to be restricted for in-water activities, providing protection to corals in this area. Management activities under this alternative would continue to have long-term, moderate, adverse impacts on these species.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Section 7 Determination of Effect: Stony corals would continue to be impacted by fishing, boating, and marine debris. The determination of effect is “may affect, likely to

adversely affect” for stony corals under a continuation of the no-action alternative.

Cumulative Impacts. Habitat disturbance or loss is the most common reason for a species to be listed. The establishment of Biscayne National Park has provided a protective refuge for terrestrial- and marine-listed species resulting in long-term beneficial impacts.

The Florida Manatee Recovery Plan and the site-specific county plans are designed in part to reduce boat-related manatee injury and mortality as well as protect habitat areas. These measures are consistent with protection measures incorporated into the proposed actions in this General Management Plan. There would continue to be a beneficial impact on manatee recovery efforts because there would be no changes to the existing system, which encourages compliance with the plans.

Reintroduction efforts of Miami blue butterflies have occurred on Elliott Key in an attempt to restore this species as an experimental population. If successful, this would be a long-term beneficial impact. The monitoring and recovery plan would continue to be implemented.

The no-action alternative would result in the continuation of adverse impacts on some listed species as well as some beneficial impacts, but would not result in any new or additional impacts. Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Management under the no-action alternative would continue to support populations of threatened and endangered species in the park. Under this alternative, there would be no new actions that would impact listed species. Existing long-term negligible impacts would persist on manatees, American crocodile, and butterfly species; therefore, they would have a section 7

determination of no effect. However, the sea turtles, smalltooth sawfish, and stony corals would continue to experience long-term, moderate adverse impacts due to the continuation of boating, fishing, and/or marine debris impacts resulting in a section 7 determination of “may affect, likely to adversely affect” for these species. There would be no project-related cumulative effects.

Special Status Species, Including State Listed Species

Birds. West Arsenicker Key is a sensitive resource area for bald eagles and would remain closed to visitors. Actions under this alternative would have no new effect on bald eagle populations and nesting activity on West Arsenicker Key. Nesting activity has been observed on the southern end of Sands Key and the ocean side of Elliott Key. Under this alternative, Sands Key would remain closed to visitors; therefore, the long-term impact on bald eagle populations and nesting activity in the park would continue to be beneficial. Under this alternative, no new facilities would be developed on Elliott Key, and visitation would be expected to continue at current levels. Visitation to the ocean side of the island is currently low and would not be expected to increase. If visitation increases to the point that eagle nesting activity might be disturbed the park could close part of the beach south of Petrel Point during nesting season to reduce impacts on the raptors. Under this alternative, the long-term impact on bald eagle populations and nesting activity in the park would continue to be beneficial. There would be no new actions that would affect bald eagles.

For other state listed birds, the potential for disruption to nesting, roosting, foraging, and/or loafing remains. For birds using low visitation areas, such as the difficult-to-access Jones Lagoon area, the potential for disturbance remains low. Birds using coastal areas adjacent to high use areas (such as Elliott Key, Sands Key, and Boca Chita Key),

however, would continue to be exposed to potential disturbances of the noise of boat engines and close approaches by people. This exposure could result in an alteration of natural behaviors, including the potential for nesting birds to inadvertently crush their eggs while fleeing or to temporarily or permanently abandon their nests, thereby exposing the eggs to predators and extreme temperatures. Under this alternative, the long-term impact on state listed birds in the park would continue to be long-term, negligible and adverse.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. These species were listed by the state because of adverse impacts of habitat disturbance or loss, which caused a severe reduction in their numbers. The establishment of Biscayne National Park has provided valuable refugia of protected habitat for many species.

At the time this plan was started, bald eagles were federally listed as endangered. They have since been delisted nationally because of widespread population recovery, indicating a long-term beneficial impact on this species.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Under this alternative, existing impacts would persist including both long-term, negligible adverse impacts due to visitor-related disturbances and long-term beneficial impacts due to habitat protection. There would be no new or additional project-related impacts caused by implementing this alternative. There would be no project-related cumulative effects.

Terrestrial Vegetation

Under this alternative, no new development would be proposed that would impact terrestrial vegetation. Current visitor facilities and park infrastructure would remain within their current footprint. Some vegetation in the park would continue to be adversely impacted by social trails and trampling. These impacts would continue to be long term, negligible to minor, and adverse.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. Nonnative invasive plant species can change the structure and function of native plant communities. These changes can have an adverse impact on habitat for native species that rely on the native plant communities. Soil and vegetation disturbances encourage growth of invasive species. A nonnative plant management plan has been developed for Biscayne National Park and eight other national park system units in the region. Removal of the nonnative species would provide better conditions to reestablish native vegetation in disturbed areas, which could help to mitigate the adverse impacts associated with social trails in the park. Implementation of this management plan would have a long-term, beneficial impact on terrestrial vegetation in the park and the habitat it provides.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Under the no-action alternative, existing, negligible to minor, adverse impacts on terrestrial vegetation in the park would continue as a result of social trails and trampling, but there would be no additional impacts caused by implementing this alternative. There would be no project-related cumulative impacts.

Submerged Aquatic Communities

Shallow benthic communities would continue to be vulnerable to impacts from boating. Boat activity has been associated with increased turbidity in shallow areas. In most areas of the bay, submerged aquatic communities would continue to be vulnerable to impacts from boating. Because the bay is shallow, boat activity has been associated with increased turbidity in all the aquatic communities. Damage to seagrass beds from boat groundings and anchors has degraded habitat for manatees, crustaceans, and echinoderms that inhabit these areas. Boat groundings (propeller and hull impacts) and inadvertent placement of anchors have damaged the dense soft corals, sea fans, and sponges in the hardbottom communities, which in turn have an adverse impact on the fish and invertebrates that seek refuge in these areas.

Coral reefs are complex ecosystems and sensitive to disturbances including fishing, snorkeling, and diving. The damage caused by these activities includes scarring from boat propellers and inadvertent placement of anchors, as well as breakage caused by snorkeling and diving.

Debris from recreational and commercial fishing (e.g., fishing tackle and lines from crab and lobster traps) left on the reef can wrap around the coral and damage it. Fishing also results in removal of predators and the removal of herbivorous fish that keep algae minimized (contributes to reef health). Damage to the coral reefs also adversely impacts other species that rely on the reefs for food and shelter.

Under this alternative, the current high levels of unrestricted boat use as well as other recreational activities would continue to cause long-term, minor to moderate, adverse impacts on the function and productivity of the submerged aquatic communities in the park.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. The population of communities and cities around the park is expected to continue to increase per county and city plans. This would probably result in additional boating use and related impacts on submerged aquatic communities, a long-term adverse impact.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Under the no-action alternative, existing, minor to moderate, adverse impacts on submerged aquatic vegetation in the park would continue due to ongoing recreational uses including boating, fishing, diving, and snorkeling. There would be no new impacts caused by implementing this alternative. There would be no project-related cumulative impacts.

Wetlands

Mangrove wetlands are found along the mainland coast and the fringes of the keys in the park. Under this alternative, wetlands in the park would continue to serve as an important habitat area for a wide variety of terrestrial and aquatic species. Currently, access for visitors into the mangroves is limited. No new access into the mangroves would be developed under this alternative on the mainland or on the keys so there would be no change in the current size, integrity, or continuity of the wetland areas in the park. Where wetlands have previously been impacted by development, including both park infrastructure for administration and visitor use as well as historic resources, those impacts would continue to persist and are generally long-term, minor to moderate, and adverse.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. The Biscayne Bay Coastal Wetlands Project of the Comprehensive Everglades Restoration Plan includes pump stations, spreader swales, stormwater treatment areas, flow ways, levees, culverts, and backfilled canals in southeast Miami-Dade County and covers 13,600 acres from the Deering Estate south to Turkey Point Power Plant. The purpose of this project is to rehydrate wetlands and reduce point source discharge to Biscayne Bay. Phase I has been implemented. The project is beginning to replace lost overland flow and partially compensate for the reduction in groundwater seepage by redistributing, through a spreader system, available surface water entering the area from regional canals. The redistribution of freshwater flow across a broad front is expected to restore or enhance freshwater wetlands, tidal wetlands, and near-shore bay habitat. Sustained lower-than-seawater salinities are required in tidal wetlands and the near-shore bay to provide nursery habitat for fish and shellfish. This project is expected to create conditions that would be conducive to the reestablishment of oysters and other components of the oyster reef community.

Diversion of canal discharges into coastal wetlands associated with Biscayne Bay Coastal Wetlands Project of the Comprehensive Everglades Restoration Plan is expected not only to reestablish productive nursery habitat along the shoreline, but also to reduce the abrupt freshwater discharges that are physiologically stressful to fish and benthic invertebrates in the bay near canal outlets. The impact of implementing these actions would be beneficial for wetlands inside and outside the park.

These other past, present, and future actions, in conjunction with the ongoing management actions in the park, would result in beneficial impacts on wetlands in the park.

Because there would be no project related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Pre-existing, long-term, minor to moderate, adverse impacts to wetlands would persist due to past land management actions. There would be no new or additional impacts on wetlands under this alternative. There would be no project-related cumulative effects.

Natural Soundscapes

Natural soundscapes have been degraded from activities on land and water portions of the park such as vehicle engines, boat traffic, agricultural or industrial activity, and occasional construction. Because most of the park is open water, noise from motorized boats is the most prevalent disruption to natural soundscapes. Frequent boat-related noise is a short-term, minor to moderate adverse impact on natural soundscapes.

The concentration of cars and visitors around the visitor center and parking lot also affects the natural soundscape at Convoy Point. NPS staff mowing the grass and blowing leaves with motorized equipment causes short-term localized adverse impacts on the soundscapes in this area. This noise is generally tolerated in the visitor services / park administration zone, so the related impacts would be short-term, negligible and adverse.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. Expected with the increased boating on the water; an associated increase in boat engine noise would be expected throughout the park.

Because there would be no project-related contribution to the impacts of other past,

present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Implementing alternative 1 would have no new effects on natural soundscapes. Because this alternative would not have any new effects on the natural soundscape, there would be no project-related cumulative effects.

CULTURAL RESOURCES

Archeological Resources (including submerged maritime)

Under the no-action alternative, archeological (including submerged maritime) resources would continue to be surveyed, inventoried, and evaluated under NRHP criteria of evaluation to determine their eligibility for listing in the national register. All ground-disturbing activities would be preceded by site-specific archeological surveys and, where appropriate, subsurface testing to determine the existence of archeological resources and how best to preserve them. Known archeological resources would be avoided whenever possible and only negligible to minor adverse impacts would be anticipated.

Although ongoing and expanded archeological site monitoring programs would be initiated and efforts would be undertaken to minimize or mitigate potential impacts from human activities and natural causes, an unknown number of archeological sites in Biscayne National Park would continue to be impacted by current and ongoing human activities. These ongoing activities would continue to cause localized, long-term, or permanent, minor adverse impacts.

Treasure hunting, looting, and amateur collection, which have had an impact on the park's archeological resources over the years, would continue to be a threat to the park's submerged cultural resources. Although such activities are not permitted in the park, and

restricting underwater access to visitors in the Legare Anchorage (which only covers a portion of the Offshore Reefs Archeological District) would continue to provide some protection for some submerged cultural resources, the park is still affected by these activities. Continuance of these activities in the park and surrounding waters promotes the commercial value of artifact selling to tourists and makes it lucrative for artifact hunters to visit the park. Much of the local public condones such activity in the park, although recognizing that it is illegal or requires permitting in other areas such as the Florida Keys National Marine Sanctuary and other state waters. Continued looting, depending on its severity, would be a minor adverse impact on submerged archeological resources.

Submerged cultural resources would also continue to be impacted by activities associated with commercial and sport fishing such as accidental net snagging. Recreational and commercial boating would continue to impact submerged archeological sites through the erosive processes of waves caused by their passage as well as activities such as dropping anchors. Impacts on cultural resources from fishing and boating would be long term to permanent, adverse, and of minor intensity depending on the frequency and intensity of these activities.

Although not as numerous or as threatened, Biscayne National Park's terrestrial archeological sites on the mainland and keys would continue to be subjected to similar concerns as those of the submerged sites. Most of the known terrestrial archeological sites, however, are not readily accessible to the public because of natural barriers and their isolation, and thus most human impacts on such resources would result from inadvertent or accidental use of park lands. Most of the significant prehistoric and historic sites on the islands are well protected by their distance from areas commonly used by the public and dense vegetation that makes them difficult to reach. Continued closure of Arsenicker and West Arsenicker

keys would help protect potential archeological resources on these islands. Because of their inaccessibility, any adverse impacts on terrestrial archeological resources would be negligible to minor and permanent.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. In the past, the relative isolation of the park and the lack of sufficient resource monitoring and protection programs have provided opportunities for treasure hunters, amateur collectors, and looters to engage in hunting artifacts and intentionally pilfering submerged archeological resources. Visitors have contributed to inadvertent disturbance of submerged and terrestrial archeological resources. Because much of the park has not been surveyed and inventoried for archeological resources, decisions about site development, such as visitor facilities, and permitted activities, such as recreational and commercial boating and commercial and sportfishing, have sometimes been made that in hindsight may have resulted in disturbance of archeological sites in the park. These impacts have been primarily adverse, permanent, and negligible to minor.

