APPENDIX A: ERRATA

1. Page 63, **Commercial Services,** second paragraph. Replace the second sentence with the following text: "The number of vessels used in the operation, and arrival and departure patterns at Fort Jefferson, will be determined in the concession contracting process."

   Explanation: The number of vessels to be used by the ferry concessionaire, and appropriate arrival and departure patterns, will be determined during the concessions contracting process that will occur during implementation of the *Final GMPA/EIS*.

2. Page 64, **Commercial Services,** third paragraph. Change the last word of the fourth sentence from "six" to "twelve."

   Explanation: Group size for snorkeling and diving with commercial guides in the research natural area zone will be limited to 12 passengers, rather than 6 passengers.

3. Page 64, **Commercial Services,** sixth paragraph. Change the fourth sentence to read: "CUA permits will be issued to boat operators for 12-passenger multi-day diving trips."

   Explanation: Group size for guided multi-day diving trips by operators with Commercial Use Authorizations will be 12 passengers, rather than 6 passengers.

4. Page 40, **Table 1. Ranges of Visitor Use At Specific Locations.** Change the last sentence in the box on page 40 to read: "Group size for snorkeling and diving with commercial guides in waters in the research natural area shall be a maximum of 12 passengers, excluding the guide."

   Explanation: Clarifies that maximum group size for guided multi-day diving trips in the RNA by operators with Commercial Use Authorizations will be 12 passengers, rather than six passengers.

5. Page 84, **Table 4: Summary of Alternative Actions.** In the first row of the table, under the column for **Alternative D**, strike the text in the box and replace it with the following: "Same as alternative C except that all visits to destinations in the research natural area zone would be by guided tour only. Private boats would be allowed to transit the RNA without stopping, but would not be allowed to anchor or tie up to mooring buoys in this zone."

   Explanation: Clarifies that private boats would be allowed to transit the RNA without stopping.

6. Page 84, **Table 4: Summary of Alternative Actions.** In the 5th row of the table, under the column for **Alternative D**, strike the word "Yes" and insert the following text: "Private boaters must obtain a permit for recreational activities occurring inside the park but outside of the RNA."

   Explanation: Clarifies that private boaters would be required to obtain a permit for recreational activities such as snorkeling, diving and fishing that take place inside the park, but outside the RNA zone.

7. Page 479, **Preparers and Consultants.** Under **Consultants** add: "Jeffrey Marion, Adjunct Faculty Member; Unit Leader, Cooperative Park Studies Unit; Virginia Polytechnic Institute and State University"

Final
General Management Plan Amendment
Environmental Impact Statement

Dry Tortugas
National Park
Monroe County, Florida

The purpose of this *Final General Management Plan Amendment / Environmental Impact Statement* for Dry Tortugas National Park in Monroe County, Florida, is to set forth the management philosophy and management direction for the park for the next 15 to 20 years. The park has been operating under the *General Management Plan / Development Concept Plan / Environmental Assessment* that was prepared in 1983. Although much of the 1983 plan is still applicable, this older plan does not address several current issues. The 1983 plan needs amending to provide overall guidance for the future use of resources and facilities; to clarify research and resource management needs, priorities, and strategies; and to address changing levels of park visitation and use. This new *General Management Plan Amendment* will replace the 1983 plan. Specific issues to be addressed in this amendment include protection of near-pristine resources such as coral reefs and sea grass beds, the protection of submerged cultural resources, the management direction for commercial services to provide transportation and assistance in educating visitors, and the determination of appropriate levels and types of visitor use. Establishing appropriate levels of visitor use is especially important. In 1984 the park had 18,000 visitors Last year more than 84,000 people visited the park. The first quarter visitation numbers of 2000 are 25% greater than last year. Managers must take actions to deal with visitor safety and enjoyment as well as protect the resources.

This *Final General Management Plan Amendment* presents and analyzes five alternative future directions for management and use of Dry Tortugas National Park and incorporates appropriate changes from the comments on the draft plan. Alternative A, a "no-action" alternative, presents what would happen under a continuation of existing conditions, without a new management plan, and provides a basis for comparing the other alternatives. Alternatives B, C, D, and E (the "action alternatives") considered in this document provide different ways to meet current and future needs, protect park resources, and enhance visitor experience. Alternative B provides greater protection of natural and cultural resources than alternative A. Alternative C, which has been identified as the National Park Service's proposed action/preferred future direction, affords a high level of protection to significant park resources through selectively applying a research natural area zone, instituting a permit system for private boaters, and using commercial services to direct and structure visitor use. Alternative D is the same as alternative C except that the research natural area zone is larger and private boaters would not be allowed in this zone. Alternative E is the same as alternative D except that the research natural area zone would be applied to almost the entire park. The potential consequences and environmental impacts associated with implementing each of the alternatives are evaluated in the "Environmental Consequences" section of this document.

Concurrent with the completion of the *General Management Plan Amendment*, the National Park Service will issue a "Notice of Proposed Rule Making." This will initiate the process of establishing new or revised regulations that are directed by the final plan. Public comments received on the *Draft General Management Plan Amendment* that address topics that will be the subject of rulemaking will also apply to public review of the draft regulations when they are released for public comment.

This *Final General Management Plan Amendment* has been distributed to other agencies and interested individuals. After at least a 30-day no-action period, a "Record of Decision" on the final approved management plan will be issued by the NPS regional director. For further information, contact Superintendent, Everglades and Dry Tortugas National Parks, 40001 State Road 9336, Homestead, FL 33034-6733.

SUMMARY

The Florida Keys are composed of 1,700 keys or islands, all of which are in Monroe County. Dry Tortugas National Park is the westernmost part of the Florida Keys and is about 70 miles west of Key West, Florida, in the Straits of Florida. The park contains seven keys and is administered by the National Park Service. Only two of the keys in the 100-square-mile national park are inhabited. The keys are composed of coral reefs and sand and the surrounding shoals and water. Totaling 104 acres, the islands in the park are situated on the edge of the main shipping channel between the Gulf of Mexico, the western Caribbean, and the Atlantic Ocean. The islands and reefs pose a serious navigation hazard to ships passing through the 75-mile-wide straits between the gulf and the ocean and have been the site of hundreds of shipwrecks, which still occasionally occur in the area. The shipwrecks on the reefs comprise one of the nation's principal ship graveyards.

Fort Jefferson, on Garden Key, is the park's central cultural feature and is the largest 19th century American coastal fort. Construction began on the structure in 1846, but the fort was never completed. Originally built to protect shipping access to the gulf, the fort was used as a military prison during the Civil War. Today, the fort is the primary destination for people visiting the park. Loggerhead Key is the largest key and contains a brick tower lighthouse that was completed in 1858 that is still operable. The lighthouse was manned by Coast Guard personnel until recently when it was turned over to the National Park Service. The remaining keys are Bush, Long, East, Hospital, and Middle. Because they are turtle and bird nesting sites, Hospital and Long Keys are closed to visitors all year; Bush Key is closed part of the year during bird nesting season. Middle Key is a sandbar that is awash in the summer but emerges intermittently at other times of the year. East Key is also a significant turtle nesting area, and is closed during the nesting/hatching period. It contains relatively unaltered natural vegetation.

The Dry Tortugas are recognized for their near-pristine natural resources including sea grass beds, fisheries, and sea turtle and bird nesting habitat. In addition, the tropical coral reef of the Tortugas is one of the best developed on the continent and possesses a full range of Caribbean coral species, some of which are rare elsewhere. These resources play a vital role in South Florida's efforts to attain a balanced and sustainable ecosystem. For example, the park's protected spawning habitat produces larger apex predators (predators at the top of the food chain) and rich biodiversity of species such as reef fish, lobster, and shrimp. Movement and flow of currents in the keys disperse larva to distant areas, resulting in benefits to regional fisheries and therefore to recreational and commercial fishermen and research scientists beyond the park.

Every unit in the national park system is required to operate under a management plan that sets the direction for future management of each specific unit. Dry Tortugas National Park has been operating under the 1983 *General Management Plan / Development Concept Plan / Environmental Assessment* (NPS 1983b). Although much of the 1983 plan still applies, it needs amending to address current issues; to provide overall guidance for the future use of resources and facilities; to clarify research and resource management needs, priorities, and strategies; and to address changing levels of park visitation and use. This new *General Management Plan Amendment* will replace the 1983 plan.

Specific issues to be addressed in this amendment include protection of near-pristine resources such as coral reefs and sea grass beds, the protection of submerged cultural resources, the management direction

of commercial services to provide transportation and assistance in educating visitors, and the determination of appropriate levels and types of visitor use. Visitation at the park has risen from 18,000 visitors in 1984 to 84,000 in 2000. The first quarter visitation numbers of 2000 are already 25% greater than last year.

Five alternative future directions for management and use of Dry Tortugas National Park are analyzed in this plan. Alternative A, a "no-action" alternative, presents what would happen under a continuation of existing conditions, without an amended management plan, and provides a basis for comparing the other alternatives. Alternatives B, C, D, and E (the "action alternatives") considered in this document provide different ways to meet current and future needs, protect park resources, and enhance visitor experience.

Alternative B provides greater protection of the natural and cultural resources than alternative A. Under alternative B the types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences. Where critical resource degradation was observed, park staff would direct intensive protection and/or remediation measures to abate impacts. Visitors would be free to travel and experience a variety of recreational opportunities throughout much of the park.

Alternative C has been identified as the National Park Service's proposed action/ preferred future direction. The intent under alternative C is to afford a high level of protection to significant park resources through the selective application of a research natural area zone in 46% of the park (46 square miles), instituting a permit system for private boaters, and using commercial services to direct and structure visitor use. The research natural area would be dedicated to resource protection, nonmanipulative research, and visitor education. Consumptive use of resources, including fishing, would be prohibited in the research natural area. A wide range of recreational and educational opportunities would be available to visitors provided that appropriate resource conditions were maintained. Visitor experience would be enhanced due to expanded access throughout the park and higher-quality resources to enjoy. The goal for commercial service operations would be to be self-contained, thus reducing the strain on the limited park facilities. The types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences.

The concept under alternative D is exactly the same as alternative C except that (1) the research natural area zone boundaries would be slightly different (still compatible with the Florida Keys National Marine Sanctuary's preferred alternative for establishing ecological reserves in the Tortugas area), and (2) private boaters would not be allowed to anchor or tie up to a mooring buoy for diving, snorkeling, etc. in the research natural area. Private boaters would be allowed to transit through the research natural area.

Under alternative E, most of the park would be designated as a research natural area and managed accordingly, with primary emphasis on resource protection and conservation. The alternative recognizes the paramount importance of preserving the park's near-pristine and fragile ecological resources and takes steps to closely direct visitor activities that could result in resource degradation. Most visitor use would be highly structured through commercial service providers. The goal for commercial service operations would be to be self-contained, thus reducing the strain on the limited park facilities. Private boaters would moor at Garden Key and join tour operations. The types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences.

The potential consequences and environmental impacts associated with implementing each of the alternatives are

evaluated in the "Environmental Consequences" section of this document. The major impacts of implementing alternative A include continued long-term impacts on coral reefs and reef fisheries from unrestricted fishing and recreational uses. Also, increases in use would result in minor to moderate long-term adverse impacts on the quality of the visitor experience.