Ongoing NPS activities, such as expanded archeological site monitoring programs and archeological survey and inventory efforts, would provide better understanding and protection of the park's submerged and terrestrial archeological resources—a beneficial impact. Other current or reasonably foreseeable planning endeavors to protect Biscayne Bay resources—such as the Florida Keys National Marine Sanctuary Revised Management Plan (2007), Comprehensive Everglades Restoration Plan, Southeast Florida Coral Reef Initiative, Biscayne Bay Partnership Initiative, and the Biscayne Bay Strategic Access Plan—could also potentially contribute to these beneficial impacts on the park's archeological resources.

As described above, implementation of the no-action alternative would result in permanent, negligible to minor, adverse effects and some beneficial impacts. The impacts of the no-action alternative, in combination with both the negligible to minor permanent adverse impacts and beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in a permanent, negligible to minor, adverse cumulative effect. The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impact.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Under this alternative, there would be primarily localized, negligible to minor, adverse, short-term to permanent impacts on submerged archeological resources, while impacts on terrestrial archeological resources would be in the negligible to minor range. Some benefits would result from survey and inventory of both submerged and terrestrial properties potentially eligible for national register listing. Generally, both submerged and terrestrial archeological resources would continue to be surveyed, inventoried, and evaluated, and all ground-disturbing activities would be preceded by site-specific archeological investigations to ensure that archeological resources would not be damaged or lost as a result of NPS actions.

Actions under this alternative would not contribute to any overall cumulative impact on terrestrial and submerged archeological resources. The adverse and beneficial impacts on archeological resources generally, however, would be a relatively small component of any overall cumulative impact.

Historic Structures and Buildings

Under the no-action alternative, historic structures and buildings in the park would continue to be surveyed, inventoried, and evaluated under NRHP criteria to determine their eligibility for listing in the national register as staff and funding permit. The surveys and research necessary to determine the eligibility of a structure or building for listing in the national register are a prerequisite for understanding the resource's significance, as well as the basis of informed decision making in the future regarding how the resource should be managed. Such surveys and research would have a beneficial long-term impact.

To appropriately preserve and protect national register-listed or -eligible historic buildings and structures, all stabilization, preservation, and rehabilitation efforts would be undertaken in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). Because the repair and replacement of historic fabric associated with the preservation or rehabilitation of historic buildings and structures would be undertaken in accordance with those standards, any adverse impacts would be of negligible to minor intensity and long term.

Historic structures and buildings, such as Fowey Rocks Lighthouse and those in the Boca Chita Key Historic District, could suffer natural deterioration and wear and tear from increased visitation and unstaffed or minimally staffed structures could be susceptible to vandalism. Regular cyclic maintenance and rehabilitative repairs minimize potential negligible to minor adverse impacts, and the possible monitoring of the user capacity of historic structures could result in the imposition of visitation levels or constraints that would contribute to the stability or integrity of the resources without unduly hindering interpretation for visitors, and continued ranger patrol and emphasis on visitor education would discourage vandalism or inadvertent impacts

and minimize adverse impacts. Any adverse impacts would be long term and of negligible to minor intensity.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. In the past, the lack of appropriate preservation treatments and the loss of historic fabric resulting from visitor use and vandalism have resulted in minor, long-term, adverse impacts on the historic structures and buildings of the Boca Chita Key Historic District. Other recent, current, and reasonably foreseeable future planning endeavors or undertakings to preserve historic structures or buildings in the surrounding region could potentially contribute to some beneficial impacts on historic structures and buildings.

As described above, implementation of the no-action alternative would result in long-term, negligible to minor, adverse effects and beneficial impacts on historic structures and buildings. The impacts of the no-action alternative, in combination with the minor, long-term, adverse impacts and beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, negligible to minor, adverse cumulative effect. The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impact.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Actions under alternative 1 would generally have localized, long-term, beneficial and long-term negligible to minor adverse impacts on historic structures and buildings. Actions under this alternative would attempt to minimize the continued loss of historic fabric to historic structures and buildings in the Boca Chita Key Historic

District and Fowey Rocks Lighthouse through law enforcement efforts and cyclic maintenance and preservation treatment. Implementation of this alternative would have long-term, beneficial impacts on the historic structures in the park because they would be preserved in accordance with the Secretary's Standards.

Actions under this alternative would generally contribute to beneficial impacts and the negligible to minor adverse impacts related to any overall cumulative effect on historic structures and buildings. Overall, the cumulative effect would be negligible to minor and adverse. The adverse and beneficial effects on historic structures and buildings, however, would be a relatively small component of any overall cumulative effect.

Cultural Landscapes

Under the no-action alternative, the cultural landscape at the Boca Chita Key Historic District would continue to be managed in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Potential cultural landscapes in Biscayne National Park would continue to be surveyed, inventoried, and evaluated under NRHP criteria to determine their eligibility for listing in the national register as NPS staff and funding permit. Ongoing studies would continue inventory and evaluation of the following potential cultural landscapes in the park:

Sweeting Homestead – Elliott Key
Maritime Cultural Landscape –
parkwide

Jones Family Historic District – Porgy
and Totten Keys

Pending results of these evaluations, the National Park Service would recommend listing the park's significant cultural landscapes in the national register. The

National Park Service would implement resource management policies that preserve the natural resource values of the listed, or determined eligible, landscapes as well as their culturally significant character-defining patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. The surveys, inventories, and evaluation of cultural landscapes and their character-defining patterns and features are the basis of informed decision making in the future regarding how national register-eligible or -listed resources should be managed, which would be a beneficial impact.

Continued and increasing use of Boca Chita Key as a visitor destination point could continue to have some negligible to minor, adverse, short-term to long-term impacts on the integrity of the historic district's cultural landscape, and continued use of Elliott Key for docking, picnicking, hiking, and camping could continue to have some negligible to minor, adverse, short-term to long-term impacts on the integrity of the potential cultural landscape associated with Sweeting Homestead. The relatively remote and inaccessible location of Porgy and Totten keys would afford protection to the potential cultural landscape associated with the Jones Homestead. The continued management of Porgy Key and Totten Key in their isolation would have a beneficial impact.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. In the past, lack of awareness for the preservation of potential cultural landscapes in the park has resulted in decisions about site development and resource management that, in hindsight, may have not have been best for the preservation of cultural landscape values and preservation. Such decisions include the placement and location of a restroom building, wooden boardwalk, and concrete paths that have

compromised some of the character-defining patterns and features of the Boca Chita cultural landscape by adding prominent, nonhistoric structures and features to the landscape and covering or damaging historic walking paths. These past impacts could be a long-term, minor, adverse impact.

Other recent, current, and reasonably foreseeable future planning efforts to protect Biscayne Bay resources—such as the Florida Keys National Marine Sanctuary Revised Management Plan (2007) (comprehensive protection of diverse marine environments of the keys), and Comprehensive Everglades Restoration Plan (restoration and preservation of the Everglades and the South Florida ecosystem)—could potentially contribute to the preservation of character-defining patterns and features of cultural landscapes. Impacts on cultural landscapes associated with such preservation efforts would be beneficial.

As described above, implementation of the no-action alternative would result in long-term, negligible to minor, adverse effects and beneficial impacts on cultural landscapes. The impacts of the no-action alternative, in combination with the minor, long-term, adverse impacts and beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in a long-term, minor, adverse cumulative effect. The adverse effects of the no-action alternative, however, would be a small component of the adverse cumulative impact.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Actions under alternative 1 would have beneficial impacts on the landscape at the Boca Chita Key Historic District, as well as other potential cultural landscapes because park properties would continue to be surveyed, inventoried, and evaluated under national register criteria of

evaluation to determine their eligibility for listing in the national register. Listed and eligible cultural landscapes would be managed to preserve their natural resource values and culturally significant character-defining patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Some unidentified cultural landscapes might experience long-term, minor, adverse impacts. Under alternative 1, potential cultural landscapes would experience mostly beneficial, short-term to long-term impacts. Actions under this alternative would generally contribute to cumulative, long-term, beneficial impacts on cultural landscapes.

VISITOR EXPERIENCE

Diversity of Visitor Activities

Visitors with boats would continue to have unrestricted access to most (approximately 97%) of park waters. Visitors would be able to participate in a full range of activities such as motorboating, sailing, canoeing, swimming, scuba diving, snorkeling, fishing, and nature study.

Under current park management policy, resource conditions fail to offer visitors the type of experiences for which the park was established. Under the no-action alternative, resource conditions and visitor experience would continue to degrade.

Some operators who lack information and/or navigation skills would continue to have the negative experience of running aground in shallow areas, potentially damaging their equipment and park resources and incurring fines and towing fees. In addition, the wide range of mixed use would continue to result in visitor conflicts in some locations such as safety conflicts between swimmers and motorboaters and speed and noise conflicts between motorboaters and nonmotorized boaters.

As visitor numbers increase over time, more areas of the park, especially during peak use times, would experience more conflicts and increased frequency of motorboaters running aground. For some visitors who enjoy a more social experience and the ability to travel and recreate throughout the park, increased numbers of visitors would not necessarily be perceived as a problem. However, it is likely that as incidents of conflict and groundings increase, many power boaters would perceive the change in their experience over time to be a long-term, minor to moderate, adverse impact on the quality and safety of their visit.

Visitors with boats who are seeking solitude and the natural sights and sounds of the park's bay and ocean waters would find it increasingly difficult to experience these qualities as visitor numbers increase. Also, safety would be an increasing problem because of the limited speeds and maneuverability of nonmotorized boats. This change in conditions would probably be perceived over time as a long-term, minor, adverse impact on these visitors' ability to navigate safely in park waters and achieve opportunities for quiet, solitude, and nature study.

There are areas of the park where visitors would continue to have limitations on their activities. This includes the slow speed zone along the mainland and at Sands Cut (by Sands Key), which would continue to restrict visitor use of about 3,295 acres of park waters. These limitations would continue to enhance visitor safety along the often crowded Sands Cut area and manatee protection area near the mainland, adding value to visitor opportunities to see these rare animals. Arsenicker Key, West Arsenicker Key, and adjacent waters within 200 feet from shore would continue to be closed to visitors for resource protection. Also, visitors would continue to be prohibited from stopping in Legare Anchorage or leaving their boat to swim or dive. These restrictions in Legare Anchorage (in its current configuration) would continue on about 2,360 acres of park waters. Because all these restrictions are well established, their continuation would have

negligible, long-term, adverse impacts on visitor experience.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Visitor Services and Facilities

Visitors would continue to have access to most of the park's land areas and would be able to participate in a range of land-based recreation such as hiking, picnicking, shore fishing, camping, nature study, and visiting historic sites. The level of access would generally continue to be limited by (1) the natural limitations of mangrove and tropical hardwood hammock habitats, and (2) the existing limits of facility development such as docking capacity and trail development. In this alternative, these conditions would continue relatively unchanged. As a result, visitor numbers on the keys would continue to be low to moderate. However, as visitor levels in the park increase, there would be an increasing likelihood that docking facilities at the keys would reach capacity more frequently and that some visitors who want access to the keys would not have anywhere to dock. This would potentially be a long-term, minor to moderate, adverse impact on some visitors' opportunities to access and experience these coral keys, especially during peak use periods.

Visitors who arrive at Convoy Point by car would continue to have easy access to visitor information and interpretation services at the Dante Fascell Visitor Center. Visitor center-based programs would continue to provide opportunities to learn about the significance and value of the park, which are not available elsewhere. This would continue to be a beneficial impact on visitor understanding and appreciation of South Florida's coastal marine environment. Visitors would continue to use the services of the park concessioner at Convoy Point to rent canoes, kayaks, or scuba equipment, or pay for a glass-bottom boat tour or guided scuba and snorkeling

trips. The concessioner would continue to provide occasional transport service to Elliott Key and Boca Chita Key for visitors interested in hiking, camping, and guided tours. Visitors who do not have the time, resources, or ability to use concessioner services would continue to be able to recreate in the Convoy Point area, including picnicking, fishing, and walking along the boardwalk. However, for many visitors, access to park waters and the keys beyond Convoy Point would remain limited, which would continue to be a long-term, minor to moderate, adverse impact on the quality of some visitor experiences.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. The growing population of the Miami-Dade region and related development pressures are being recognized by local, regional, state, and federal entities as important concerns affecting the region's environmental, economic, and community values. To this end, there are a number of ongoing studies and partnership efforts underway in the Biscayne Bay area to improve and protect water quality and quantity, wetlands, fisheries, and coastal viewsheds. Projects include the Fishery Management Plan for Biscayne National Park; the South Miami-Dade Watershed Study and Plan; the Biscayne Bay Surface Water Improvement and Management Plan; the Lower East Coast Regional Water Supply Plan; the Biscayne Bay Partnership Initiative; the Southeast Florida Coral Reef Initiative; and the Biscayne Bay Coastal Wetlands Plan. The projects could all contribute to improvements in visitor experience, especially related to quality fishing opportunities and other resource-based recreational activities. The intensity and duration of the cumulative effect of the above planning efforts would depend on the actual number and type of actions taken to implement them.

Adjacent state parks (such as Bill Baggs Cape Florida State Park, Key Largo Hammock Botanical State Park, and John Pennekamp Coral Reef State Park) and the Florida Keys National Marine Sanctuary offer services, facilities, and recreational opportunities that enable visitors to experience and learn about the natural and cultural resources of the Biscayne Bay and reef area. Also, current efforts through the Stiltsville plan and the public access plan for Biscayne Bay (“Get Your Feet Wet”) provide opportunities for enhanced visitor access, education, and recreation related to the Biscayne Bay area. These nearby and available recreational and interpretive resources would result in a beneficial effect on visitor understanding and opportunities in the Biscayne Bay area.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative 1 would not have any new contribution to cumulative effects.

Conclusion. Continued speed limitations and closures under this alternative would have long-term, negligible, adverse impacts on current visitor use patterns or opportunities. The potential for increased crowding and conflict, especially during peak use times and between different user groups, would probably continue, which would continue to result in short-term, minor to moderate, adverse impacts on visitor experiences. Lack of visitor services and facilities to support access to park waters and keys would continue to result in long-term, minor to moderate, adverse impacts to visitors. There would be beneficial cumulative effects. Alternative 1 would have a slight contribution to these cumulative effects.

NPS OPERATIONS AND FACILITIES

Actions under alternative 1 would provide continuation of current visitor opportunities, resource management practices, and law enforcement activities with current levels of

personnel, facilities, and equipment. The park’s developed area, which covers approximately 38 acres, would continue to be used for park operations and to provide recreational opportunities and visitor services. Mainland visitor services and infrastructure, including a visitor center, designated paths and trails, a boardwalk, and jetty, would remain at or near current levels at Convoy Point. Facilities on the keys would also continue to remain at or near current levels as follows:

- Boca Chita Key – boat dock, harbor, historic structures, picnic areas, restrooms, and primitive campground
- Elliott Key – boat dock, trail, picnic and restroom facilities, environmental education center, ranger station, employee residences, and maintenance facilities
- Adams Key – boat dock, trail, picnic and restroom facilities, and employee residences
- visitor contact points outside the park – limited contact information and signs at public sites

Channels, harbors, and areas with limitations, such as the slow speed zone (3,295 acres) and Legare Anchorage (2,360 acres), in the park would continue to be marked by existing navigation aids and buoys.

Because of the park’s growing visitation, the park’s staff has estimated that the number of current employees would need to be increased by 25% to stay current with the needs of law enforcement, visitor protection, resource management, facility maintenance, interpretation, and adequate contacts with visitors. However, no staffing increase is anticipated.

Additionally, to provide effective visitor protection and resource management, the park needs updated communications equipment and additional vessels, but such needs would continue to be largely unmet.

Special events, such as the Columbus Day Weekend, would probably continue to grow in size, thus resulting in increasing strains on the park's overburdened staff. Visitor destination points, such as day use areas and camp-grounds, would continue to be frequently congested and overcrowded during peak visitation periods, challenging the ability of NPS staff and existing facilities to provide an acceptable level of desired services. Increased visitor impacts combined with static or reduced staffing capacity would continue to adversely impact park operations. Thus, this alternative would have long-term, moderate, adverse impacts on park operations and facilities.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. Past and ongoing cooperative planning and development projects in the Biscayne Bay region, such as the Biscayne Bay Partnership Initiative, Miami-Dade County Comprehensive Development Master Plan, and Biscayne Bay Strategic Access Plan, and NPS special resource studies, such as those for Miami Circle and Virginia Key Beach Park, have resulted in some long-term beneficial effects on park operations and facilities. National Park Service participation in such collaborative efforts has enabled the National Park Service to engage in constructive dialogue with park neighbors regarding park operations and facilities. Such efforts have provided the National Park Service with better information on Biscayne Bay-wide visitor trends, services, and facilities, thus enabling NPS managers to make more informed decisions regarding appropriate park operations and facilities as well as enhancing the park's ability to provide desired services. However, these beneficial effects are almost impossible to measure.

This alternative's long-term, moderate, adverse impacts, in combination with the aforementioned beneficial effects of past and ongoing cooperative planning and

development projects in the Biscayne Bay region, would result in long-term adverse cumulative effects. However, this alternative's contribution to these effects would be small.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Overall, actions under alternative 1 would result in continuing, long-term, moderate, adverse impacts on park operations and facilities due to unmet operational needs. The overall cumulative effects would be long term and adverse; this alternative's contribution to these effects would be small and adverse.

SOCIOECONOMIC ENVIRONMENT

The social and economic situation in Miami-Dade County is affected by a combination of many factors, including the presence of units of the national park system. Some of the \$15.5 billion in federal spending in the county is generated by Biscayne National Park in the form of employee wages, purchase of supplies, and construction contracts. The livelihoods of service-related businesses in the region rely on the inflow of tourist dollars, especially restaurants and motels.

The no-action alternative would not result in any change to current contributions that park operations and visitation have on the regional economy. Visitors would continue to visit the park in the same manner and experience the same social conditions. This alternative would not be expected to alter the number of visitors or length of stay in the region. Park operations or development would not change appreciably, so the no-action alternative would have no new effects on the socioeconomic environment. The existing contributions to the local and regional economies would continue to be long term and beneficial.

The total direct economic value of public recreation areas includes two sets of values: (1) the user benefit that people receive from their visit, and (2) the values of land near the recreation area. Economic studies have shown that the value of land can increase with the number of outdoor recreation opportunities and the proximity to outdoor recreation space (Clawson and Knetsch 1966). Therefore, the continued presence and operation of Biscayne National Park provides a long-term, beneficial impact on the residents and property values in the vicinity.

As no new actions are proposed, there would be no new or additional impacts as a result of implementing the no-action alternative.

Cumulative Impacts. The population of communities and cities around the park is expected to continue to increase per county and city plans. Generally, increasing human population in the local community would be expected to result in increased park visitation; therefore, an increase in visitor use with associated economic activity—a long-term, beneficial impact.

Because there would be no project-related contribution to the impacts of other past, present, and future actions, this alternative would not have any new contribution to cumulative effects.

Conclusion. Existing contributions to the local and regional economies would continue to be long term and beneficial. Implementing the no-action alternative would have no new impact on the regional economy. There would be no project-related cumulative effects.

UNAVOIDABLE ADVERSE IMPACTS

Existing moderate or major adverse impacts to fisheries, federally listed sea turtles, smalltooth sawfish, and stony corals, submerged aquatic communities, and natural soundscapes would be expected to continue. These impacts are primarily caused by the relatively unrestricted use of motorized boats as well as fishing and marine debris that continue to impact most park waters and submerged habitats. These impacts cannot be fully mitigated by perpetuating existing park operations and thus are unavoidable under the no-action alternative.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There would be no change in irreversible or irretrievable commitments of resources as a result of implementing the no-action alternative because there would be no new development occurring in previously undeveloped areas.

NATURAL OR DEPLETABLE RESOURCES AND ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

No change in resource consumption, energy requirements, or conservation potential is expected as a result of implementing the no-action alternative.

IMPACTS OF IMPLEMENTING ALTERNATIVE 6

NATURAL RESOURCES

Fisheries

In the waters of the multiuse/water zone impacts described in the no-action alternative (alternative 1) would probably persist. These impacts include impacts on fisheries and fish habitat caused by boating and fishing in the park. These impacts would continue to be long term, minor to moderate, and adverse.

Proposed management actions under alternative 6 include designating both the West, Middle, and East Featherbed banks and Caesar Creek bank as noncombustion engine use zones. This zone would limit the speed and type of boats entering these waters, thus reducing boat traffic overall as well as reducing the impacts associated with boat traffic such as scarring and localized turbidity. This would be a long-term beneficial impact.

This alternative would provide a greater benefit to fisheries habitat in the seagrass than alternative 1 because a larger area of seagrass beds in the park would be included in protective zoning designation.

The west coast of Elliott Key from the southwest tip of Sands Key south to Elliott Key Harbor would be designated a slow speed zone. The number of boats entering this area would be reduced because not all boats would be able to travel at slower speeds in the shallow water. The slow speed zone would reduce the potential for scarring in the seagrass beds in this area as well as reduce the potential for turbidity in the water column, thus minimizing adverse impacts on the productivity of this habitat and water quality in the area. The slow speed zone would have a beneficial impact on the quality of fish habitat in this area.

A special recreation zone where spearfishing and commercial fishing (with the exception of the ballyhoo lampara net fishery) are prohibited, recreational fishing would be limited by the number of special fishing permits issued, and additional limitations would be in effect to preserve natural resources and reduce human-caused intrusions. The special recreation zone would include 14,585 acres, which is substantially larger than the marine reserve zone proposed in alternative 4, but less prohibitive to anglers by still allowing recreational fishing under a special license. The anticipated reduction in fishing pressure in this zone, where targeted fish species could grow larger and therefore increase in reproductive output, is expected to result in a long-term, beneficial impact on park fishery resources.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Also, the evaluation would consider adjustments to other management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions, particularly a reduction in fishing permits issued and removal of marine debris, would be expected to improve fisheries and fish habitat in general. However, the addition of or relocation of mooring buoys and boundary markers would result in short-term, minor adverse impacts in specific areas associated with underwater installation

and associated impacts to submerged substrates, though every effort would be installed in locations away from corals, seagrass beds, and submerged cultural resources. Increased public outreach and/or law enforcement efforts would probably reduce the potential for illegal harvest of fish and could potentially improve data accuracy and collection through greater oversight. Also, any changes in the monitoring protocol that increases the number or frequency of extractive samples for destructive analysis could have short-term, minor adverse impacts on fish in general or fish habitat. Likewise, monitoring protocols that require installed markers or in situ equipment could have short-term localized, minor adverse impacts to the area around those sites. Additional analysis and agency consultation, as appropriate, would be conducted when site-specific location information has been adequately identified.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on the monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal). If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is

anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this zone, including the ballyhoo lampara net fishery, after passage of a park special regulation. This locally reduced fishing pressure, where targeted fish species could grow larger and therefore increase in reproductive output, would result in a long-term very beneficial impact on park fishery resources. Even though fishing pressure may increase outside this zone, the expected increase in size and abundance of fish within the marine reserve zone is expected to have a “spillover” effect outside the zone, as documented in other marine reserve zones worldwide.

All the commercial fishing activities that would occur now in the special recreation zone are part of the activities analyzed in the Fishery Management Plan, including a phase out of all commercial fishing overtime. Within the special recreation zone, almost all commercial fishing would be terminated immediately by special regulation with the exception of the ballyhoo lampara net fishery. That one fishery would continue during the adaptive management period but may still be terminated after 10 years if the decision is made to convert to a marine reserve zone. Termination of commercial fishing, whether immediately, at 10 years, or over time, would be a very beneficial impact to park fisheries and fish habitat and the benefit would be greater the sooner the termination occurs.

Cumulative Impacts. In 2002, the National Park Service and the Florida Fish and Wildlife Conservation Commission initiated a Fishery Management Plan and Environmental Impact Statement. Once completed, the Fishery Management Plan would involve changes in current management strategies for both recreational and commercial fishing activities throughout the multiuse zone. These changes could include establishment of a permit system for both recreational

boating and commercial fishers, limits on the type of spearfishing equipment that can be used in the park, a moderate decrease in fishery harvests, and elimination of the lobster sport season. With implementation of the Fishery Management Plan, the park anticipates the current condition of fisheries stocks would improve and the impact of fishing on habitat within the park would be reduced. The long-term impacts of the Fishery Management Plan on fisheries in the park would be beneficial. Because proposed management actions under this alternative are more protective of fish habitat than under alternative 1, there would be more benefits on fisheries realized from combining actions under this alternative with the implementation of the Fishery Management Plan than implementing the Fishery Management Plan alone (as in alternative 1).

The human population surrounding the park is expected to continue to increase per county and city plans. This could lead to additional fishing pressure on fish populations in the park—a potential long-term adverse impact that would be partially mitigated by actions in the Fishery Management Plan.

The United States Coral Reef Task Force, created in 1998, was established to lead U.S. efforts to protect, restore, and “sustainably” use coral reef ecosystems. These efforts include but are not limited to reducing and mitigating coral reef degradation from pollution, overfishing, and other causes. The task force has identified fundamental themes to guide immediate and sustained national action. These themes include quickly reducing the adverse impacts of human activities on coral reefs and associated ecosystems. This would be a long-term benefit to the ecosystem.

This alternative would contribute a beneficial impact to the beneficial impacts of other past, present, and future actions resulting in beneficial cumulative effects.

Conclusion. Adverse impacts now occurring to fisheries and fish habitat in the park would

persist in most of the park, but would be reduced in the special recreation zone under alternative 6, resulting in a long-term, minor impact to fish and fish habitat as well as beneficial impacts in some locations. Cumulative effects would be beneficial. This alternative’s contribution to these impacts would be minor.