The major impacts of implementing alternative B would include continued long-term adverse impacts on coral reefs and reef fisheries from unrestricted fishing and recreational uses. Establishing maximum levels, types, and locations of use would have long-term minor beneficial impacts on the quality of the visitor experience.

The major impacts of implementing alternatives C and D would include a significant reduction in the long-term adverse impacts from fishing and recreational uses through the establishment of a research natural area in a portion of the park. Establishing visitor capacities, providing commercial tours throughout the park, improving and protecting the quality of the resources, and enhancing interpretation and education would have long-term major beneficial impacts on the quality of the visitor experience. In alternative C, the establishment of the research natural area in the park and the establishment of the adjacent ecological reserve by the Florida Keys National Marine Sanctuary would set aside a total of about 197 square nautical miles where fishing would not be allowed and the fisheries and other benthic resources could recover from overfishing. When implemented, the combined NPS and FKNMS proposals would establish the third largest no-take marine reserve in the world (according to the National Fisheries Conservation Center).

The major impacts of implementing alternative E would include the elimination of almost all of the long-term adverse impacts from fishing and recreational uses through the establishment of a research natural area throughout most of the park. Visitor use would be highly structured throughout the park. Visitors without private boats would have greater opportunities to tour diverse areas in the park. Establishing visitor capacities, providing commercial tours, improving and protecting the quality of the resources, and enhancing interpretation and education would have long-term major beneficial impacts on the quality of the visitor experience. The restriction against private boat use and recreational fishing in most of the park, and the requirement that these visitors be with a guide, would change the nature of the remote marine experience and sense of freedom now available. This would have long-term moderate negative impacts for those visitors with private boats.

UNDERSTANDING PARK PLANNING

The purpose of these two pages is to explain what you are going to be reading about in this document and why.

Park planning is a decision-making process, and general management planning is the broadest level of decision making for parks. General management plans are required for all units in the national park system and are intended to set the management direction for the park for the next 15 to 20 years. General management planning constitutes the first phase of tiered planning and decision making. It focuses on *why* the park was established (purpose, significance, mission) and *what* resource conditions and visitor experiences should be achieved and maintained over time (desired conditions). The general management plan looks years into the future when dealing with the framework of natural and cultural processes, considering the park holistically in its full ecological and cultural context and as part of a surrounding region. Site-specific planning will be done in later implementation plans.

There are two broad **purposes for a general management plan**:

- Clearly describe the desired conditions, the specific resource conditions and visitor experiences to be achieved in a park, and identify the kinds of management, use, and development that will be appropriate in achieving and maintaining those conditions.
- Ensure that this basic foundation for decision making has been developed in consultation with interested stakeholders and adopted by the National Park Service (NPS) leadership after an adequate analysis of the benefits, environmental impacts, and economic costs of alternative courses of action.

A **general management plan needs to do two things**:

(1) Clarify and articulatewhat must be achieved in the park — These requirements are based on the park's purpose, significance, special mandates, agreements, and the body of laws and policies directing the management of the national park system.

Park management is directed by law, policy, and plans — in that order. Law and policy deal with *musts* — things that must happen in the park because they have been mandated by Congress or the NPS leadership. Park managers and staffs do not make decisions about laws and policies; they simply implement them.

(2) Make decisions about the most appropriate mix of desired conditions that have been identified for a park — These desired conditions may be identified by the park staff, technical experts, current and potential visitors, other agencies, traditional users, regional/area residents, and the general public.

Laws and policies as well as the park's purpose, significance, and mission are the sideboards for determining which of the suggested desired conditions can be legitimately considered.

Planning provides the process for choosing among the desired conditions. The desired conditions are grouped appropriately by concept and expressed as different alternatives. In other words, various approaches to protecting the park's resources and allowing visitor use and development may be possible. These different approaches are called the alternatives, and the alternatives are described by establishing management zones that tell what specific conditions and visitor experiences will be achieved and maintained in each particular area of the park over time. The size and

placement of the different management zones usually varies in each alternative. Determining the best mix of desired conditions (i.e., the best alternative) is the point of the general management planning process, and decisions are based on scientific and academic resource analysis, a rigorous evaluation of the natural, cultural, and social impacts of alternative courses of action, and consideration of long-term economic costs.

The example below is meant to simply illustrate how all that bureacratese is really applied. For the example below, we are assuming that our desired conditions are in line with laws, policies, park purpose, significance, etc.

Some people might want to double the number of people allowed out to Dry Tortugas National Park so that more people could learn about and enjoy the park and its resources (a concept/ desired condition for one alternative). Others might want to limit the number of people that go to the park to researchers only so that the park's resources would always remain in near-pristine conditions (a concept/desired condition for a second alternative). Many other concepts are possible. Once concepts are formed, then decision makers (which includes the interested public) decide what actions would have to take place in the park to support this concept. They do that by establishing management zones that describe what specific conditions and visitor experiences would be achieved and maintained in each particular area of the park over time. As shown below, the size and placement of the management zones would vary with each alternative concept.

Suppose, for example, we have a historic preservation/adaptive use management zone and a research natural area zone (among others) that the planning team, park managers, the public, and others have developed as appropriate for Dry Tortugas National Park. (Different management zones would be appropriate for different parks.) In the historic preservation / adaptive use zone we might develop many structured activities and opportunities for many visitors (primarily those on tours) to learn about the park and its resources while carefully protecting any historic structures (such as the fort). Visitors would only be allowed in the research natural area management zone with a permit. This would help ensure the protection of the park's near-pristine resources in that management zone. In the first alternative concept (double the visitors allowed), the historic preservation / adaptive use zone might encompass Garden Key/Fort Jefferson and Loggerhead Key, and the research natural area might encompass 20 square miles of the most representative of the park's near-pristine resources. In the second alternative concept above (no one but researchers), there would be no need for a historic preservation/ adaptive use zone and the research natural area zone might encompass the entire park. Although the reader will find the management zone descriptions and alternative action descriptions in this document to be more complex, this is the basic idea of general management planning.

The other "piece" that needs to be added is an analysis of the environmental consequences (impacts) of implementing each of the alternatives — including impacts on the natural and cultural resources (will the fort and the coral beds and birds be protected?), impacts on park visitors (can visitors still fish, snorkel, and dive to shipwreck sites?), and impacts on the socioeconomic environment (can commercial charter boats still take people to fish, will the ferry to the park still run, and what will the park be like in 20 years?). These and other important questions and their answers are what general management planning is all about. The method may seem a bit complex, but the goal is simple — while considering park visitors and park resources, what is the best way to manage the park for the next 15 to 20 years.

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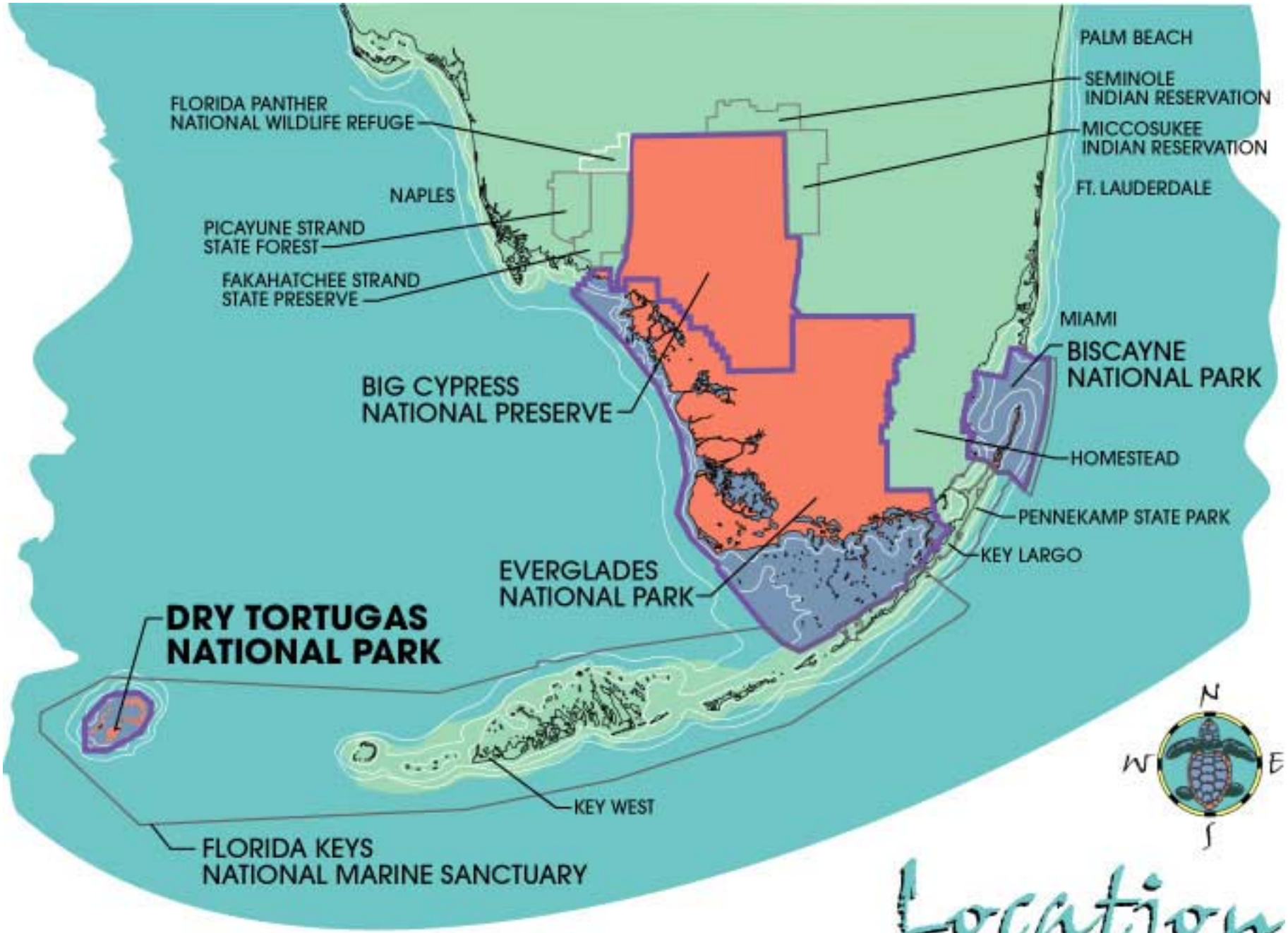

Location

Dry Tortugas National Park

United States Department of the Interior • National Park Service

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PURPOSE OF AND NEED FOR THE AMENDMENT

General management plans are required for each unit of the national park system. These plans provide a clearly defined direction for visitor use and resource preservation and provide a basic foundation for decision making and managing the park unit for the foreseeable future.