Threatened and Endangered Species

Manatee. Manatees are more likely to be found in the warm waters closest to shore, so the 1,000-foot-wide slow speed zone adjacent to the entire length of the mainland shoreline would provide protection for manatees in this area. The slow speed zone would provide boat operators a greater opportunity to avoid collisions with manatees by increasing their response time. The expanded slow speed zone under this alternative would also result in fewer boat groundings in seagrass beds, an important habitat/food source for manatees.

The modifications to the manatee protection area and zoning would have a long-term beneficial impact on manatees in the park.

Section 7 Determination of Effect— Measurable beneficial outcomes on individual manatees and the manatee population because of the protective zones are likely. The determination of effect is “may affect, not likely to adversely affect” for manatee under alternative 6.

Sea Turtles. In the waters of the multiuse / water zone, impacts described in the no-action alternative (alternative 1) would probably persist. These impacts include potential for collisions with boats, strangulation and entanglement with marine debris (including lobster and crab traps), hook and line fishing, and vessel groundings on sea turtle foraging habitat (coral and seagrass), which may adversely affect sea turtles, particularly green, hawksbill, and loggerhead species. Leatherback and Kemp’s Ridleys would be less likely to be affected because they are rarely in the park. These

impacts would continue to be long-term, minor to moderate, and adverse.

Collisions between boats and sea turtles would be expected to be minimized in the slow speed and the noncombustion engine use zones.

The implementation of a special recreation zone would result in less impact from fishing activities and from derelict fishing gear (monofilament, traps) in this area. This would result in the reduction of threat of entanglement for sea turtles within this zone. This would be a beneficial, long-term impact on sea turtles in and near that zone.

Section 7 Determination of Effect — Impacts to sea turtles from fishing and boating would persist in most of the park, resulting in a determination of “may affect, likely to adversely effect” for green, hawksbill, and loggerhead species that frequent the park waters.

American Crocodile. Most visitor services and infrastructure in habitat suitable for crocodile would remain near current levels with the designated paths, a possible viewing platform, boardwalk, and jetty in the vicinity of Convoy Point. This area is north of the designated critical habitat area for the crocodiles and so would not be expected to impact their activities in the park. The mangrove south of the visitor center would continue to be managed primarily to protect the natural habitat characteristics of the area. No additional development within the designated critical habitat would be proposed under this alternative. The impacts of activities on crocodile habitat and activities along the mainland shore would be long-term, negligible and adverse.

Under this preferred alternative, the development footprint on Porgy Key would remain as it is. The noncombustion engine use zone would include the eastern shoreline of Old Rhodes Key and the waters around Totten Key so relatively few visitors would be expected in this area because of the boating

limitations. Although in designated critical habitat, there are relatively few crocodiles in this area of the park.

If, because of human population pressure along the mainland, crocodiles begin to venture across the bay, there could be increased interaction between visitors and crocodiles around Old Rhodes and Totten keys. The developed area at Adams Key provides an excellent opportunity to orient visitors to this area of the park, including appropriate actions when traveling in crocodile habitat. With mitigation, the long-term adverse impact of this alternative on the crocodile population in this area of the park would be negligible.

As a whole, the park protects habitat for the crocodile and serves to further its conservation through education and law enforcement, resulting in long-term beneficial impacts to this species.

Section 7 Determination of Effect — The long-term impacts on the American crocodile under alternative 6 would be both beneficial due to habitat protection and education as well as negligible and adverse in localized areas. Mitigation measures would be put in place in the event of more human-crocodile interactions because of population pressures near the park. Overall, this would equate to a “may affect, not likely to adversely affect” determination for the American crocodile.

Smalltooth Sawfish. In the waters of the multiuse/water zone, impacts described in the no-action alternative (alternative 1) would probably persist. These impacts include potential for bycatch, which could occur with any continuation of hook-and-line fishing efforts as well as potential for entanglement in marine debris such as fishing line and nets. These impacts would continue to be adverse, minor to moderate, and long term, although realizing such effects is unlikely given the rarity of smalltooth sawfish in the park.

While the establishment of the special recreation zone in deeper reef habitat, is not likely to have a substantial effect on this species that tends to prefer shallow water, it is possible that the implementation of the fishing restrictions and limits on number of fishing licenses issued could have a beneficial impact on smalltooth sawfish by reducing bycatch since reports of this species in reef and deeper water habitats, although uncommon, do exist. No other actions that would occur under this alternative would be expected to affect sawfish in the park.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Also, the evaluation would consider adjustments to other management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions, particularly a reduction in fishing permits issued and removal of marine debris, would be expected to benefit smalltooth sawfish by further reducing potential for bycatch and entanglement, respectively. Increased public outreach and/or law enforcement efforts would probably reduce the potential for illegal harvest of fish, including smalltooth sawfish, and could potentially improve data accuracy and collection through greater oversight. Also, any changes in the monitoring protocol that increases the number or frequency of extractive samples for destructive analysis could have short-term, minor adverse impacts on fish in general or fish habitat although smalltooth sawfish would not be targeted for such sampling. Additional analysis and agency

consultation, as appropriate, would be conducted when site-specific location information has been adequately identified.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on the monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal). If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this zone, including the ballyhoo lampara net fishery, after passage of a park special regulation. This locally reduced fishing pressure, where targeted fish species could grow larger and therefore increase in reproductive output, would result in a long-term very beneficial impact on park fishery resources and effectively eliminate impacts to smalltooth sawfish from bycatch or entanglement in marine debris.

Section 7 Determination of Effect — Existing impacts from fishing would persist in much of the park and may be locally reduced by

implementation of the special recreation zone. The section 7 effect determination would be “may affect, likely to adversely affect” for smalltooth sawfish under alternative 6.

Schaus Swallowtail Butterfly and Miami Blue Butterfly. New development on Adams Key where butterfly habitat exists would be limited in scale to include only the staging area for canoes and kayaks and possibly minimal facilities for the environmental education center. The level of development on the island would occur near the shore where the habitat is less suitable for butterflies and would be unlikely to impact the butterfly population or habitat on the island. The impacts would be long term, negligible, and adverse.

On Elliott Key, the existing loop trail would be made universally accessible but this change would probably not alter its footprint or measurably increase visitor use. As a result, the potential disturbance of the butterfly population or habitat would be slight. The impacts would be long term, negligible, and adverse.

Old Rhodes and the other southern keys would be zoned for nature observation, and Swan Key and Soldier Key would be zoned as a sensitive resource area. Impacts on the hardwood hammocks on these keys would not change under this alternative. There would be no impacts on butterfly populations and habitat caused by this alternative.

Continued protection of butterfly habitat on these keys would generally be a beneficial impact to these butterfly species.

Section 7 Determination of Effect — The impacts on the Schaus swallowtail butterfly and the Miami blue butterfly would be both beneficial and long term, negligible and adverse in some locations, but mitigation measures to protect the species’ habitat and breeding season are likely to be successful. Overall, the determination of effect for alternative 6 is “may affect, not likely to

adversely affect” the Schaus swallowtail butterfly and the Miami blue butterfly.

Stony Corals. In the waters of the multiuse/water zone impacts described in the no-action alternative (alternative 1) would probably persist. These impacts include the potential for ecological and physical stress to corals from overfishing, fishing debris, anchoring, and/or vessel groundings associated with existing boating and fishing activities. Such impacts are moderate, long-term adverse impacts to stony corals and their habitat.

The Legare Anchorage would be reduced in size from its current configuration, and in-water activities would continue to be restricted for in-water activities that would provide protection to corals in this area.

The creation of a 14,585-acre special recreation zone would limit fishing and prohibit anchoring on many of the southern reefs in the park, which include areas known to have stony coral populations. Both of these actions are expected to benefit coral populations. Because visitors who would otherwise use the area in the special recreation zone to fish may choose to fish elsewhere with fewer limitations—boat traffic could be expected to decrease. Although unlikely, these decreases could be offset if people use the special recreation zone for nonextractive activities such as snorkeling and diving. Because the special recreation zone is expected to limit fishing through regulations and improve ecological balance, reduce fishing debris, reduce vessel groundings, and eliminate damage from anchoring in coral habitat, actions under alternative 6 are expected to have a beneficial effect.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would

consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Also, the evaluation would consider adjustments to other management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions, particularly a reduction in fishing permits issued and removal of marine debris, would be expected to have beneficial impacts on submerged aquatic communities including stony coral habitat. However, the addition of or relocation of mooring buoys and boundary markers would result in short-term, minor adverse impacts in specific areas associated with underwater installation and associated impacts to submerged substrates, although every effort would be installed in locations away from corals, seagrass beds, and submerged cultural resources. Increased public outreach and/or law enforcement efforts would probably reduce the potential for illegal anchoring that could impact stony corals. Also, any changes in the monitoring protocol that increases the number or frequency of extractive samples for destructive analysis could have short-term, minor adverse impacts on submerged habitats in general although endangered corals would not be targeted for such sampling. Likewise, monitoring protocols that require installed markers or in situ equipment could have localized adverse impacts to the area around those sites and in considering placement of such markers and equipment every effort would be made to avoid impacts to endangered corals and thus the impact would be negligible or nonexistent. Additional analysis and agency consultation, as appropriate, would be conducted when site-specific location information has been adequately identified.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida

Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on the monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal). If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this zone, including the ballyhoo lampara net fishery, after passage of a park special regulation. This locally reduced fishing pressure, where targeted fish species could grow larger and therefore increase in reproductive output, would result in a long-term very beneficial impact on the stony coral habitat.

Section 7 Determination of Effect—The special recreation zone in alternative 6 is expected to have a localized long-term, beneficial effect on corals by protecting them from activities that could lead to physical and ecological damage, but existing boating, fishing, and marine debris impacts in most of the park would persist. Thus, this alternative would result in a determination of “may affect, likely to adversely affect” on stony corals.

Cumulative Impacts. Habitat disturbance or loss is the most common reason for a species

to be listed. The establishment of Biscayne National Park has provided a protective refuge for listed species resulting in long-term beneficial impacts.

The Florida Manatee Recovery Plan and the site-specific county plans are designed in part to reduce boat-related manatee injury and mortality as well as protect habitat areas. These measures are consistent with protection measures incorporated into the proposed actions in this General Management Plan. Implementation of this recovery plan would continue to have a beneficial impact on manatee protection efforts in the park. The efforts to protect the manatee would be strengthened under this alternative with the establishment of a slow speed zone for 1,000 feet of the mainland shoreline. The impacts of this action would continue to have a beneficial impact on manatee protection efforts.

Reintroduction efforts of Miami blue butterflies have occurred on Elliott Key in an attempt to restore this species. If successful, this would be a long-term beneficial impact. The monitoring and recovery plan would continue to be implemented.

Alternative 6 would result in negligible adverse and beneficial impacts on federally listed species. When combined with the impacts of other past, present, and future actions the overall cumulative effect would be beneficial. This alternative would contribute a slight amount to the overall cumulative effects.

Conclusion. Existing impacts to listed species and their habitat would persist in much of the park. Some impacts would be reduced through changes in zoning which would be expected to have localized beneficial impacts. Under this alternative, there would be proposed small-scale development that could have long-term negligible adverse impacts on habitats used by American crocodiles, sea turtles, butterflies. The park would continue to coordinate with the U.S. Fish and Wildlife

Service and NOAA Fisheries and work to avoid and mitigate any adverse impacts on these species. Thus, the section 7 determination would be that this alternative “may affect, for those for those species. However, existing impacts to sea turtles, stony corals, and smalltooth sawfish would continue to be long term, moderate and adverse and would result in a “may affect, likely to adversely affect” determination although there are no new impacts to these species associated with any proposed actions. Cumulative effects would be negligible to beneficial. This alternative would contribute a small amount to the overall cumulative effects.

Special Status Species, Including State Listed Bird Species

Birds that eat small fish near the water’s surface would continue to be impacted in the short term by the continuation of the ballyhoo lampara net commercial fishery that would reduce potential food sources for those bird species. All the commercial fishing activities that would occur now in the special recreation zone are part of the activities analyzed in the Fishery Management Plan, including a phase out of all commercial fishing over time. Within the special recreation zone, almost all commercial fishing would be terminated immediately by special regulation with the exception of the ballyhoo lampara net fishery. That one fishery would continue during the adaptive management period but may still be terminated after 10 years if the decision is made to convert to a marine reserve zone. Termination of commercial fishing, whether immediately, at 10 years, or over time, would be a very beneficial impact to park fisheries and the bird species that use them for food. The benefit would be greater the sooner the termination occurs.

West Arsenicker Key, used by bald eagles, would be zoned a sensitive resource zone and would remain closed to visitors. Thus, there would be no effect on the West Arsenicker

Key bald eagle population or nesting activity under this alternative. Furthermore, the creation of a slow speed zone extending 300 feet from the sensitive resource zones around West Arsenicker and Arsenicker keys would further reduce the likelihood of disturbances to bald eagles or any other state listed birds using these islands.

Under this alternative, Sands Key, which is closed to visitors, and the islands surrounding Jones Lagoon would be zoned as nature observation zones. Most of the waters of Jones Lagoon would be designated a noncombustion engine zone. Visitation would be allowed on Sands Key and the islands of Jones Lagoon, so there would be some human-caused intrusions to birds nesting, roosting, loafing, and/or foraging there; however, resource protection would be emphasized. Actions under alternative 6 would reduce, although not eliminate, the potential for disturbance to birds using the Jones Lagoon area because there is still the possibility that small vessels (e.g., kayaks and canoes) and people coming ashore could closely approach birds.

The establishment of a visitor services zone on Porgy Key could encourage visitation to the Jones Lagoon area, although the difficulty in accessing this area and the specialized equipment and knowledge needed to safely traverse Jones Lagoon would keep the likelihood of this fairly low. Given that visitation to both Sands Key and Jones Lagoon would be expected to remain minimal, adverse impacts on the birds and their habitat would be negligible. If visitation increases such that any state listed birds could be disturbed, management actions could include limiting access to areas where birds are known to nest during nesting season and/or establishing set-back distances following recommendations in scientific literature. Under this alternative, the long-term adverse impact on the state listed bird populations in the park and potential nesting activity on Sands Key and the Jones Lagoon area would be negligible.

Currently, visitation to the ocean side of Elliott Key is low. The level of visitation on Elliott Key is likely to increase if facilities are developed—the trail from the harbor to Sweeting Homestead was hardened for universal accessibility, and three primitive campsites were developed, including one near Petrel Point. Birds using coastal areas adjacent to areas developed for visitor recreation (such as Elliott Key) could be exposed to potential disturbances of the noise of boat engines and close approaches by people. This exposure could result in an alteration of natural behaviors, including the potential for nesting birds to inadvertently crush their eggs while fleeing or to temporarily or permanently abandon their nests, thereby exposing the eggs to predators and extreme temperatures. If visitation to the ocean side increases such that the state listed birds could be discouraged from nesting or are disturbed during nesting, the park could enforce no-access set-back distances and/or close areas near Petrel Point during critical nesting season to reduce impacts on the birds.

The proposed slow speed zone on the bay side of Elliott Key would be expected to reduce the likelihood of disruptions to birds using the coastal areas immediately adjacent to this zone. As a result, beneficial effects on state listed birds in the immediate area would be expected.

Under this alternative, birds using coastal habitats along the park's mainland shoreline would receive protection from potential boat-related disturbances from a slow speed zone covering the area 1,000 feet from the mainland shoreline. By essentially reducing the speed of boats, the waters immediately adjacent to the mainland shoreline would be expected to reduce potential boat-related disturbances to birds that are roosting, nesting, foraging, and/or loafing along the mainland shoreline. Some birds may still experience disturbance from noise associated with motorized watercraft in this zone, even though they are operating at slower speeds.

Overall, under this alternative, any necessary mitigation, would probably result in long-term, minor, adverse impacts on state listed bird populations in the keys.

Cumulative Impacts. Large-scale habitat loss is an ongoing impact throughout the region, which resulted in the classification of many bird species as state listed. The establishment of Biscayne National Park has provided increased habitat protection for bald eagles and other state listed birds in the park—a long-term beneficial impact.

Alternative 6 would result in negligible impacts on listed birds due to increased visitor use and construction of minor visitor facilities. When combined with the impacts of other past, present, and future actions, the overall cumulative effect would be minor and adverse. This alternative would have a small contribution to the overall cumulative effects.

Conclusion. Implementing alternative 6 would result in long-term, negligible to adverse impacts on state listed birds and would not be likely to lead to federal listing. Cumulative effects would be minor and adverse.

Terrestrial Vegetation

Under this alternative, the impacts on terrestrial vegetation on the keys, particularly the hardwood hammocks, would occur due to localized construction of minor visitor facilities and continued visitor use. Visitation to the keys would still be expected to increase over current levels because visitor services would be concentrated in these areas. The adverse impacts from increased visitation could include trampling and loss of vegetation from social trails. In general, these impacts could be mitigated by visitor education efforts and trail design to keep visitors on the existing trails. With mitigation measures in place, the impacts would be long term, negligible to minor and adverse. Under this alternative, the existing “loop” area of the hiking trail (the two east-west segments from

Elliott Key Harbor to the north and south entrances of the boardwalk and the north-south segment near the harbor) would be hardened to provide universal access. With mitigation, the localized impacts on vegetation would be long term, negligible and adverse.

Long-term impacts from the proposed Convoy Point boardwalk would include the removal of mangroves and other wetland plants, trimming mangroves, and would have shading impacts on mangroves and other vegetation. Localized impacts would be long term, minor, and adverse.

Cumulative Impacts. A nonnative plant management plan has been developed for Biscayne National Park and eight other national parks in the region. Nonnative invasive plant species can change the structure and function of native plant communities. These changes can have an adverse impact on habitat for native species that rely on the native plant communities. Vegetation disturbances caused by social trails and trampling of native vegetation encourages growth of invasive species. Removal of nonnative species would provide better conditions to reestablish native vegetation in disturbed areas, which could help mitigate the adverse impacts associated with social trails in the park. Implementation of this plant management plan would have a beneficial impact on terrestrial vegetation in the park and the habitat it provides.

When the negligible to minor adverse impacts of alternative 6 are combined with the beneficial impacts of other past, present, and future actions, the resulting cumulative effects would continue to be beneficial. This alternative would slightly reduce these beneficial cumulative impacts.

Conclusion. Implementing this alternative would result in long-term, negligible to minor adverse impacts on terrestrial vegetation in localized areas associated with minor construction projects and continued or increasing visitor use. Cumulative effects

would be beneficial. This alternative would slightly reduce these beneficial cumulative impacts.

Submerged Aquatic Communities

In the waters of the multiuse zone impacts described in the no-action alternative (alternative 1) would probably persist. These impacts include impacts on submerged aquatic communities caused by boating and fishing and associated marine debris. These impacts would continue to be long term, minor to moderate, and adverse.

Under this alternative, there would be greater controls on speed and vessel types in areas where there are submerged aquatic communities, particularly seagrass beds. West, Middle, and East Featherbed banks would be zoned for noncombustion engine use (poling and trolling only). Boats in this zone would be traveling relatively slowly, and fewer boats would be operating with high-speed propellers so the potential for scarring of the seagrass beds would be substantially reduced. Within the noncombustion engine zone, the potential for turbidity in the water column caused by motorboats would also be reduced. Thus, the health of the seagrass beds would be higher under this alternative—a long-term beneficial impact.

The bay side of Elliott Key from Sands Cut to Elliott Key Harbor and a strip along the mainland shore from 1,000 feet out would be zoned as a slow speed area to protect natural marine resources such as seagrass. Because the boats in these areas would be traveling at a reduced rate of speed, there would be reduced potential for seagrass scarring. Overall, the health of the seagrass beds would be expected to increase under this alternative because of the increased areas zoned for slow speeds and noncombustion engines. The increase in the health of seagrass beds would be a long-term beneficial impact.

The waters within Jones Lagoon and around Totten Key would be zoned for noncombustion engine use. The potential for scarring of

the seagrass and hardbottom communities would be reduced in this area. This would be a long-term beneficial impact on the productivity of the submerged aquatic communities in these areas.

Under this alternative, a special recreation zone would be designated from Hawk Channel east to the park boundary from 2 miles south of Pacific Reef to north of Long Reef. The special recreation zone includes limitations that accommodate some recreational fishing while meeting the goal of providing a healthy coral reef ecosystem for a more enjoyable and diverse visitor experience. Fishing activities would be restricted to protect resources in this zone, but some fishing would still occur, which could result in marine debris and conflicts with other users. It would be expected that the adverse impacts on the reef from fishing-related activities would be reduced under this alternative compared to alternative 1, but not eliminated. In particular, the prohibition on anchoring would reduce the potential for scarring, but there could still be adverse impacts from fishing and other recreational activities such as diving. There would still be potential impacts to submerged aquatic communities in this zone due to vessel groundings. Implementation of the special recreation zone would generally reduce the impacts of recreational activities in this area of the reef, resulting in a long-term beneficial impact. Moderate, adverse impacts from fishing and anchoring would continue outside the special recreation zone.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Also, the evaluation would consider adjustments to other

management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions, particularly a reduction in fishing permits issued and removal of marine debris, would be expected to have beneficial impacts on submerged aquatic communities including corals and seagrass beds. However, the addition of or relocation of mooring buoys and boundary markers would result in short-term, minor adverse impacts in specific areas associated with underwater installation and associated impacts to submerged substrates, although every effort would be installed in locations away from corals, seagrass beds, and submerged cultural resources. Increased public outreach and/or law enforcement efforts would probably reduce the potential for illegal anchoring that could impact submerged aquatic communities and thus is a beneficial impact. Also, any changes in the monitoring protocol that increases the number or frequency of extractive samples for destructive analysis could have short-term, minor adverse impacts on submerged habitats in general although sensitive submerged aquatic communities would not be targeted for such sampling. Likewise, monitoring protocols that require installed markers or in situ equipment could have localized negligible adverse impacts to the area around those sites and in considering placement of such markers and equipment every effort would be made to avoid impacts to corals and seagrass beds and thus the impact would be negligible or nonexistent. Additional analysis and agency consultation, as appropriate, would be conducted when site-specific location information has been adequately identified.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would

decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on the monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal). If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this zone, including the ballyhoo lampara net fishery, after passage of a park special regulation. This locally reduced fishing pressure, where targeted fish species could grow larger and therefore increase in reproductive output, would result in a long-term very beneficial impact on the submerged aquatic habitats.

Cumulative Impacts. Boat groundings and anchoring have damaged seagrass beds, coral reefs, and hard bottom communities, and degraded habitat for fish, shrimp, crabs, lobsters, and other invertebrates that inhabit these areas.

Coral reefs are complex ecosystems and sensitive to disturbances. Fishing, snorkeling, and diving can also have adverse impacts on coral reef systems. The damage caused by these activities includes scarring from boat propellers and inadvertent placement of anchors, as well as breakage caused by snorkeling and diving. Fishing gear and debris can break, smother, and entangle

benthic resources on coral reefs and in seagrass meadows. Fishing also results in removal of predators and the removal of herbivorous fish that keep algae minimized (contributes to reef health). Damage to the coral reefs also adversely impacts other species that rely on the reefs for food and shelter. Damage to the seagrass beds, hardbottom communities, and coral reefs would continue to be a long term, minor to moderate, and adverse impact.

Alternative 6 would reduce some of the existing impacts associated with recreational and commercial boating and fishing use, which result in long-term beneficial impacts. When combined with the adverse impacts of other past, present, and future actions, the cumulative impacts would be minor to moderate and adverse. The contribution to this alternative would be small.

Conclusion. Impacts associated with boating and fishing would continue to have long-term, minor to moderate, adverse impacts in most of the park. In some areas where protective zoning would be in place around particularly sensitive resources, alternative 6 would result in long-term beneficial impacts on submerged aquatic communities. Cumulative effects would be minor to moderate and adverse, although the actions proposed in alternative 6 would modestly reduce these adverse cumulative impacts of other past, present, and reasonably foreseeable actions.

Wetlands

Wetlands in the park would continue to serve as an important habitat area for a wide variety of terrestrial and aquatic species. Placement of the nature observation zone and the slow speed zone in the open water along the mainland shoreline along portions of the mainland would give greater protection to mangrove shorelines. This would have long-term, beneficial impacts.

Under this alternative, construction of a boardwalk or viewing platform would be considered to interpret the mangrove forests and the mangrove shoreline north of the visitor center at Convoy Point; also, the visitor center boardwalk and jetty could be upgraded. With these improvements, visitors would have an opportunity to experience the mangroves along the shore north of the visitor center at Convoy Point. Construction of the boardwalk and viewing platform would cause both short-term and long-term adverse impacts on the mangroves along the mainland shoreline of the park. During construction, there would be short-term adverse impacts on water quality from increased turbidity. Increased turbidity in the water column could degrade the habitat for wetland plant species. These localized impacts would be short-term, minor to moderate, and adverse.

Long-term impacts from the proposed boardwalk might include removal of some mangroves and other wetland plants, trimming mangroves, and shading mangroves and other aquatic life. Impacts would be long-term, minor, and adverse. These impacts could be mitigated during the design process to ensure that the structures do not substantially shade the mangroves.

No additional access into the mangroves that fringe the keys would be developed under this alternative so there would be no change in the current size, integrity, or continuity of these other wetland areas in the park. Mangroves are extremely difficult to walk through, and while the proposed visitor facility improvements at Porgy, Elliott, and Boca Chita keys might attract more visitors—this is not likely to affect the wetlands.

Cumulative Impacts. The Biscayne Bay Coastal Wetlands Project of the Comprehensive Everglades Restoration Plan includes pump stations, spreader swales, stormwater treatment areas, flow ways, levees, culverts, and backfilled canals in southeast Miami-Dade County and covers 13,600 acres from the Deering Estate south to the Turkey Point

Power Plant. The purpose of this project is to rehydrate wetlands and reduce point source discharge into Biscayne Bay. The proposed project would replace lost overland flow and partially compensate for the reduction in groundwater seepage by redistribution through a spreader system, with available surface water entering the area from regional canals. The proposed redistribution of freshwater flow across a broad front is expected to restore or enhance freshwater wetlands, tidal wetlands, and nearshore bay habitat.