The purpose of this *Final General Management Plan Amendment / Environmental Impact Statement* for Dry Tortugas National Park is to set forth the management philosophy and framework for decision making and problem solving in the park for the next 15 to 20 years. The park has been operating under the *General Management Plan / Development Concept Plan / Environmental Assessment* that was prepared in 1983 (for Fort Jefferson National Monument) before the site was designated as a national park in 1992. Although much of the 1983 plan is still applicable, NPS planning guidance has changed and this older plan does not address current issues. The older plan needs amending to provide overall guidance for the future use of resources and facilities; to clarify research and resource management needs, priorities, and strategies; and to address changing levels of park visitation and use. This new *General Management Plan Amendment* will replace the 1983 plan.

Specific issues to be addressed in this amendment include protection of near-pristine resources such as coral reefs and sea grass beds, the protection of submerged cultural resources, the management direction of commercial services to provide transportation and assistance in educating visitors, and the determination of appropriate levels and types of visitor use. In 1984 the park had 18,000 visitors Establishing appropriate levels of visitor use is especially important. Last year more than 84,000 people visited the park. The first quarter visitation numbers of 2000 are 25% greater than last year. Managers must take actions to deal with visitor safety and enjoyment as well as protect the resources (see “Issues and Concerns” section).

This *General Management Plan Amendment* presents and analyzes five alternative future directions for management and use of Dry Tortugas National Park (the park or Dry Tortugas). Alternative A, a “no-action” alternative, presents what would happen under a continuation of existing conditions, without a new management plan, and provides a basis for comparing the other alternatives. Alternatives B, C, D, and E (the “action alternatives”) considered in this document provide different ways to meet current and future needs, protect park resources, and enhance visitor experience. Alternative C has been identified as the National Park Service’s proposed action / preferred future direction. The potential consequences and environmental impacts associated with implementing each of the alternatives are evaluated in the “Environmental Consequences” section of this document.

Visitation to the park has traditionally relied on and would continue to rely on commercial transportation providers under any of the alternatives discussed in this document. For that reason, this plan addresses ways for commercial services to help provide for visitor experiences in each alternative. The impacts on commercial operators are analyzed in the “Environmental Consequences” section of this document. A subsequent concessions contract prospectus will follow this *General Management Plan Amendment/ Environmental Impact Statement* to outline specific operations and equipment needed to implement the selected alternative.

BRIEF DESCRIPTION OF THE PARK

Established in 1992 (Public Law 102-525, Title II, Oct. 26, 1992), Dry Tortugas

National Park is in Monroe County, Florida, 70 miles west of Key West in the Straits of Florida. The park's approximate 100-square-mile jurisdiction includes seven small keys (islands) composed of coral reefs and sand and the surrounding shoals and water. Totaling 104 acres, the islands are known as the Dry Tortugas and are situated on the edge of the main shipping channel between the Gulf of Mexico, the western Caribbean, and the Atlantic Ocean. The islands and reefs pose a serious navigation hazard to ships passing through the 75-mile-wide straits between the gulf and the ocean and have been the site of hundreds of ship-wrecks. The earliest known shipwreck occurred in 1622, and marine casualties, wrecks, and strandings still occur in the area. The shipwrecks on the reefs comprise one of the nation's principal ship graveyards.

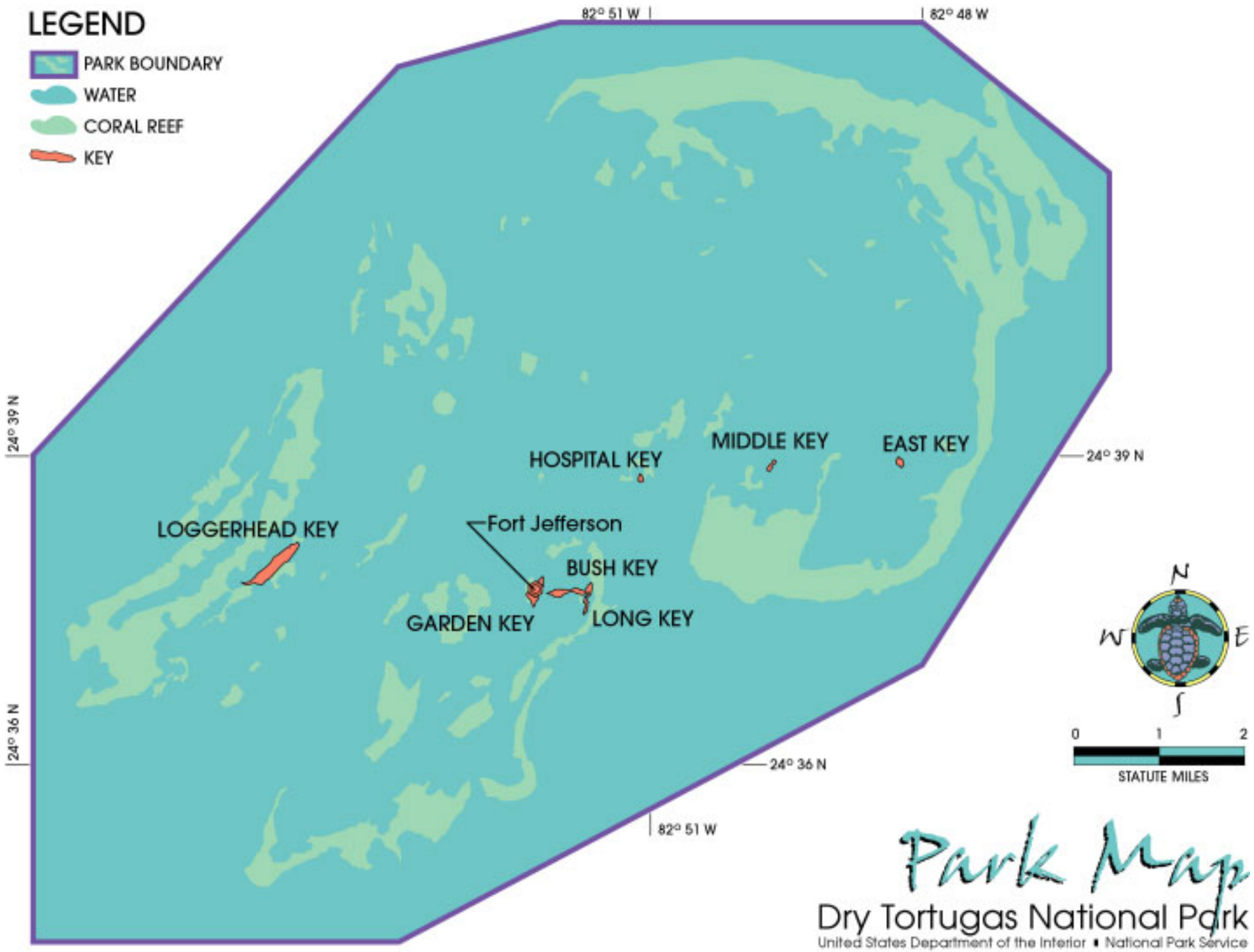
Fort Jefferson, on Garden Key, is the park's central cultural feature and is the largest 19th century American coastal fort. Construction began on the structure in 1846 but was never completed. Originally built to protect ship-ping access to the gulf, the fort was used as a military prison during the Civil War, housing Union deserters and four Lincoln assassination conspirators. Today, the fort is the primary destination site for people visiting the park.

Loggerhead Key is the largest key and con-tains a brick tower lighthouse that is still operable. The lighthouse is the most promi-nent historic structure on that key. Com-pleted in 1858, the 150-foot tower provides warning of the Tortugas' dangerous reefs. The lighthouse was manned by Coast Guard personnel until recently, when it was turned over to the National Park Service. Also on Loggerhead Key are the ruins of the world's first marine biological laboratory in the Western Hemisphere — the Carnegie Institution of Washington, D.C., Marine Biology Laboratory.

The remaining keys are Bush, Long, East, Hospital, and Middle. Because they are turtle and bird nesting sites, Hospital and Long Keys are closed to visitors all year; Bush Key is closed part of the year during bird nesting season. Middle Key is a sandbar that is awash in the summer but emerges intermittently at other times of the year. East Key is also a significant turtle nesting area, and is closed during the nesting/hatching period. It contains relatively unaltered natural vegetation.

The Dry Tortugas are recognized for their near-pristine natural resources including sea grass beds, fisheries, and sea turtle and bird nesting habitat. Pristine, for the purposes of this document, means in an unaltered natural condition, and near-pristine means in an unaltered natural condition but having minor effects from current levels of recreational use and broader environmental influences. In addition, the tropical coral reef of the Tortugas is one of the best developed and most pristine on the continent and possesses a full range of Caribbean coral species, some of which are rare elsewhere. These resources play a vital role in South Florida's efforts to attain a balanced and sustainable ecosystem. For example, the park's protected spawning habitat produces larger apex predators (predators at the top of the food chain) and rich biodiversity of species such as reef fish, lobster, and shrimp. Movement and flow of currents in the keys disperse larva to distant areas, resulting in benefits to the region's fisheries and therefore to recreational and commercial fishermen beyond the park, as well as to research scientists.

The primary means of access to the park are by commercial boat (tours) or seaplane or private boat. Visitors come to the area for recreational opportunities including touring Fort Jefferson, snorkeling, scuba diving, birdwatching, boating, and recreational fishing.



Park Map

Dry Tortugas National Park

United States Department of the Interior • National Park Service

DSC / DEC. 00 / 364 / 20013

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PARK PURPOSE

The reason(s) for which the park was established provides the most fundamental criterion for determining actions proposed in the general management plan.

Dry Tortugas National Park was established to "preserve and protect for the education, inspiration, and enjoyment of present and future generations nationally significant natural, historic, scenic, marine, and scientific values in South Florida." The new park supplanted its smaller predecessor, Fort Jefferson National Monument (established in 1935). The following management purposes were identified in the enabling legislation (see appendix A for the complete text of the legislation):

- Protect and interpret a pristine subtropical marine ecosystem, including an intact coral reef community.
- Protect populations of fish and wildlife, including loggerhead and green sea turtles, sooty terns, frigate birds, and numerous migratory bird species.
- Protect the pristine natural environment of the Dry Tortugas group of islands.
- Protect, stabilize, restore, and interpret Fort Jefferson, an outstanding example of 19th century masonry fortification.
- Preserve and protect submerged cultural resources.
- In a manner consistent with the paragraphs above, provide opportunities for scientific research.

PARK SIGNIFICANCE

The following statements define the significant attributes that relate to the park purpose and why the park was established. Knowing the park's significance helps managers set protection priorities and determine desirable visitor experiences.

Dry Tortugas National Park is a significant unit in the national park system because it

- contains historic Fort Jefferson, a militarily and architecturally significant 19th century fort
- protects the historic Loggerhead Key lighthouse and the historic Garden Key harbor light
- possesses one of the greatest concentrations of historically significant shipwrecks in North America, with some dating back to the 1600s
- maintains one of the most isolated and least disturbed habitats for endangered and threatened sea turtles in the United States
- supports the only significant sooty and noddy tern nesting colonies in the United States (on Bush and Long Keys) and harbors the only frigate bird nesting colonies in the continental United States (on Long Key)
- serves as an important resting spot for migrating birds
- provides unique opportunities to see tropical seabirds
- protects the least disturbed portion of the Florida Keys coral reef ecosystem
- presents outstanding potential for education, recreation, and scientific research related to the park's exceptional marine resources
- offers a sense of quiet remoteness and peace in a vast expanse of sea and sky
- affords an opportunity to understand and appreciate a rare combination of natural, historic, marine, and scenic resources

PARK MISSION GOALS

Given the purpose and significance, goals were developed to provide guidance in preserving and protecting what is significant and communicating the primary themes to the visitors.