Sustained lower-than-seawater salinities are required in tidal wetlands and the nearshore bay to provide nursery habitat for fish and shellfish. This project is expected to create conditions that will be conducive to the reestablishment of oysters and other components of the oyster reef community. Diversion of canal discharges into coastal wetlands is expected not only to reestablish productive nursery habitat along the shoreline, but also to reduce the abrupt freshwater discharges that are physiologically stressful to fish and benthic invertebrates in the bay near canal outlets. The impact of these actions once implemented would be beneficial for wetlands inside and outside the park.

The Biscayne Bay Coastal Wetlands Project could improve the overall health of the wetland areas along the mainland shoreline such that the system as a whole is better able to accommodate the stresses associated with the short- and long-term impacts of the development and human use in the area.

This alternative would contribute minor adverse impacts to the beneficial impacts of other present and future actions resulting in a beneficial cumulative impact. This alternative would slightly reduce these beneficial cumulative effects in localized areas.

Conclusion. Localized impacts associated with construction under this alternative would be short term, minor to moderate adverse. The long-term impacts of the new

facilities would be mitigated through design and would be adverse and minor. Cumulative effects would be beneficial. This alternative would slightly reduce these beneficial cumulative effects.

Soundscapes

In the waters of the multiuse zone impacts described in the no-action alternative (alternative 1) would probably persist. These impacts include short-term, minor to moderate adverse impacts caused by boat noise on the water as well as short-term negligible adverse impacts caused by vehicles and routine maintenance equipment on land. In both cases, these noises can transcend the zone in which they originate and be heard in adjacent zones.

Under alternative 6, there would be areas of the bay zoned for slow speed or noncombustion engine use. Because these limitations would reduce the level and duration of noise from boats, there would be long-term, beneficial impacts on soundscapes on portions of the bay and adjacent land.

There would a limited amount of new construction in this alternative occurring mostly in the visitor service and park administration zone. This would result in short-term, localized, adverse impacts that would be negligible to minor in intensity. Use of the new or upgraded facilities would result in a long-term negligible adverse impact to natural soundscapes.

Existing natural soundscapes in the interior of the larger keys would continue to be preserved by protective zoning and relatively low visitor use—a continuing beneficial impact.

Cumulative Impacts. Increased boating from a generally increasing human population as provided for in county and city plans would be expected to result in increased boat engine noise.

The beneficial and adverse impacts of this alternative, in combination with the adverse impacts of other actions, would result in minor and adverse cumulative impacts on the natural soundscape; however, the contribution of this alternative to these impacts would be a slight reduction of these adverse cumulative impacts.

Conclusion. Implementing alternative 6 would continue to have short-term, minor to moderate adverse impacts on land and water due to the noise generated by motorized boats and equipment. During construction of small-scale visitor facilities, there would also be localized impacts that are short term, minor, and adverse. There would be beneficial impacts on soundscapes on many of the keys due to protective zoning. The overall cumulative impacts would be minor and adverse.

CULTURAL RESOURCES

Archeological Resources (including submerged maritime)

Implementation of this alternative would have the same impacts on archeological resources as those listed in alternative 1, although the strong emphasis on cultural resource protection could be expected to have some additional beneficial impacts on archeological resources (including submerged maritime) sites. Actions under this alternative, such as exclusion of visitors from West Arsenicker, Arsenicker, and Swan keys, and prohibition of anchoring and fishing limitations in the special recreation zone would generally contribute to beneficial impacts on potential terrestrial archeological sites and both potential and known submerged maritime archeological resources. These added protections would provide far less potential for treasure hunting, looting, amateur collection, and inadvertent visitor impacts.

The special recreation zone would be implemented using an adaptive management

strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Also, the evaluation would consider adjustments to other management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions, particularly a reduction in fishing permits issued and the associated reduction in the generation of marine debris as well as the active removal marine debris would be expected to have beneficial impacts on submerged cultural resources. However, the addition of or relocation of mooring buoys and boundary markers would result in short-term, minor adverse impacts in specific areas associated with underwater installation and associated impacts to submerged substrates, though every effort would be installed in locations away from corals, seagrass beds, and known submerged cultural resources. Increased public outreach and/or law enforcement efforts would probably reduce the potential for illegal anchoring that could impact submerged cultural resources.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, National Oceanic and Atmospheric Administration, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to

continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal). If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this zone, including the ballyhoo lampara net fishery, after passage of a park special regulation. This prohibition of fishing would virtually eliminate the on-site generation of fishing-related marine debris and its associated impacts on submerged cultural resources, which would be a long-term beneficial impact. The potentially increased diving-related activities associated with a healthy and attractive coral reef system could have negligible to minor adverse impacts on submerged cultural resources due to depreciative visitor behaviors and accidental damage.

Cumulative Impacts. Impacts associated with other past, present, and reasonably foreseeable actions would be the same as described under alternative 1. As described above, implementation of alternative 6 would result in negligible to minor adverse effects and beneficial effects. The impacts of alternative 6, in combination with negligible to minor adverse impacts and beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in a negligible to minor adverse cumulative effect. The adverse effects of alternative 6, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of this alternative would have the same impacts on archeological resources as those listed under

alternative 1, although the strong emphasis on cultural resource protection could be expected to have some additional, long-term beneficial impacts on archeological sites. Actions under this alternative would have the same cumulative effects on archeological resources as those listed under alternative 1. This alternative's contribution to these cumulative effects would be small.

Section 106 Summary. The implementation of this alternative could include some minor adverse impacts on archeological resources. If impacts remain minor, there would be no adverse effects under section 106. Any adverse impacts resulting from moderate or major impacts would be mitigated through the use of the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* and a memorandum of agreement with the state historic preservation office and Advisory Council to counteract such adverse effects.

Historic Structures and Buildings

Implementation of this alternative would generally have the same impacts on historic structures and buildings in Boca Chita Key Historic District and at Fowey Rocks Lighthouse as those listed under alternative 1 because the structures and buildings would be rehabilitated, preserved, and adaptively used in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. However, some minor elements of historic fabric could be lost as a result of remodeling/rehabilitation efforts, and anticipated increasing visitation levels could result in loss of some historic fabric from inadvertent visitor use or vandalism. As with alternative 1, impacts on historic structures and buildings would be localized, long-term to permanent, generally beneficial, and of negligible to moderate intensity.

Cumulative Impacts. Impacts associated with other past, present, and reasonably foreseeable actions would be the same as described under alternative 1. As described

above, implementation of alternative 6 would result in negligible to minor adverse effects and beneficial effects. The impacts of alternative 6, in combination with negligible to minor adverse impacts and beneficial impacts of other past, present, and reasonably foreseeable future actions, would result in a long- and short-term beneficial impact. The adverse effects of alternative 6, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of this alternative would have the same impacts on historic structures and buildings in the Boca Chita Key Historic District as those listed under alternative 1 because they would be rehabilitated, preserved, and interpreted by the National Park Service in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. As with alternative 1, impacts on historic structures and buildings would be localized, long-term to permanent, and generally beneficial. Implementation of this alternative would have a long-term, beneficial impact on the Fowey Rocks Lighthouse because it would be preserved in accordance with the Secretary's Standards.

Actions under this alternative would generally have the same cumulative effects on historic structures and buildings in the park as those listed under alternative 1. Implementation of this alternative would have cumulative beneficial effects.

Section 106 Summary. The implementation of this alternative could include some minor adverse impacts on historic structures and buildings. If impacts remain minor there would be no adverse effects under section 106. Any adverse impacts resulting from moderate or major impacts would be mitigated through the use of the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* and a memorandum of agreement with the state historic preservation officer and Advisory Council to counteract such adverse effects.

Cultural Landscapes

Implementation of this alternative would have the same impacts on cultural landscapes in the park as those listed under alternative 1 because potential landscapes would continue to be surveyed, inventoried, and evaluated under NRHP criteria, and the National Park Service would implement resource management policies that preserve the natural resource values and culturally significant character-defining patterns and features of Boca Chita Key as well as other listed, or determined eligible, landscapes in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties With Guidelines for the Treatment of Cultural Landscapes*.

Although this alternative would emphasize strong cultural resource protection, enhancement of recreational opportunities and development of visitor services and facilities on Boca Chita, Elliott, and Porgy keys could result in some minor impacts on the integrity of the listed and potential cultural landscapes at those visitor destination points. Expansion of recreational opportunities and development of enhanced visitor services throughout much of the park's lands and waters could also result in some minor impacts on the integrity of the potential parkwide maritime and cultural landscape, actions under this alternative, such as the creation of the special recreation zone, would generally contribute to beneficial impacts to a potential marine cultural landscape.

Cumulative Impacts. Impacts associated with other past, present, and reasonably foreseeable actions would be the same as described under alternative 1. As described above, implementation of alternative 6 would result in negligible to minor adverse effects and beneficial impacts. The impacts of alternative 6, in combination with minor long-term adverse impacts and beneficial impacts of other past, present, and reasonably foreseeable future actions, would

result in a long-term minor adverse cumulative effect. The adverse effects of alternative 6, however, would be a small component of the adverse cumulative impact.

Conclusion. Implementation of this alternative would have the same beneficial impacts on cultural landscapes as those listed under alternative 1. Although the emphasis is on natural resource preservation, the strong protection provided cultural resources could be expected to have some additional long-term beneficial impacts.

Actions under this alternative would have the same cumulative effects on cultural landscapes as those listed under alternative 1. This alternative's contribution to these cumulative effects would be small.

Section 106 Summary. The implementation of this alternative could include some minor adverse impacts on cultural landscapes. If impacts remain minor, there would be no adverse effects under section 106. Any adverse impacts resulting from moderate or major impacts would be mitigated through the use of the *Secretary of the Interior's Standards and Guidelines for Documentation and Treatment of Cultural Landscapes* and a memorandum of agreement with the state historic preservation office and Advisory Council to counteract such adverse effects.

VISITOR EXPERIENCE

Diversity of Visitor Activities

Under this alternative, visitors would continue to have unrestricted access (as described in the multiuse zone) to most park waters (approximately 83%) to participate in a wide range of recreational opportunities such as motorboating, sailing, canoeing, swimming, scuba diving, snorkeling, fishing, and nature study. About 8% of the park would have some limitations or changes (existing and new) that would potentially enhance, modify, limit, or prohibit visitor access and activities.

This alternative would continue to require visitors to maintain slow speeds near the mainland and Sands Cut. It would also add a slow speed zone to Caesar Creek and the west side of Elliott Key beginning at Sands Key and extending south to Elliott Key Harbor. These slow speed zones would help visitors focus attention on these relatively shallow, sensitive, and sometimes busy areas of the bay, thus enhancing visitor safety. Slower speeds would help reduce damage to boats in docks and the frequency of boat groundings, which would be an indirect, long-term, beneficial impact on some visitors. Some visitors would have boats with a deep draft that would not operate successfully at slow speeds in these areas and would be excluded from access. For some visitors, this change would be perceived as a minor, adverse impact on their visitor experience while boating in the park. For other visitors these reduced speeds would enhance their sense of safety and opportunities for swimming, wading, and fishing. The total area that would have slow speed limits would be about 2% of park waters.

The noncombustion engine zone would include two areas that generally are shallow, where caution is needed, and where different visitor experiences are available. The waters around the park's southern keys, including the bay side of Old Rhodes and Totten, and near portions of Rubicon, Reid, Porgy, and Swan keys. It would also include West, Middle, and East Featherbed banks. This prohibition of combustion engine use (with some limited exceptions) would potentially have a negative impact on those visitors who are used to accessing these areas of the park with combustion engines. Some visitors would have boats with a deep draft that would not operate successfully at slow speeds in these areas and would be excluded from access. For some visitors, this change would be perceived as a long-term adverse impact on their visitor experience while boating in the park. This zoning would potentially have a beneficial impact on the experience of many visitors who currently use or would like

to use these areas of the park to canoe and kayak and explore the mangroves and more remote key environments. Prohibiting combustion engines would enhance visitors' abilities to more successfully view wildlife and experience the natural sounds of the bay and mangrove environments as well as increase the likelihood that some visitors would be able to achieve a sense of solitude and tranquility. Also, boaters would have less likelihood of grounding in this zone, and flats anglers would have improved conditions for successful catches. This noncombustion engine zone would affect less than 1% of park waters.

Under this alternative, Legare Anchorage would be rezoned and reduced in size relative to current conditions. This would result in visitors having access to an additional 1,700 acres of reef waters for a full range of recreational activities (multiuse zone). The sensitive underwater archeological zone, which would be applied to a smaller area at Legare Anchorage, would allow limited visitor access, which is currently the case. The addition of 1,700 acres to the multiuse zone would provide visitors with enhanced opportunities for access and recreation, which would be a long-term beneficial impact on visitors' abilities to access and recreate in park waters.

The continued closure to visitors of West Arsenicker and Arsenicker keys would not change. What would change under this alternative is the application of the sensitive resource zone 300 feet out from the keys' shorelines and a slow speed zone extending out another 500 feet from the sensitive resource zone. This would be a modest increase over the current 200-foot closure. Also, Swan Key and Soldier Key would be closed to visitors. This area is currently lightly used because of limited accessibility; however, those visitors who expect unrestricted access might find this closure to be a long-term, minor, adverse impact on their ability to experience the area.

Northern and southern portions of the mainland, the southern keys, and all of Sands Key would be zoned nature observation. The relative inaccessibility of the mangrove forests and tropical hardwood hammocks naturally limits the range of visitor activities. Most visitors to these areas would probably experience few interactions with others and would have opportunities to explore, observe nature, and find solitude.

An area from Hawk Channel to the eastern park boundary (about 8% of park waters) would be placed in the special recreation zone with recreational fishing by special permit and other limitations on fishing activities. Visitors to this zone would be able to engage in most of their current activities, and the concessioner would continue to be able to take visitors here. For anglers, these fishing limitations would result in a moderate adverse impact on their visitor experience. Overall, the reduced fishing pressure in this zone may result in more and bigger fish over time, which would result in a beneficial impact to both anglers and nonanglers.

Visitors who snorkel and dive in the special recreation zone would be able to experience a healthier, more natural coral reef than what is currently present, with larger and more numerous tropical reef fish and an ecologically intact reef system. The increased number of mooring buoys would make the snorkeling and diving experience safer and easier. The prohibition on spearfishing also improves visitor safety. Therefore, a beneficial impact would be expected for visitors who snorkel and dive in the special recreation zone.

Anchoring would not be allowed in the special recreation zone and some visitors may feel this is adverse impact on their visitor experience due to their lack of freedom to choose their stationary location. However, this should not be an adverse effect as additional mooring buoys would be provided to facilitate access to reefs and historic shipwrecks within this zone. The shift from anchoring to use of mooring buoys would

improve resource conditions, which would improve visitor experience and create a safer environment for park visitors.

The special recreation zone may also increase visitor confusion due to new permit requirements and other location-specific regulations. This would also increase law enforcement requirements. However, the requirement to obtain a special fishing permit would provide an opportunity to specifically educate anglers about the new limitations and benefits to park resources. These concerns would result in short-term, minor, adverse impacts to visitors initially after implementation of the new regulations.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Over time, the size and abundance of fish in the special recreation zone is expected to increase during the adaptive management period and this would have beneficial effects on the quality of visitor experience afforded to anglers, divers, and snorkelers. Also, the evaluation would consider adjustments to other management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions, particularly a reduction in fishing permits issued and removal of marine debris, would be expected to improve visitor experience for divers and snorkelers. However, the addition of or relocation of mooring buoys and boundary markers would result in short-term, minor adverse impacts to visitors if they are unaware of the current location of buoys or find that their favorite mooring location is no longer available.

While every effort would be made to communicate changes in a timely manner to the visiting public, inevitably there will be some amount of visitor confusion and frustration during the adaptive management period as adjustments are made and visitor expectations are not realized, thus resulting in a short-term, minor adverse impact. Increased public outreach and/or law enforcement efforts would probably reduce the potential for unlawful and/or negative visitor behaviors and would probably improve visitor safety, thus realizing a beneficial impact.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The decision to either continue the adaptive management strategies or implement a marine reserve would be predicated on the monitoring data showing a sufficiently improved resource condition and that the park has met its goals for an improved visitor experience in the zone; and the expectation that the trends would continue; otherwise, the marine reserve zone would be implemented to more immediately address the downward trend in resource conditions and/or visitor experiences. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal). If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this

zone, including the ballyhoo lampara net fishery, after passage of a park special regulation. This locally reduced fishing pressure, where targeted fish species could grow larger and therefore increase in reproductive output, would result in long-term beneficial impacts on the quality of visitor experience afforded to anglers, divers, and snorkelers.

Visitor Services and Facilities

The northern half of Boca Chita Key would be designated as a visitor services / park administration zone. Some of the historic structures could be used for expanded visitor services that might be provided through on-site staff or wayside exhibits. This would be a beneficial impact on enhancing visitors' opportunities to learn about and experience the key.

In the harbor area at Elliott Key, accessibility for visitors would be enhanced through hardening the trail connecting the harbor with the ocean side. This would be a beneficial enhancement of visitor opportunities to better access the ocean side of Elliott Key.

The park would consider using Adams Key as a backup staging area for canoes or kayaks and might use Adams Key as a staging area for canoes or kayaks to access Porgy Key during special events or programs.

At Porgy Key, a canoe dock and interpretation of the old homesite would provide long-term beneficial improvements in visitor opportunities to learn about and experience that key.

Cumulative Impacts. The growing population of the Miami-Dade area and related development pressures provided for in county and city plans raises concerns affecting the area's environmental, economic, and community values. To this end, there are a number of recent and ongoing studies and partnership efforts underway in the Biscayne

Bay area to improve and protect water quality and quantity, wetlands, fisheries, and coastal viewsheds. Projects include the Fishery Management Plan for Biscayne National Park; the South Miami-Dade Watershed Study and Plan; the Biscayne Bay Surface Water Improvement and Management Plan; the Lower East Coast Regional Water Supply Plan; the Biscayne Bay Partnership Initiative; the Southeast Florida Coral Reef Initiative; and the Biscayne Bay Coastal Wetlands Plan.

The actions of this alternative, especially park zoning that could enhance resource conditions, such as the slow speed, noncombustion engine use, sensitive resource, and nature observation zones, combined with these ongoing regional efforts, would have the potential to improve the quality of visitor activities in the region, especially related to fishing, nature viewing, and other resource-based recreational activities. There would also be improved visitor opportunities to learn from various sources regarding the importance and complexity of restoration efforts in a rapidly growing urban environment.

Adjacent state parks (such as Bill Baggs Cape Florida State Park, Key Largo Hammock Botanical State Park, and John Pennekamp Coral Reef State Park) and the Florida Keys National Marine Sanctuary offer services, facilities, and recreational opportunities that enable visitors to experience and learn about the natural and cultural resources of the Biscayne Bay and Florida Keys region. Also, current efforts through the General Management Plan Amendment: Stiltsville Management Plan, and the Biscayne Bay Coastal Wetlands project provide potential opportunities for enhanced visitor access, education, and recreation related to the Biscayne Bay area.

The actions of this alternative to improve access and recreational opportunities and facilities would have the potential positive contribution of more and better public information about and access to the Biscayne Bay area and enhanced opportunities to learn

about and recreate there, especially enhanced canoeing and kayaking opportunities.

Alternative 6 would have beneficial and adverse impacts, and when combined with the beneficial effects of other actions, would result in beneficial cumulative effects on visitor experience in the area. The contribution to the cumulative effects of alternative 6 would be small.

Conclusion. Additional speed limitations and new noncombustion engine zones would exclude some visitors from these areas, which would be a long-term, minor to moderate, adverse impact to some users. The same zones would help, over time, to separate conflicting visitor uses, increase boating safety, increase the quality of nonmotorized opportunities, and increase opportunities for solitude, which would be long-term beneficial impacts on some visitors' experiences. Upgrades of visitor information, services, and facilities would be limited but result in a long-term beneficial impact on some visitors' experiences. Both long-term, adverse, and beneficial impacts would occur to different visitors from implementing the special recreation zone. This alternative would have small contributions to the effects of other actions, resulting in beneficial cumulative effects on visitor experience in the area.

NPS OPERATIONS AND FACILITIES

This alternative would establish many new park zones that would require new staff and investment to plan and implement, which would be addressed through staff and funding proposed in the alternative. Actions under alternative 6 would continue to concentrate park operations and facilities at Convoy Point and Porgy, Adams, Elliott, and Boca Chita keys. These impacts include increased workloads associated with construction of new facilities, acquisition of new equipment, continuing maintenance of new facilities and equipment, contract

oversight, and employment of additional staff.

The new special recreation zone as well as the expanded nature observation zone, slow speed zone, sensitive resource zone, and noncombustion engine zone would require additional park staff time to educate park visitors and enforce new regulations. Implementation of the adaptive management strategy for the special recreation zone would require additional staff for monitoring, issuance of fishing permits, and interagency coordination. It would also require additional capacity for enforcement, interpretation, education, and maintenance.

These actions would result in short-term, moderate, adverse impacts on the park because of equipment acquisition and construction management. There would also be long-term, minor, adverse impacts on the park because of the current lack of organizational capacity to undertake those tasks, but additional project and base funding would serve to mitigate those impacts. Creative use of partnerships and volunteers may also serve to bolster organizational capacity to undertake the proposed actions. After the initial implementation phase, and assuming adequate funding to meet existing and future park needs, this alternative could result in long-term efficiencies to park operations by reducing visitor conflicts and visitor-resource conflicts, which would be a long-term beneficial impact.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Over time, the size and abundance of fish in the special recreation zone is expected to increase during the

adaptive management period. Also, the evaluation would consider adjustments to other management actions such as the location and number of mooring buoys and zone boundary markers, marine debris removal, public outreach efforts, and law enforcement efforts. Implementing these adaptive management actions would require additional organizational capacity, including staff and equipment. The potential adaptive management changes to be implemented in the zone also introduce an added complexity to otherwise routine park operations such as law enforcement, visitor education, and resource management. This would result in a short-term, minor impact to park operations.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal).

If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this

zone, including the ballyhoo lampara net fishery, after passage of a special park regulation. Implementation of the marine reserve zone would result in short-term negligible to minor impacts to park operations during the first few years of implementation, but eventually those impacts would subside as park operations regarding the marine reserve zone normalize.

Assuming full funding, long-term impacts would be beneficial to park operations. Although under current funding reality and trends, the impacts may be much more severe to park operations.

Cumulative Impacts. As discussed under alternative 1, past and ongoing cooperative planning and development projects in the Biscayne Bay region, such as the Biscayne Bay Partnership Initiative, Miami-Dade County Comprehensive Development Master Plan, and Biscayne Bay Strategic Access Plan, and NPS special resource studies, such as those for Miami Circle and Virginia Key Beach Park, have resulted in some long-term beneficial effects on park operations and facilities. However, the effects are almost impossible to measure.

This alternative, with its emphasis on strong natural and cultural resource protection, while providing a diversity of visitor experiences as well as establishment of potential visitor contact points outside the park, in combination with the aforementioned beneficial effects of past and ongoing cooperative planning and development projects in the Biscayne Bay region, would generally result in long-term beneficial cumulative effects on facilities and long-term, minor, adverse cumulative effects on park operations. This alternative's contribution to these effects would be beneficial for facilities and adverse for park operations.

Conclusion. Actions under alternative 6 would generally result in short-term, minor to moderate, adverse impacts on park operations during construction and implementation. There would also be long-

term, minor adverse impacts that would be mitigated by increasing organizational capacity. Over time, the resolution of long-standing visitor use issues and conflicts would result in beneficial impacts to park operations. The overall cumulative effects would be long term and beneficial for facilities and long term, negligible, and adverse for park operations. This alternative's contribution to these effects would be small and beneficial for facilities and minor and adverse for park operations.

SOCIOECONOMIC ENVIRONMENT

The social and economic situation in Miami-Dade County is affected by a combination of many factors, including the presence of units of the national park system. Some of the \$15.5 billion in federal spending in the county is generated by Biscayne National Park in the forms of employee wages, purchases of supplies, and various contracts. Although tourism is not the most important driving factor in the regional economy, the livelihood of service-related businesses in the region rely to some degree on the inflow of tourist dollars, especially restaurants and motels. In 2011, visitors to Biscayne National Park were estimated to have spent over \$34 million in the local region surrounding the park.

Full implementation of this alternative would be expected to require additional staff, partners, or volunteers to handle the increased workload for resource management, interpretation, and maintenance. Any additional employment along with the federal dollars that would be required to implement this alternative is expected to have a long-term beneficial impact on the regional economy.

The total direct economic value of public recreation areas includes two sets of values: (1) the user benefit that people receive from their visit, and (2) land values of property near the recreation area. Economic studies have shown that the value of private land can increase with the number of outdoor

recreation opportunities and the proximity to outdoor recreation space (Clawson and Knetsch 1966). Therefore, the continued presence of Biscayne National Park provides an important benefit to area residents and property values in the vicinity.

Implementing alternative 6 would result in the creation of a special recreation zone, which is an area where some types of fish harvest would be prohibited and the number of fishing permits within this area would be limited. With the exception of lampara net commercial fishing operations for ballyhoo, which would be allowed in the special recreation zone, this would have an adverse effect on commercial fishing as this activity would have to occur elsewhere in or out of the park. The zone in this alternative would comprise about 8% of the park, so the impact would be expected to be long term, negligible, and adverse.