These are immediate and long-term goals — what actions would have taken place over the life of this plan amendment (15–20 years) — to fulfill resource protection, visitor use, and operational mandates.

All submerged and land-based cultural resources have been identified, documented, protected, and/or stabilized.

All terrestrial archeological resources have been identified, documented, evaluated, and protected.

All submerged cultural resources in 30 feet or less of water have been identified, documented, evaluated, and protected.

One example of each type of armament and the hot shot oven at Fort Jefferson has been restored.

All periods of Dry Tortugas history have been researched and documented.

All historic structures at Dry Tortugas, including Fort Jefferson and the Loggerhead Key lighthouse, have been stabilized.

The type and level of public use does not negatively impact cultural resources.

All natural resources and associated values are protected, restored, and maintained in near-pristine condition.

Habitats impacted by humans are restored, and the natural environment is suitable for use by sea turtles and migrating birds.

Native plants and animals are not impaired by invasive, exotic plants.

The physical oceanography (currents, tides, and winds) in the area is understood and is used to manage remote sources of pollutants.

The park is internationally recognized as a center for marine research.

The type and level of public use does not negatively impact natural resources.

Human-caused physical damage to reefs and sea grass meadows is eliminated, and natural populations of fish and marine life are maintained.

Management decisions are based on sufficient data, and park policies support and enhance the survival of threatened and endangered species.

Visitors understand, appreciate, and are inspired by the park's historical and natural resources, and they support the protection of these resources.

Dry Tortugas provides only minimal onsite visitor services and facilities and requires park visitors to be self-sufficient for all their supplies.

The quality of the visitor experience is protected by sustaining the park's peaceful and remote character.

All visitors and affiliated political entities and interest groups understand why the park was established and work cooperatively to achieve its purpose and mission.

Commercial operators are aware of park purpose and convey that to their customers.

Available park facilities, infrastructure, and services are sufficient to support operational needs, park staff, and visitors; appropriate recreational opportunities are safe and adequate for visitors and employees.

Facilities and infrastructure are sufficient to support park operations and visitor needs, in conformance with state and federal laws and the park purpose.

"Interpretation" is an educational activity that is designed to stimulate curiosity, convey messages to the visiting public, and help the public understand, enjoy, appreciate, and protect the resources. The orientation aspect of interpretation is telling visitors where the visitor center is, what there is to see, how to get there, and where the restrooms are. But more important is determining what visitors should learn about the park — the interpretive themes — and how they would best learn that information — through media such as an audiovisual program, a wayside exhibit (an outside interpretive panel), a self-guiding brochure, a guided tour, or some other means. When determined, this is called the interpretive program for the park.

Dry Tortugas National Park is a responsive and efficient organization, enhancing managerial capabilities through initiatives and support from other agencies, organizations, and individuals.

Title to Loggerhead Key and submerged lands within the park boundary are transferred to the park, in accordance with the park's enabling legislation.

Cooperative relationships are developed to assist in and carry out the park purpose.

COLLECTIVE MISSION AND MISSION GOALS OF THE NPS SOUTH FLORIDA UNITS

Collectively, the South Florida parks face similar challenges and demands. They confront related environmental threats and impacts from urban growth. They share common publics and visitor needs, and they maintain relationships with many of the same public and private entities throughout South Florida. They preserve the most intact portions of the South Florida ecosystem and play vital roles in sustaining the health of that system. Because the parks have so much in common, it is imperative that they coordinate the management strategies, crossing unit and agency boundaries in ways that serve the ecosystem's overall needs.

To meet these challenges, the four parks have identified a common mission and a series of mission goals (see appendix B). The mission reflects the collective purpose, significance, and special mandates of the National Park Service in South Florida. The mission goals identify what the parks envision as desired future conditions. Both the mission and the mission goals conform to the NPS *Strategic Plan.* The collective mission goals, however, have been redefined so that they fit the needs of the South Florida parks.

ISSUES AND CONCERNS

The public, park staff, and planning team members (the team of people responsible for preparing this plan) identified a number of issues facing Dry Tortugas National Park. The issues and concerns generally involve determining the appropriate visitor capacity, types and levels of facilities, services, and activities while remaining compatible with desired resource conditions. The general management plan amendment will provide a framework or strategy for addressing the following issues within the context of the park's purpose, significance, and mission goals.

- Visitation at Dry Tortugas National Park has risen from 18,000 visitors in 1984 to 84,000 visitors in 1999. The first quarter visitation numbers of 2000 are 25% greater than last year. Increased popularity of the park strains facilities, compromises visitor safety and quality of visitor experience, and threatens resources. The number of visitors and types and levels of activities lack balance against the needs of vegetation, wildlife and aquatic life, historic structures, and their environments. There are concerns that the trend in increased visitation will destroy the very resource qualities that make the area special.

- Research indicates that recreational fishing, especially for trophy fish, is having a significant detrimental impact on the fisheries in the entire region. The contribution of these largest fish to production in the Tortugas region is essential to the marine-based ecology and economy.

- There has been a steady increase of interest by the commercial sector during the past few years to operate in the park. Interest has been expressed for much larger vessels, which would bring many more visitors into the park. Park managers were concerned that the fragile resources in the park might suffer as a result of the increases being contemplated. This resulted in a moratorium being placed on new commercial activity in the park until this planning effort was completed. Park managers need the direction from this plan to efficiently and effectively manage appropriate types and levels of commercial services at Dry Tortugas National Park.

- Although many of the park's resources maintain high levels of integrity and near-pristine conditions, some resources such as coral reefs and sea grass meadows are being degraded by pollution from outside the park and by damage from divers, snorkelers, and the use of anchors. In addition, the potential exists for the loss of historic fabric at Fort Jefferson and artifacts at shipwreck sites. As visitation increases, resource values could be compromised even more. Lacking strategies to balance location and density of visitor activities will make it difficult for the park to protect, restore, and maintain resource conditions.

- Dry Tortugas National Park contains many natural and cultural resources across a vast expanse of sea. Transportation to and within the park allows visitors limited access to park resources, which minimally achieves the park goals of educating visitors and providing a quality experience. Without a vessel, those resources are relatively inaccessible to most visitors. Commercial services support a variety of visitor activities, including sailing; transportation by boats, ferries, and air taxis; and guided history tours and tours for photography, wildlife watching, snorkeling, diving, and fishing. Although activities are appropriate for private individuals to enjoy, it is equally appropriate to offer these activities for visitors through the commercial sector.

  However, the current park management framework lacks critical tools for initiating, continuing, modifying, or eliminating commercial services at specified locations. Many public commentors acknowledge the value of commercial services but express concern that irreparable damage to the park's sensitive cultural and natural resources could result from overuse unless visitation levels and types of activities and their locations are balanced with resource preservation.

- Most visitors come between March and July. Visitors seeking quiet and solitude during this time complain that these experiences are not available due to

overcrowding and overuse. A continued increase in visitation numbers will likely degrade the experience even more for some visitors. With more users, noise levels would likely increase, and there would be more competition for services and facilities and increased safety concerns. The management tools currently in use do not limit the numbers of visitors or disperse visitors to maintain a safe and high-quality experience during peak visitation periods.

- Visitors and the general public have expressed varying opinions as to the type and level of facilities that the park should offer. Some prefer minimal facilities, while others would like additional restrooms, campsites, showers, mooring buoys, and dock space. Infrastructure such as the sewage disposal system is inadequate for current levels of visitation. Freshwater storage and processing are at capacity and will not support additional demand. Options to provide basic utilities and other facilities are greatly restricted by the limited land area, its closeness to open water, and the need to generate power to treat water and wastewater. Power must be generated onsite with diesel-fueled generators. Also, intrusions into historic and submerged cultural resource sites present concerns. Currently, there is an imbalance between visitation levels, facility and infrastructure capacity, and the need to maintain near-pristine resource qualities in accord with the park's purpose.

- Although research programs are implemented when funds permit, an ongoing program with cultural and natural resource indicators and a monitoring system to determine status and trends of resource conditions do not exist. Without baseline natural and cultural resource information, the National Park Service cannot become aware of undiscovered significant resources in the park, impacts affecting resources, and management strategies needed to maintain and protect the resources.

- The National Park Service is increasingly aware of the need to develop a mutually beneficial working relationship that extends beyond park boundaries. This need holds true in working with various entities including other government agencies, community groups, commercial organizations, and individuals. As interest in the Dry Tortugas area increases, there are opportunities to establish partnerships with other managers and operators.

ISSUES BEYOND THE SCOPE OF THIS PLAN

This plan is intended to establish general, conceptual guidance for the management of Dry Tortugas National Park. Subsequent plans and reports will implement this management plan and provide more detailed management direction. These plans would include a concessions contract prospectus, in which specific commercial services parameters, feasibility analysis, and operations options would be outlined. The park also needs an interpretive plan that establishes interpretive themes and the ways they will be communicated to the visitor and the public at large. These implementation plans and details are beyond the scope of this management plan. (See the "Recommendations for Future Research and Planning" section for more information.) No other issues were raised during scoping that are beyond the scope of this management plan. Although many of the park's resources maintain high levels of integrity and near-pristine conditions, some marine resources such as coral reefs and sea grass meadows are being degraded by pollution, climate changes, and extreme natural events. These external forces are beyond the scope of this plan.

SERVICEWIDE LAWS AND POLICIES AND SPECIAL PARK MANDATES AND AGREEMENTS

In the process of preparing this *General Management Plan Amendment,* the planning team looked at things the park must do regardless of which alternative is implemented. These "must dos" fall into two categories — (1) things that are required because of laws and policies that apply throughout the National Park Service (servicewide), and (2) things that are specific to Dry Tortugas National Park because they are mandated in the park's establishing legislation or that are required because of a signed agreement with others.

PARK MANDATES AND AGREEMENTS

There are no special park mandates or agreements in the legislation that established the park other than fulfilling the park purposes stated previously.

NATIONAL PARK SERVICE ORGANIC ACT (16 U.S.C.1, et seq.) — to *conserve* the scenery and the natural and historic objects and the wildlife herein and to provide for the enjoyment of the same in such a manner and by such means as will leave them *unimpaired* for the enjoyment of future generations.

PUBLIC LAW 102-525 — in October, 1992, Congress established Dry Tortugas National Park to (a) *protect* and interpret a pristine subtropical marine ecosystem, including an *intact* coral reef community; (b) to *protect* fish and wildlife, including (but not limited to) loggerhead and green sea turtles, sooty terns, frigate birds, numerous migratory bird species; (c) to *protect* the pristine natural environment of the Dry Tortugas group of islands; (d) to *preserve and protect* submerged cultural resources; and (e) in a manner consistent with the above, provide opportunities for scientific research.

EXECUTIVE ORDER 13089 — to *preserve* and *protect* the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment. All federal agencies whose actions may affect U.S. coral reef ecosystems shall to the extent permitted by law, ensure that any actions they authorize, fund, or carry out *will not degrade* the conditions of such ecosystems.