The special recreation zone would be implemented using an adaptive management strategy whereby resource conditions and fishing activities are monitored and management actions are reconsidered and adjusted on pre-defined intervals. These evaluation intervals at years 3, 5, and 8, would consider the need to potentially reduce the number of fishing permits to be issued for following years and the need to refine monitoring protocols to improve data quality for future evaluations. Over time, the anticipated reduction in fishing pressure in this zone, where targeted fish species could grow larger and therefore increase in reproductive output, would be expected to result in a long-term, beneficial impacts on recreational fishing and associated service-related sectors. Even though fishing pressure may increase outside this zone, the expected increase in size and abundance of fish within the marine reserve zone is expected to have a "spillover" effect as documented in other marine reserve zones worldwide.

Following the 10-year adaptive management period for the special recreation zone, the National Park Service would consider

monitoring data and consult with the Florida Fish and Wildlife Conservation Commission, NOAA Fisheries, and an expert panel. At that point, the National Park Service would decide whether to continue adaptive management strategies for a special recreation zone or implement a marine reserve zone. The continuation of the special recreation zone would be predicated on monitoring data demonstrating a sufficiently improved resource condition and the expectation that the trend would continue. Where the decision is made to continue adaptive management and implementation of the special recreation zone, the impacts described above would be expected to continue. Where monitoring trends and indicator data show that management objectives are not being met, the marine reserve zone would be established to eliminate all fishing (except lionfish removal).

If the decision is made to convert to a marine reserve zone where fishing is not allowed, it would eliminate commercial and recreational fishing from its area of coral reef habitat. It is anticipated that commercial fishing would be phased out eventually in this area as provided for in the draft Fishery Management Plan, but implementation of a marine reserve zone would prohibit all commercial fishing in this zone, including the ballyhoo lampara net fishery, after passage of a special park regulation. Implementation of the marine reserve zone would result in long-term minor adverse impact to commercial fishing as this activity would have to occur elsewhere in or out of the park. Termination of commercial fishing, whether immediately, at 10 years, or over time, would be a localized minor adverse impact to commercial fishing in south Florida.

Under this alternative, nonconsumptive recreation benefits, such as snorkeling and diving, would be further allowed. Economic studies have shown that snorkelers and divers would increase trips with improvements in fish abundance, water visibility, and coral quality (Bhat 2003), all of which are expected to occur under this alternative, but

to a lesser extent than alternatives 3, 4, and 5. Due to a shift in visitation pattern, the net effect in the number of visitors or average length of visit would be expected to be negligible. Therefore, under this alternative it is expected there would be no effect on tourism-related businesses.

Cumulative Impacts. The population of communities and cities around the park is expected to continue to increase per county and city plans. Generally, increasing human population in the local community would be expected to result in increased park visitation; therefore, an increase visitor use with associated economic activity would have a long-term, beneficial impact. Population growth could also lead to additional fishing pressure on fish populations in the park—a potential long-term adverse impact on recreational fishing that would be partially mitigated by combining actions under this alternative with implementation of the Fishery Management Plan.

The long-term socioeconomic impacts of phasing out commercial fishing in the park are expected to be realized with the anticipated implementation of the Fishery Management Plan and are assessed in that plan.

Alternative 6 would contribute a small beneficial increment to the above impacts of other past, present, and future actions on socioeconomic conditions and, when considered in combination with other actions, would result in a beneficial cumulative impact.

Conclusion. Implementing alternative 6 would have a long-term negligible adverse impact and short-term and long-term beneficial impacts on the regional economy. The overall cumulative effects would be beneficial with this alternative contributing a small increment.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are defined here as impacts that cannot be fully mitigated or avoided.

Existing moderate or major adverse impacts to fisheries, federally listed sea turtles, smalltooth sawfish, stony corals, submerged aquatic communities, and natural soundscapes would be expected to continue in the majority of park waters included in the multiuse zone. These impacts are primarily caused by the relatively unrestricted use of motorized boats as well as fishing and marine debris that continue to impact most park waters and submerged habitats.

New actions proposed under this alternative would reduce some or all of those impacts to many of the most sensitive areas of park waters. Thus there would be no new unavoidable moderate or major adverse impacts expected as a result of implementing alternative 6.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Alternative 6 would have a small potential for some commitments of resources because it would involve a minimum of new development (e.g., trails, primitive dock, marine signage). However, most of the development being proposed is minimal, such as trails with only small areas of potential effect. Most proposed development would be built in previously disturbed areas, so would not result in irreversible or irretrievable commitments of resources. Cultural resources would continue to be protected through active preservation maintenance.

NATURAL OR DEPLETABLE RESOURCES AND ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Whenever feasible, the National Park Service strives to maximize the use of renewable resources and energy and therefore minimize the use of depletable resources. However, it is not possible with today's technologies to cost-effectively avoid all use of depletable resources in building and operating facilities.

Implementing alternative 6 would involve minimal increase in energy requirements.

IMPACTS OF IMPLEMENTING ALTERNATIVE 7

NATURAL RESOURCES

Fisheries

Fishery impacts to all zones except the special recreation zone are the same as those described in alternative 6.

Adverse impacts to fisheries in the special recreation zone would be similar to those described in alternative 6, except the impacts associated with bycatch would be absent for four months of the year. In addition, the beneficial impacts would be intensified because angler access would be closed June through September when water temperatures peak. At these increased temperatures, oxygen solubility is decreased, fish are more easily fatigued, and a caught fish is less likely to recover if it were released. Thus, this closure would allow a greater protection to reef fish during a time when they are already stressed by environmental extremes (Bartholomew and Bohnsack 2005; Wooton 1992). Thus, there are potentially greater benefits to fisheries to be realized in a summer seasonal fishing closure than in reduced fishing pressure year-round.

Beneficial impacts of terminating commercial fishing would be the same as described in alternative 6.

Cumulative Impacts. Same as alternative 6.

Conclusion. Same as alternative 6, but with more beneficial impacts due to season closure.

Threatened and Endangered Species

Manatee. Management actions proposed in manatee habitat are the same as alternative 6; therefore, impacts are expected to be the same as alternative 6.

Sea Turtles. Management actions proposed in sea turtle habitat are the same as alternative 6; therefore, impacts are expected to be the same as alternative 6.

American Crocodile. Management actions proposed for American crocodile habitat are the same as alternative 6; therefore, impacts are expected to be the same as alternative 6.

Smalltooth Sawfish. Adverse impacts to smalltooth sawfish would be the same as described in alternative 6 for all zones except the special recreation zone.

Adverse impacts to smalltooth sawfish in the special recreation zone would be similar to those described in alternative 6, except impacts associated with bycatch (a known cause of mortality) would be absent for four months of the year. In addition, beneficial impacts would be intensified because angler access would be closed June through September when water temperatures peak. At these increased temperatures, oxygen solubility is decreased, fish are more easily fatigued, and a caught fish is less likely to recover if it were released. Thus, this closure would allow a greater protection to smalltooth swordfish during a time when their habitat is already stressed by environmental extremes (Bartholomew and Bohnsack 2005; Wooton 1992). Thus, there are greater benefits to smalltooth sawfish to be realized in a summer seasonal fishing closure than in reduced fishing pressure year-round.

Section 7 Determination of Effect — no actions in this alternative would adversely affect the sawfish and there could be a reduction in potential hook-and-line catches due to the seasonal fishing closure in the special recreation zone, but moderate adverse impacts from fishing in most park waters persist. The section 7 effect determination

would be “May affect, likely to adversely affect.”

Schaus Swallowtail Butterfly and Miami Blue Butterfly. Management actions proposed in butterfly habitat are the same as alternative 6; therefore, impacts are expected to be the same as alternative 6.

Stony Corals. Adverse impacts to stony corals would be the same as described in alternative 6 for all zones except for the special recreation zone.

Adverse impacts to stony corals in the special recreation zone would be similar to those described in alternative 6, with the possible difference that fishing-related marine debris might be lessened, resulting in beneficial impacts to stony corals.

Section 7 Determination of Effect — The special recreation zone in alternative 7 is expected to have a beneficial, long-term, effect on corals by protecting them from activities that could lead to physical and ecological damage, but such impacts would persist in most of the park. Thus, this alternative would result in a determination of “may affect, likely to adversely affect” corals.

Cumulative Impacts. Same as alternative 6.

Conclusion. Same as alternative 6.

Special Status Species, including State Listed Species

Birds. Same as alternative 6.

Terrestrial Vegetation

Same as alternative 6.

Submerged Aquatic Communities

Same as alternative 6. However benefits would be greater than alternative 6 due to seasonal closure.

Wetlands

Same as alternative 6.

Soundscapes

Same as alternative 6.

CULTURAL RESOURCES

Archeological Resources (including submerged maritime)

Same impacts as described in alternative 6, though potentially there would be slightly more benefits from alternative 7 due to a slight anticipated reduction in fishing-related impacts.

Historic Structures and Buildings

Same impacts described in alternative 6.

Cultural Landscapes

Same impacts as described in alternative 6, although potentially there would be slightly more benefits from alternative 7 due to an anticipated slight reduction in fishing-related impacts.

VISITOR EXPERIENCE

Diversity of Visitor Activities

Impacts not related to the special recreation zone are the same as alternative 6.

An area from Hawk Channel to the eastern park boundary (about 8% of park waters) would be placed in the special recreation zone with a summer seasonal recreational fishing closure and other limitations on fishing activities. Visitors to this zone would be able to engage in most of their current activities, and the concessioner would continue to be able to take visitors here. For some visitors these fishing limitations would result in a minor adverse impact on their visitor experience. However, the reduced fishing pressure in this zone may result in more and bigger fish over time, which would result in a beneficial impact for both anglers and nonanglers.

Visitors who snorkel and dive in the special recreation zone would be able to experience a healthier, more natural coral reef than what is currently present, with larger and more numerous tropical reef fish and an ecologically intact reef system. The increased number of mooring buoys would make the snorkeling and diving experience safer and simpler. The prohibition on spearfishing also improves visitor safety. Therefore, a beneficial impact would be expected for visitors who snorkel and dive in the special recreation zone.

Anchoring would not be allowed in the special recreation zone and some visitors may feel this is an adverse impact on their visitor experience due to the lack of freedom to choose a stationary location. However, this should not be an adverse effect as additional mooring buoys would be provided to facilitate access to coral reefs and historic shipwrecks within this zone. The shift from anchoring to use of mooring buoys would improve resource conditions, which would improve visitor experience and create a safer environment for park visitors.

The seasonal closure and new regulations in the special recreation zone may also increase visitor confusion as well as law enforcement requirements. These concerns would result in short-term, negligible, adverse impacts to

visitors initially following implementation of the new regulations.

Visitor Services and Facilities

Same as alternative 6.

Cumulative Impacts. Same as alternative 6.

Conclusion. Same as alternative 6.

NPS OPERATIONS AND FACILITIES

Actions under alternative 7 would generally have the same impacts on park operations and facilities as described for alternative 6.

Implementation of the adaptive management strategy for the special recreation zone would also require additional staff time for monitoring and enforcement of the seasonal fishing closure, although this would be less than required for implementation of alternative 6 because staff time would not be needed to administer the dual permit system, fulfill the monitoring requirements associated with the permits, or maintain collaborations with the Florida Fish and Wildlife Conservation Commission. Thus the implementation of this alternative is expected to result in long-term, negligible to minor, adverse impacts on park operations.

Cumulative Impacts. Same as alternative 6. However, existing long-term moderate adverse impacts on park operations would be exacerbated due to additional capacity needed to implement the special recreational zone with fishing closure.

Conclusion. Same as alternative 6.

SOCIOECONOMIC ENVIRONMENT

Impacts not related to the special recreation zone are the same as alternative 6.

As in alternative 6, implementing alternative 7 would result in the creation of a special recreation zone, which is an area where some types of fishing would be prohibited. Unlike alternative 6, the number of fishing permits within this area would not be limited, but rather, the area would be closed to fishing during the summer months. This seasonal closure would have an adverse effect on recreational fishing as this activity would have to occur elsewhere in or out of the park. The anticipated reduction in fishing pressure in this zone, where targeted fish species could grow larger and therefore increase in reproductive output, would be expected to result in a long-term, beneficial impact on recreational fishing and associated service-related sectors. It would have no effect on commercial lampara net fishing for ballyhoo because that harvest occurs during winter months and not during the closed season. The zone in this alternative would comprise about 8% of the park, so the impact would be expected to be long term and adverse but negligible.

Under this alternative, nonconsumptive recreation benefits, such as snorkeling and diving, would be allowed. Economic studies have shown that snorkelers and divers would increase trips with improvements in fish abundance, water visibility, and coral quality (Bhat 2003), all of which are expected to occur under this alternative, but to a lesser extent than alternatives 3, 4, and 5. Due to a shift in visitation patterns, the net effect in

the number of visitors or average length of visit would be expected to be negligible. Therefore, under this alternative it is expected that there would be no effect on tourism-related businesses.

Impacts related to a conversion of a special recreation zone to a marine reserve zone are the same as alternative 6.

Cumulative Impacts. Same as alternative 6.

Conclusion. Same as alternative 6.

UNAVOIDABLE ADVERSE IMPACTS

Same as alternative 6.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Same as alternative 6.

NATURAL OR DEPLETABLE RESOURCES AND ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Same as alternative 6.