According to Webster's New Collegiate Dictionary ……

conserve – to keep in a safe or sound state
unimpaired – uninjured, left complete or entire
intact – untouched by anything that harms or defiles
protect – to cover or shield from injury or destruction
preserve – to keep intact, save, to keep from injury
degrade – to reduce from a higher to a lower rank or degree, to depreciate

SERVICEWIDE LAWS AND POLICIES

General

Law or Policy	Management Direction / Action
NPS Organic Act NPS *Management Policies*	The National Park Service will "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."
Director's Order 55, "*Interpreting the Organic Act*	"NPS Obligation to Conserve and Provide for Enjoyment of Park Resources and Values: Congress, recognizing that the enjoyment by future generations of the national parks can be assured only if the superb quality of park resources and values is left unimpaired, has provided that when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant." NPS management policies acknowledge that providing opportunities for public enjoyment is a fundamental part of the NPS mission. But they emphasize that recreational and other activities, including NPS management activities, may be allowed only when they will not cause impairment or derogation of a park's resources, values, or purposes. The sole exception is when an activity that would cause impairment or derogation is specifically mandated by Congress.
Public Law 95-625; NPS M*anagement Policies*; 16 USC 1a-7(b)(4)	NPS management plans must include measures for protecting the parks' resources and "indications of potential modifications to the external boundaries of the unit and the reasons therefore" (PL 95-625).

Natural Resources

The primary goal of natural resource management is to preserve the components and processes of the Dry Tortugas' naturally evolving ecosystems. These components include the natural abundance, diversity, and ecological integrity of the park's wildlife and vegetation. The park's natural resources will continue to be managed in accordance with laws and NPS policies and regulations, including those below.

Law or Policy	Management Direction / Action
National Environmental Policy Act Guidelines, NPS-12	**Natural Resources — General:** This act directs agencies to "encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man and to enrich the understanding of the ecological systems and natural resources important to the Nation . . . . "

Law or Policy	Management Direction / Action
NPS *Management Policies* NPS *Natural Resources Management Guideline* (NPS-77) Endangered Species Act of 1973 Migratory Bird Conservation Act of 1929 Fish and Wildlife Coordination Act of 1958 Marine Mammal Protection Act of 1972	Policies and guidelines for natural resources direct that the park must • Identify and complete the inventories of natural resources for baseline information. • Maintain and protect the natural ecological processes occurring in the Dry Tortugas and its immediate environs. • Minimize impacts of human activities, developments, and uses on marine and terrestrial resources. • Establish systems to monitor the condition of key natural resources and to identify and monitor threats to those resources. • Continue to close areas of the park to protect birds and turtles during nesting season. Manage endangered, threatened, and candidate species.
Title 36 *Code of Federal Regulations* 1.5, 1.6 1.10, 2.1, 2.2, 2.3, 2.4, 2.5	The 36 CFR provides authorization for • Closing areas and limit public use to protect resources • Providing public notice of closures or use limits. • Prohibiting the destruction, defacing, or disturbing resources. • Protecting fish and wildlife and permit research.
NPS *Natural Resources Management Guideline* (NPS-77)	**Research Natural Areas:** "Managers should give consideration to the establishment of restricted waters in which no fishing is allowed. These areas can be valuable for the study of unaltered ecological processes and serve as important baselines or control areas for harvested populations of fish." (Chapter 3, page 34) "Prime examples of natural ecosystems and areas with significant genetic resources with value for long-term baseline observational studies or as control areas for comparative studies involving manipulative research outside the park may be recommended … for designation as research natural areas. Research natural areas will be managed to provide for greatest possible protection of site integrity in accordance wit their designation. Activities in research natural areas will be restricted to nonmanipulative research, education, and other activities that will not detract for the area's research values." (Chapter 4, Special Park Designations, pg. 14)
Executive Order 13089, Coral Reef Protection, signed June 11, 1998, by President Clinton.	**Coral Reefs:** The order helps fulfill the purposes of the Clean Water Act of 1977, as amended (33 USC 1251, et seq.), the Coastal Zone Management Act (16 USC 1451 et seq.), the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801, et seq.), the National Environmental Policy Act of 1969, as amended (42 USC 4321, et seq.), the National Marine Sanctuaries Act (16 USC 1431, et seq.), the National Park Service Organic Act (16 USC 1m et seq.), the National Wildlife Refuge System Administration Act (16 USC 668dd-ee), and other pertinent statutes, to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment (see appendix C for Executive Order 13089). The order directs that all federal agencies whose actions may affect U.S. coral reef ecosystems shall: (a) identify their actions that may affect U.S. coral reef ecosystems; (b) utilize their programs and authorities to protect and enhance the conditions of such ecosystems, and (c) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such

Law or Policy	Management Direction / Action
Executive Order 13089, (cont.)	ecosystems. The U.S. Coral Reef Task Force duties include coral reef mapping and monitoring; research; conservation, mitigation, and restoration; and international cooperation. Development of the general management plan amendment for Dry Tortugas National Park has been consistent with the directives of this order. Duties and plans of the U.S. Coral Reef Task Force will support and not supercede recommendations of this management plan.
Executive Order 13158 "Marine Protected Areas"	**Marine Protected Areas:** This order helps fulfill the purposes of the National Park Service Organic Act, the National Marine Sanctuaries Act, and other pertinent statutes. The purpose of the order is to (a) strengthen the management, protection, and conservation of existing MPAs; (b) develop a scientifically based, comprehensive national system of marine protected areas representing diverse U.S. marine ecosystems, and the nation's natural and cultural resources; and (c) avoid causing harm to marine protected areas through federally conducted, approved, or funded activities. The order directs that each federal agency whose actions affect the natural or cultural resources that are protected by a marine protected area shall identify such actions and shall avoid harm to those natural and cultural resources. Each agency affected by this order shall prepare and make public annually a concise description of actions taken by it the previous year to implement this order, including a description of written comments by any person or organization stating that the agency has not complied with this order and a response to such comments by the agency. (See appendix C.)
Executive Order 11990, "Protection of Wetlands"	**Wetlands:** This order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction of modification of wetlands.
Executive Order 11988, "Floodplain Management"	**Floodplains:** This order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modifications of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
National Parks Omnibus Management Act of 1998, Title II, Resource Inventory and Management	**Scientific Research and Monitoring:** Title II, Sec. 201. Purposes. The purposes of this title are — (2) to enhance management and protection of national park resources by providing clear authority and direction for the conduct of scientific study in the national park system and to use the information gathered for management purposes; (4) to encourage others to use the national park system for study to the benefit of park management as well as broader scientific value, where such study is consistent with the National Park Service Organic Act of 1916 Sec. 204 Inventory and Monitoring Program The Secretary shall undertake a program of inventory and monitoring of national park system resources to establish baseline information and to provide information on the long-term trends in the condition of national park system resources. The monitoring program shall be developed in cooperation with other federal monitoring and information collection efforts to ensure a cost-effective approach. Sec. 206. Integration of Study Results into Management Decisions The Secretary shall take such measures as are necessary to assure the full and proper utilization of the results of scientific study for park management decisions.

Law or Policy	Management Direction / Action
NPS *Natural Resources Management Guideline* (NPS-77), Chapter 2, page 95	**Marine Resources:** "Objectives for marine resource management are the following: 1. Inventory all ecosystem components 2. Maintain and restore all components and processes of naturally evolving park marine ecosystems, recognizing that change caused by extreme natural events (e.g., storms, red tide, El Niño) is an integral part of functioning natural systems. 3. Maintain natural genetic diversity of marine ecosystems. 4. Maintain or improve water quality affecting marine ecosystems. 5. Maintain or improve air quality affecting marine ecosystems. 6. Maintain natural marine viewsheds. 7. Protect and restore threatened and endangered species and their critical habitat. 8. Regulate and mitigate human activities to minimize adverse impacts. 9. Determine limits of natural system variation (baseline condition). 10. Monitor system dynamics to detect abnormal changes in time to affect remedial actions. 11. Educate visitors about the importance and fragility of marine resources, threats to them, and mitigation to lessen impact."

Cultural Resources

Under all alternatives, the park's cultural resources (land-based and submerged) will be protected and preserved in accordance with applicable laws and NPS policies and regulations, including those listed below.

Law or Policy	Management Direction / Action
The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995) NPS *Director's* Order #28 (1998)	**Land-based Cultural Resources:** Continue preservation measures at Fort Jefferson to arrest masonry deterioration and retain the essential architectural character and configuration of the structure and its contributing features. All stabilization and preservation/maintenance undertakings will follow *The Secretary of the Interior's Standards for the Treatment of Historic Properties*.
The Secretary of the Interior's Standards for the Treatment of Historic Properties (1995) NPS *Director's* Order #28 (1998) National Historic Preservation Act (1966)	Preserve and protect land-based national register properties — e.g., Fort Jefferson and the Loggerhead Key lighthouse and associated structures
NPS *Director's* Order #28 (1998) Archeological Resources Protection Act, (1979) National Historic Preservation Act (1966)	Assess all activities, including ground or offshore disturbances, for the potential to disturb archeological resources. If significant resources were identified in project areas, avoid them if at all possible, or undertake appropriate data recovery measures before possible construction disturbance.

Law or Policy	Management Direction / Action
NPS *Management Policies* (1988); NPS *Abandoned Shipwreck Act Guidelines* (1990), National Historic Preservation Act (1966)	**Submerged Cultural Resources:** ▪ In accordance with appropriate professional standards, stabilize and preserve historic shipwrecks and submerged cultural resources in place. ▪ Permit limited archeological investigations only under an approved research design. ▪ Document and evaluate the significance of submerged cultural resources according to the eligibility criteria of the National Register of Historic Places. ▪ Monitor submerged cultural resources to assess site conditions and undertake remedial preservation treatments as necessary. ▪ Assess the suitability of documented sites for public visitation/interpretation. Sensitive sites would remain off limits to the public. ▪ Continue archeological surveys to inventory and evaluate submerged cultural resources within the park at depths of less than 30 feet. Eventually, complete archeological survey for the entire park waters at all depths

Visitor Use and Safety

Law or Policy	Management Direction / Action
Safe harbor adheres to marine traditions.	**Safe Harbor:** Because the park contains the only islands for many miles, afford safe harbor to any vessel when warranted.
An executive memorandum *signed* by President Clinton on April 22, 1996 directed the Federal Aviation Administration and the National Park Service to "develop appropriate educational and other materials for the public at large and all aviation interests that describe the importance of natural quiet to park visitors and the need for cooperation from the aviation community." NPS *Management Policies*	**Natural Soundscape:** Americans regard parks as national treasures set aside to preserve this country's natural and cultural heritage and associated values and resources. The park system includes some of the quietest places on earth, and this quiet is valued as a resource in keeping with the NPS mission. The resource is called the natural soundscape and includes silence, solitude, and tranquility along with sounds of nature such as birds calling or waves gently washing against the shore. Soundscape also involves those sounds inherent in cultural settings. Today, many parks may *appear* as they once did historically, but they no longer *sound* as they did in the past. Increasingly, intruding external and internal sources of noise affect not only the visitor experience but the resources as well. As stated by NPS Director Robert Stanton, "Natural sounds are part of the special places we preserve. Rustling winds in the canyons and the rush of waters in the rivers are the heartbeat and breath of some of our most valuable resources." Noise sources in Dry Tortugas include watercraft, aircraft, generators, and other equipment associated with maintenance and park operations. In addition, visitors themselves may be a source of intrusive sounds. Proper management of noise sources is necessary to preserve or restore the natural soundscape.

Law or Policy	Management Direction / Action
National Parks and Recreation Act, 1978	**Levels of Visitation/Carrying Capacity:** The National Park Service is required by law to address carrying capacity (how many people can visit the park and specific sites without damaging the resources or visitor experience) in planning for parks. One product of the process for developing this general management plan amendment was the identification of a range of numbers that would indicate the visitor carrying capacities for key park areas. These capacities acknowledge the strong relationship among the number of visitors, the quality of the visitor experience, and impacts on the resources. Specific use capacities for park sites such as coral reefs and Fort Jefferson have been defined based on current scientific information and daily park operational knowledge (see table 1) The process for determining carrying capacities includes • Developing management zones that define desired visitor experience and resource conditions for each area of the park. • Determining a range of the number of visitors at one time at specific sites and attractions. • Developing indicators that can be monitored to ensure that desired visitor experience and resource conditions are achieved. • Developing a systematic monitoring process. • Incorporating the freedom to lower or raise capacities if standards indicate that no resource damage is occurring or standards warn that conditions require management action.
Americans with Disabilities Act; *Uniform Federal Accessibility Standards*; and NPS *Management Policies;* Architectural Barriers Act of 1968; Rehabilitation Act of 1973	**Accessibility:** Make visitor and management facilities as accessible as practicable, depending on the nature of the area and of the facility, to persons with visual, hearing, mobility, and mental impairments. Strive to provide the highest level of accessibility possible to facilities, programs, and services, consistent with the nature of the area, the conservation of resources, and the mandate to provide a quality experience for everyone. Meet accessibility standards on visitor transportation vessels and aircraft within the limits of marine and aircraft design and safety requirements. Work with organizations that encourage and enable use of park areas by special populations, which will increase awareness of the needs of these populations and help to ensure that potential visitors with particular needs are aware of the opportunities offered at the Dry Tortugas.
NPS *Management Policies; Loss Control Management Program Guidelines* (NPS-50); *Federal Assistance and Interagency Agreement Guideline* (NPS-20); National Security Decision Directive 259.	**Visitor Safety:** Although visitors assume a certain degree of responsibility for their own safety when visiting Dry Tortugas, strive to ensure that there are no hazards posing a serious threat to human health and safety. Ensure that actions to prevent known hazards will not conflict with NPS mandates to preserve the park's resources.

Law or Policy	Management Direction / Action
NPS *Management Policies*, chapter 7	**Interpretation and Education**: The National Park Service will conduct interpretive programs in all parks to instill an understanding and appreciation of the value of parks and their resources; to develop public support for preserving park resources; to provide the information necessary to ensure the successful adaptation of visitors to park environments; and to encourage and facilitate appropriate, safe, minimum-impact use of park resources.

Commercial Services

Law or Policy	Management Direction / Action
The Omnibus Park Management Act of 1998 was passed by Congress and signed into law November 13, 1998. Section IV of the Omnibus Act, which deals directly with NPS concessions, is called the National Park Service Concessions Management Improvement Act of 1998. This legislation supercedes the Concessions Policy Act of 1965, which has guided Park Services management of concessions for the last 30 years. The *U.S. Code of Federal Regulations* (36 CFR) section 5.3 requires that all commercial activities in national parks be authorized by a written instrument (contract or permit). The Cost Recovery Act (16 USC 3a) requires the National Park Service to recover all costs associated with administering and monitoring business permits. The National Park Service guidelines that are applicable to commercial services include: * *Concessions Guidelines* (DO–48) * *Loss Control Management Program Guideline* (DO–50) * *Special Park Uses Guidelines* DO–53 * *Public Health Management Guideline* (DO–83) These guidelines, along with fundamental policies, standard contract language, and operating practices, are used in managing commercial activities throughout the national park system.	**Concession Activities:** Concession activities and development shall be limited to those facilities and services that are necessary and appropriate for public use and enjoyment of the park. All commercial activities shall be consistent with the preservation and conservation of resources and values for which the park was established. Concession activities should be authorized in a manner consistent with a reasonable opportunity for the concessioner to realize a profit. To encourage competition among perspective bidders Existing concessioners would not have a preferential right of renewal. For further details, see appendix D.

Energy Management

Law or Policy	Management Direction / Action
Executive Order 13123, "Greening the Government through Efficient Energy Management (PL 95-619, 92 Stat.. 3206, 42 USC 8252 et seq.)	**Energy Management:** This order has many requirements, but the bottom line is that agencies have been given a goal to reduce their energy consumption by 30% from the base year of 1990 by the year 2010.

IMPACT TOPICS ELIMINATED FROM FURTHER EVALUATION

The following impact topics were eliminated from further evaluation. These topics are briefly discussed below and are not analyzed in detail in this document due to the following: (a) implementation of the alternatives would have no discernible effect on the topic or resource or (b) the resource does not occur in the park.

CLIMATE

The Dry Tortugas region has a tropical maritime climate, driven in large part by the influence of the Caribbean Sea and the Bermuda/Azores high pressure system. Seasonal variations in position and interactions with other air masses affect temperature, precipitation, and wind speed in the lower Keys. Two primary climatic seasons are present. The rainy season occurs from about May to October. The dry season typically extends from November to April. In addition to a comparative reduction in rainfall, the dry season is punctuated by rapidly dissipating cold fronts. Winds from the east-southeast typically prevail during the rainy season and from the east-northeast during the dry season. These wind patterns are disrupted by occasional cyclonic disturbances, including hurricanes, during the rainy season and cold fronts accompanied by strong winds from the northwest during the dry season.

Temperatures in the Florida Keys are the most moderate in Florida, and Key West receives about 3,300 hours of sunshine per year, the most in the state (Schomer and Drew 1982). Temperatures in the Dry Tortugas vary little from the rest of the Keys, typically being within 33°F to 37°F (1°C to 3° C) of other areas. Highest temperatures typically occur in July and August and approximate 90°F (32°C). Lowest temperatures typically do not drop below 66.2°F (19° C).

The Keys are the driest area in Florida. Due to its relatively remote positioning from the mainland and Florida Bay, the Dry Tortugas is one of the driest areas in the Keys. Precipitation averages about 49 inches (125 centimeters) per year with 66% to 80% of the total annual precipitation occurring from May to October (Schomer and Drew 1982). Most rainfall results from local convective storms, which occur most typically in September and are least common in March. Precipitation from individual hurricanes typically ranges from 5 to 10+ inches (13 to 26) centimeters but can exceed 19.7 inches (50 centimeters).

The Florida Keys experiences more tropical depressions and hurricanes than any other area of the North American continent. Storms typically occur between June and November and peak in September and proximal months. Twenty hurricanes traversed Monroe County between 1900 and 1990, 11 of which were class 3 or greater (Neumann 1993). Wind effects from hurricanes can substantially affect marine as well as terrestrial structures, and the development of many reef-building species of the Dry Tortugas has been affected by winds associated with both tropical depressions and hurricanes (e.g., Knowlton and Lang 1981; Mah and Stearn 1986; Rogers et al. 1991; Wulff 1995).

AIR QUALITY

Due to the remote location of the park (about 70 miles west of Key West) and year-round winds, the air quality is not significantly impacted by external land-based pollution or airborne contaminants (e.g., urban or industrial pollutants, power generating pollutants, dust, etc.). There is no source of airborne pollution at or near the Dry Tortugas. It has been hypothesized that airborne dust particles from the Sahara Desert may be providing a source of

nutrients and iron to places as far away as the Gulf of Mexico, but the implementation of any of the alternatives proposed in this document would have no impact on this phenomenon. In addition, this possible external source of nutrients has not been scientifically validated.

SOILS

The Dry Tortugas is the westernmost extension of the oolitic facies of the Miami limestone (Hoffmiester 1974). No sources were found indicating that a soil analysis has been performed at the park. A detailed analysis of soils from Monroe County is available from the Natural Resources Conservation Service, including Key West. No management action proposed in any of the alternatives would impact soils.

PRIME AND UNIQUE FARMLANDS

The U.S. Department of Agriculture defines prime farmland as the land that is best suited for food, feed, forage, fiber, and oilseed crops; unique farmland produces specialty crops such as fruit, vegetables, and nuts. According to an August 11, 1980, memorandum from the Council on Environmental Quality, federal agencies must assess the effects of their actions on soils classified by the Soil Conservation Service as prime or unique. According to the U.S. Department of Agriculture, Natural Resources Conservation Service's definition of prime farmlands, the land of the Dry Tortugas is not appropriate for prime farmland designation.

RELATIONSHIP OF OTHER PLANNING EFFORTS TO THIS MANAGEMENT PLAN AMENDMENT

U.S. CORAL REEF TASK FORCE — *THE NATIONAL ACTION PLAN TO CONSERVE CORAL REEFS*

The action plan was produced by the Working Group of the United States Coral Reef Task Force in response to its request for a cohesive national strategy to implement Executive Order 13089 on coral reefs (see appendix C). These actions were developed in consultation with various stakeholders and cover the spectrum of coral reef conservation from mapping, monitoring, management, and research to education and international cooperation. The plan calls for designating 20% of all U.S. coral reefs as no-take ecological reserves by 2010, mapping all U.S. coral reefs by 2009, and monitoring to build an integrated national reef monitoring system that profiles and tracks the health of U.S. coral reefs. Collectively, these actions are intended to provide a comprehensive road map for federal, state, territorial, and local actions to reverse the worldwide decline and loss of coral reefs. This is a living document, intended by its authors to be revisited and revised regularly, and to be augmented by agency implementation plans and an annual report from each task force member agency summarizing significant issues and accomplishments related to coral reef conservation. This general management plan amendment for Dry Tortugas National Park has been coordinated with the national initiative, and approval of alternatives B, C, D, or E would advance the two fundamental goals of the task force's action plan.

FLORIDA KEYS NATIONAL MARINE SANCTUARY — *DRAFT TORTUGAS ECOLOGICAL RESERVE SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT / DRAFT MANAGEMENT PLAN*

Dry Tortugas National Park is completely surrounded by the Florida Keys National Marine Sanctuary. The sanctuary is part of the National Oceanic and Atmospheric Administration, Department of Commerce. This agency creates and adopts management plans for the sanctuary. The Marine Sanctuaries Division of the National Oceanic and Atmospheric Administration working in cooperation with the state of Florida and the Gulf of Mexico Fishery Management Council proposes to establish a 151-square-nautical-mile no-take ecological reserve in the remote westernmost portion of the Florida Keys National Marine Sanctuary. A *Draft Tortugas Ecological Reserve Supplemental Environmental Impact Statement / Draft Management Plan* is being closely coordinated with this NPS *General Management Plan Amendment / Environmental Impact Statement* and will address only the proposed boundaries and regulations for the Tortugas Ecological Reserve, which is within the sanctuary. The ecological reserve concept was presented in the sanctuary's initial *Draft Environmental Impact Statement* as a technique to restore and protect natural spawning, nursery, and permanent resident areas for marine life, and critical habitats not already protected by fisheries management regulations.

All aspects of planning by the sanctuary and the National Park Service have been coordinated, including the involvement of the local and national publics. Although these agencies have different and distinct missions and responsibilities, it is recognized that the resources being managed are inextricably linked. Therefore the actions of one agency will affect the effectiveness of the other agencies' actions. It is the intent of both agencies that the plans and subsequent management of the park and the sanctuary complement and support each other.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL — *REEF FISH FISHERY MANAGEMENT PLAN*

The Gulf of Mexico Fishery Management Council is amending their *Reef Fish Fishery*

Management Plan to propose as a preferred alternative — the permanent closure to fishing of the Tortugas South area and the portion of Tortugas North in the council's jurisdiction. Also, the state of Florida is drafting fishing regulations to prohibit fishing in those portions of Tortugas North that are within state waters. Combined, these proposed actions will result in comprehensive protection for habitats from shallow to deep water extending from the park into sanctuary waters and Gulf of Mexico Fishery Management Council waters.

SOUTH FLORIDA ECOSYSTEM RESTORATION TASK FORCE — *STRATEGIC PLAN*

The interrelationship of and balance between the natural and built environment in South Florida has been the subject of much planning and manipulation throughout the 20th century. For example, less than 50% of the original wetlands of the Everglades remain after canalization to make more land available to agriculture and development. Much of this manipulation has been found to have had a detrimental impact on the complex natural systems upon which much of the South Florida region depends. The latest planning initiatives include the restoration of these previously disturbed water flows and correcting the subsequent decline of many natural elements and systems that depend on them. These initiatives include more than 34 federal, state, and tribal organizations, 16 counties, and more than 100 cities. The National Park Service and its four south Florida units have been centrally involved. The coordination of all of these planning efforts is the responsibility of the South Florida Ecosystem Restoration Task Force.

NATIONAL PARK SERVICE — *COORDINATED SOUTH FLORIDA FRAMEWORK*

Dry Tortugas National Park is but one of four national park system units in the South Florida ecosystem, the others being Everglades National Park, Big Cypress National Preserve, and Biscayne National Park. These four park units are managed in a coordinated way. The National Park Service developed a joint *"Coordinated South Florida Framework"* for the four parks. The goals of this framework are included in appendix B.

The management of the Dry Tortugas is by the same staff as manages Everglades National Park. However, Dry Tortugas National Park shares more resource characteristics with Biscayne. The coral reef system that lies within Dry Tortugas is the southernmost extent of the same track as found in Biscayne, which is the reef system's northernmost extent. Planning for the health of this reef system is done through coordinated management in the two parks.

- **Visitor Experience and Resource Protection Plan (VERP).** A VERP plan is needed to help achieve the desired conditions for resources and visitor experience described in this *General Management Plan Amendment*. It would address visitor carrying capacity and identify the indicators, standards, and monitoring strategies that can be used to ensure provision of quality experiences while protecting park resources.

- **Resource Management Plan.** The *Resource Management Plan* would be revised to incorporate management direction provided by this *General Management Plan Amendment*. The revised plan would detail the status of the park's natural and cultural resource programs and would detail needs for research, monitoring, and other programs.

- **Comprehensive Interpretive Plan.** This plan would be developed to provide detailed guidance on improvements to media, facilities, and education and outreach programs.

STATE AND LOCAL PLANS

The park lies within Monroe County, Florida. However Monroe County does not have land use jurisdiction in or near the park because the only dry land in the vicinity is in federal ownership. The state of Florida has jurisdiction over submerged lands not in federal ownership. Where that may occur within the boundary, coordination with the state on those lands and the resources in them is done through the Florida Department of Environmental Protection. State and county health regulations do apply and the park must comply with the standards of those entities for water and wastewater.

RULEMAKING

A rule (also called a regulation) is a document published in the *Federal Register* to implement or interpret law or policy. A rule is generally published first as a proposed rule and receives comment from the public. It is then published as a final rule. Once a rule is published in final, it is codified in the *Code of Federal Regulations* and remains in effect until it is modified by publication of another rule.

Following the completion of the *Final General Management Plan Amendment*, rules would be published that would regulate certain activities as directed by the final plan. Activities that could be regulated within the research natural area would include:

recreational fishing
private boat use including bare boat charters
research
diving and snorkeling

Other areas that could require rules include the parkwide permit system and establishing special protection zones.

Proposed rules that result from the *Final General Management Plan Amendment* will be published for public review as a next step of the implementation process. Public comments that are received on the *Draft General Management Plan Amendment* that address topics that will be the subject of rulemaking will also apply to the public review of the draft regulations when they are released for public comment. This will save the public time by not having to send comments on the proposed rules that they felt were sent during review of the *Draft General Management Plan Amendment*.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

THE PROPOSED ACTION AND THE ALTERNATIVES

In this section a proposed future direction for Dry Tortugas National Park (alternative C, the proposed action) is described along with four alternatives, including one that describes a continuation of existing conditions (alternative A) and serves as a basis for comparison.

Before the proposed action and alternatives were developed, information on park resources, visitor use, and visitor preferences was gathered and analyzed. Information was solicited about the issues and the scope of the project from the public, government agencies, and special interest groups through newsletters, meetings, and personal contacts. Based on the park purpose and significance and public comments, the planning team identified the resource conditions desired and a range of appropriate visitor experiences or opportunities for various areas in the park. The development of four preliminary concepts (alternatives B-E) for the park's future presented in this document was the result. All four concepts were intended to support the park's purpose and significance, address issues, avoid unacceptable resource impacts, respond to public wishes and concerns, and meet the park's long-term goals. An evaluation process called "choosing by advantages" was used to evaluate and compare the alternatives and to develop a preliminary preferred alternative.

Alternative A, the no-action alternative, describes the continuation of existing conditions. Alternative B manages for increased protection of resources under existing management zoning and within current authorities. Alternatives C and D provide for a research natural area zone (the basis for which is described in the next section) in two different, limited geographic locations in the park, and alternative E presents a research natural area zone throughout the park except at Garden Key and central Loggerhead Key. The research natural area zones in alternatives C, D, and E emphasize resource protection and the management of visitor use through a permitting system and structured activities. Fishing would be prohibited in any areas designated as research natural area zones.

Because so much in the alternatives depends on the application of management zones, the following section provides background for developing the zones and more detailed information on the research natural area zone in particular.

Some Definitions
Private boats are defined as those owned or rented by an individual. Rented boats with a hired captain and/or crew would be considered commercial and are not included in this category. The same is true for aircraft. **Commercial vessels/aircraft** include any mode of transportation for which the passenger is charged a fee and which is operated primarily by commercial staff. **Anchorages** are where boats would anchor or moor while visitors snorkel or dive to nearby resources. Overnight anchorage would be within the historic preservation/adaptive use zone. **Commercial Services** is an umbrella term that encompasses any service in a park that involves the exchange of money. The two main types of commercial services at most parks are authorized by concession contracts and commercial use authorizations.

Some Definitions (cont.)
Concessions are authorized by a legal contract requiring that specific services and/or facilities be provided to visitors. For the exclusive right to provide services and facilities, the concessioner pays the government a predetermined franchise fee on an annual basis. Contracts contain operational, maintenance, and environmental plans that detail what the concessioner is required to do. The business activities (charging fees, advertising etc.,) of a concession can occur within the park. Concessioners are often, but not always, assigned land and/or facilities within the park. **Concession Contracts** are legally, binding agreements between concessioners and the National Park Service to provide certain visitor services within a park under specified terms and conditions. Some services must be provided and are "required". Others may be provided and are "authorized.". The National Park Service has three levels of concession contracts. Category I contracts are used for major operations involving land/facility assignments with capital improvements made by the concessioner. Category II contracts are used for less complex operations with land/facility assignments but no capital improvement program. Category III contracts are primarily for services only with no land/facility assignments, although personal property can be assigned. They are typically used for guide, outfitter, and simple transportation services. **Commercial Use Authorizations (CUAs)** are used to permit appropriate commercial activities within a park that start and finish outside the park. All business activities must occur outside the park. No land or facilities can be assigned to the operator. Activities cannot conflict with activities authorized in a concession contract. Commercial use authorizations used to be called **incidental business permits (IBPs)**. If deemed necessary and appropriate, the National Park Service can convert a CUA activity to an appropriate category concession contract.

BACKGROUND FOR DEVELOPING THE MANAGEMENT ZONES

INTRODUCTION

Congress gave very clear direction for managing the park in the enabling legislation for the park (Public Law 102-525). Specifically the law states that:

> The park shall be managed for the following purposes among others:
>
> (1) To protect and interpret a pristine subtropical marine ecosystem, including an intact coral reef community.
> (2) To protect populations of fish and wildlife, including loggerhead and green sea turtles, sooty terns, frigate birds, and numerous migratory bird species.
> (3) To protect the pristine natural environment of the Dry Tortugas group of islands.
> (4) To protect, stabilize, restore, and interpret Fort Jefferson, an outstanding example of 19th century masonry fortification.
> (5) To preserve and protect submerged cultural resources.
> (6) In a manner consistent with the above paragraphs, to provide opportunities for scientific research.

It is rare in the Park Service to have been given such clear direction from Congress on the management of resources within a national park. In the past the park has had two advantages in meeting these mandates from Congress. First there has been a long and rich history of research in the area, especially through the Carnegie Institution's former facility based on Loggerhead Key (see the discussion on Loggerhead Key in the "Affected Environment" section). As a result, much is known about the ecological resources at the park. Second, the remoteness of this cluster of islands has, until recently, spared the resources found there the dramatic damage from human uses seen elsewhere. Damage caused by overfishing and destructive fishing practices, and by the collection of and inappropriate contact with the coral, is observed throughout the Caribbean, but is limited at the park. Anchor damage to corals and sea grass beds can be identified but is not of the magnitude of impacts found in places like Florida Bay or the Virgin Islands.

Serendipitous protection due to the remote location is no longer a certainty. The Dry Tortugas have been discovered, and the word is out. Boats are bigger. More people can afford private boats or chartered tours. There is money to be made selling trips. The Park Service has examined the impacts from human use and extrapolated from them and studies made elsewhere the impacts likely to occur given anticipated visitation increases. Current management strategies at the park would make it difficult to fulfill the congressional direction of protecting the park's resources with the anticipated increasing visitor numbers.

In the following section, management zones are described, along with alternative ways of applying them to fulfill the purpose of the park — to protect the resources for the reasons Congress stated. Three of the management zones are updated versions of zones in place at the park at this time. A fourth, the research natural area (RNA) zone, is based on NPS *Natural Resources Management Guidelines* (NPS-77) (see the "Servicewide Laws and Policies and Special Park Mandates and Agreements" section). The objectives stated in the policy guidelines for research natural areas are to

1. preserve a wide range of undisturbed, representative areas that typify important … natural situations, that have special or unique characteristics, or provide outstanding examples of geological,

biological, or ecological processes of scientific interest and importance;
2. preserve and maintain genetic diversity;
3. protect against environmental disturbance;
4. serve as reference areas for the study of ecological succession;
5. provide student and professional education;
6. serve as baseline areas for measuring long-term ecological changes; and
7. serve as control areas for comparing results from manipulative research.

This policy echoes guidance and management objectives being used internationally in the protection of rare, unique, or imperiled marine resources and ecosystems. Other similar protection strategies being used are called ecological reserves and marine protected areas. In the following discussion, the term research natural area is used to describe all of the similar strategies. The discussion describes how the protection strategy is being applied and what results are being observed.

BACKGROUND ON RESEARCH NATURAL AREAS

Authority for establishing research natural areas is provided by the NPS Organic Act of 1916. The use of research natural areas/ ecological reserves/marine protected areas has recently gained scientific and public support as a means to (1) mitigate the negative effects of fishing, and (2) provide sanctuaries for the recovery and sustainability of fish stocks, the restoration of natural habitat quality, and the conservation of marine biodiversity (Plan Development Team 1990). Many other potential positive effects have been postulated (Bohnsack 1993; Bohnsack and Ault 1996); also, research natural area zones/reserves may

- ensure adequate quantity and quality of genetic material
- maintain or increase fishery yield
- eliminate accidental catches in shrimp trawls (sometimes called "by-catch mortality" or "accidental catch mortality")
- allow for population to rebuild and provide insurance against population collapse
- facilitate scientific studies
- simplify enforcement
- protect sensitive habitats
- foster ecotourism and education

Because research natural areas can provide multiple benefits, they are being established for a myriad of reasons and goals. The goals of a research natural area should be determined before establishment, and a monitoring program should also be initiated to assess the impact of establishing the area over time. (See the management zone descriptions later in this chapter to understand the goal for the park's research natural area zone.)

Research natural areas provide excellent protection to the natural habitats through restricting human use and minimizing the impacts of uses that are allowed. How well a research natural area protects the underwater (benthic) habitat depends on the types of invasive human activities allowed within the research natural area borders. The fundamental ways that reserves may benefit reef fish stocks and fisheries is through the increase in abundance and size of individuals within the research natural areas. In turn, this increase in population abundance and size can benefit local fisheries through the export of larvae and juvenile and adult fish into less protected areas.

Numerous studies have shown a positive correlation between research natural areas and increases in abundance and size of protected populations. Russ and Alcala (1996a, 1996b) found that the average number of large predators correlated with the number of years of reserve protection for two reefs within the Apo Reserves in the Philippine Islands. Several other studies

have also shown that grouper densities increased in research natural areas versus nonprotected areas (Alcala 1988, Clark et al. 1989, Russ and Alcala 1989). DeMartini (1993) concluded from the results of simulation that reserves can enhance the number and size and spawning populations of species, showing fast growth and relatively low bidirectional migration rates.

A potential result of the increased abundance and sizes of individuals within research natural areas is the emigration of these individuals out of the reserve into local fishing areas. A study conducted at the De Hoop Nature Reserve in South Africa showed that catch rates increased for six out of 10 species studied, with increases of up to 400 % to 500% for two of the species (Bennett and Attwood 1991). Research conducted in the Sumilon Island Reserve in the Philippines showed that the fishery yields in areas surrounding a reserve increased after the reserve was established and that the authors concluded that spillover of adult fish from the reserve was the best explanation for this increase (Alcala and Russ 1990). The results of a study on the range of movement of a large predator on Heron Reef, Australia, were consistent with the theory that reserves can enhance neighboring fisheries through adult emigration (Samoilys 1997). The number of fish that swim into adjacent fished areas will depend on factors such as the species home range and movement rates, as well as reserve boundaries that intersect desirable habitat to allow for movement out of the reserve.

Research natural areas may also increase the larval production in the protected area and the subsequent dispersal of larvae to areas outside the protected area. Many commercially important species have geometric increases in egg production as size increases. For example, one 61-centimeter red snapper produces as many eggs as 212 females that are 42 centimeters long (Grimes 1987); thus, allowing individuals to grow to larger sizes will dramatically increase population larval output. Research conducted on the dispersal rates of a species (the teleost) in the De Hoop Research Natural Area in South Africa implied that the emigration of juveniles out of the reserve was restocking exploited adjacent areas (Attwood and Bennett 1994). Larvae moving to other places may counteract the effects of overfishing in those other places (Carr and Reed 1993, Russ et al. 1992). A simulation study done by Holland and Brazee (1996) indicated that for moderate to heavily fished fisheries, research natural areas could sustain or increase yields. Another study showed that the use of research natural areas can lead to substantial increases in the size of the spawning stock when fishing mortality rates are high (Polacheck 1990).

The marine environment, particularly a reef ecosystem, is extraordinarily complex, and complete understanding and predictability of such a system may never be possible. In the face of such uncertainty, research natural areas provide a safety net to reduce the risk of a fish stock collapse in the face of overfishing or uncertain management decisions (Lauck et al. 1998; Bohnsack 1998). Based on findings that the Florida Keys contain many large reef fish species that are currently heavily fished or overfished (Ault et al. 1998), the park should be an ideal environment for the use of research natural areas to improve the state of the reef fish fisheries.

Mathematical programming, optimization, and simulation-based research conducted by Meester (2000), which is discussed in more detail later in this document, showed that the effectiveness of research natural areas in protecting reef fish stocks depended on several critical factors — the movement strategies employed by a species of fish, as well as its growth rate and natural mortality rate. The fishing mortality rate both before research natural area establishment and in nonprotected areas after establishment is also important.

MANAGEMENT ZONES

Management zones prescribe what specific resource conditions and visitor experiences would be achieved and maintained in each particular area of the park under each of the action alternatives (alternatives B–E). (Alternative A's management zones, which are similar to these zones, would remain the same as those in the 1983 management plan.) Ideas for the range of zones came from the park staff and the public in the scoping phase. They are grounded in the park's purpose, significance, and mission goals. In formulating alternatives for future park conditions and management, these zones were placed in different locations or configurations on the map to align with the overall intent (concept) of each of the alternatives. That is, the management alternatives represent different ways to apply the four management zones to the park.

Each zone specifies a particular combination of physical, biological, and social conditions, the types and levels of visitor use desired, and the amount of manipulation of the natural or cultural setting that would be appropriate to support those conditions and uses. Each zone also calls for a level of management or enforcement to maintain the desired conditions for that zone. Four distinct management zones were developed.

HISTORIC PRESERVATION/ ADAPTIVE USE ZONE

In an area managed as historic preservation/ adaptive use, visitors would be immersed in a built environment that is rich in architectural and cultural history. Interpretive and educational opportunities would be greatest in this zone, and opportunities would exist to experience both natural and cultural resources. Visitor activities would often occur in a structured manner (such as guided tours). The probability of encountering other people and NPS staff would be moderate to high, but at certain times of the day or season opportunities would exist to experience solitude and quiet. Opportunities for challenge and adventure would be low to moderate in this zone. At all times, visitors would be encouraged to act in a manner that respects others' use and enjoyment of the park. Visitors should expect moderate intrusions to the natural soundscape by boats, planes, mechanical systems, and other people. (This zone would have the same configuration for alternatives B–E and is detailed on the map shown in alternative B.)

The setting within this zone would be predominantly historic, and the integrity of significant historic resources would not be compromised. The historic scene and the land and marine natural features would be managed to maximize their integrity and to support visitor use. Some aspects of the natural and cultural landscape would be modified (e.g., site hardening, landscaping, and restoring disturbed areas) to protect resources and accommodate use. Nighttime light levels would remain low so that visitors could enjoy the impressive night skies.

Appropriate visitor activities could include learning about the park's natural, cultural, and human history and its ecological and historical relevance, birdwatching, photography, walking, picnicking, swimming, snorkeling, scuba diving, camping, boating, and recreational fishing. Some of these activities could be provided by commercial operators. A range of interpretive, educational, and orientation programs would be provided, with orientation and interpretation of resources taking place mostly onsite.

To support a wide range of activities and higher concentrations of visitors, there would be more visitor services than in any other zone, but food service and fresh water would not be available. Facilities within this zone could include visitor contact facilities, restrooms, exhibits, and facilities related to

park administration and operations. Also included could be self-guiding trails, mooring and navigation buoys, primitive campgrounds, and picnic areas.

The management focus in this zone would be on maintaining and protecting historic resources, maintaining visitor facilities, mitigating impacts from human use, and providing for quality visitor experiences. Evidence of management activity and resource preservation could be visible to visitors.

NATURAL/CULTURAL ZONE

In areas of the park managed as natural/ cultural, maintenance or improvement of resource quality would be emphasized but visitors would be free to move about the zone with few restrictions. The surroundings would offer a sense of remoteness and peace in a vast expanse of sea and sky. The land, sea, and soundscapes would be predominantly natural with minimal signs of human intrusions. Visitors would generally expect to find solitude. There would be the expectation that other individuals or small groups would sometimes be encountered, but concentrations of use would be low and visual and soundscape intrusions would be minimal. Opportunities for challenge and adventure would be relatively high compared to other zones, and boaters would need to be self-reliant and have good marine and navigational skills.

The natural scene would remain largely intact, with natural processes predominating. There would be little lasting evidence of recreational impacts, and most management actions would be devoted to protecting resources, minimizing or preventing impacts from visitor use, enhancing visitor safety, and restoring disturbed areas.

Facilities would generally not be appropriate; however, interpretive signs might be appropriate in certain cases. Minor alterations to the natural environment (such as mooring buoys and signs used for resource protection, interpretation, and visitor safety) would be allowed.

Appropriate activities would include snorkeling, scuba diving, swimming, boating, wildlife viewing, and recreational fishing. Some of these activities could be provided by commercial operators. Visitors would be free to pursue activities with generally few restrictions as long as high levels of resource protection, resource quality, and visitor experience exist. Anchors generally would be permitted; however, tying to mooring buoys may be required in certain areas if protection of sensitive resources warrants restricting anchors.

Most information and orientation would be received elsewhere, such as at the fort and before entering the park, although some information and interpretation might be given to visitors during tours within the zone.

RESEARCH NATURAL AREA ZONE

Research natural areas would be established in areas of outstanding and important resource value in order to protect the physical structure of habitats and ecological processes. In Dry Tortugas, research natural areas would protect a representative range of terrestrial and marine resources that would ensure protection of spawning fish stocks and fish diversity and to protect near-pristine habitats and processes to ensure high-quality research opportunities.

Research natural areas would be representative of the park's near-pristine, intact ecosystems (islands, deep and shallow coral reefs, sea grass beds, sand, and hard bottom [type of resource on the sea floor]). Visitor travel and behavior within the zone would be highly controlled to maintain the highest levels of resource quality. This zone would provide baseline areas for measuring long-term ecological changes. Within research natural areas the natural land, sea, and

soundscapes would predominate. The areas would be managed to provide the greatest possible protection of resource integrity. They would be set aside permanently and managed for approved nonmanipulative research (research that measures but does not alter the existing condition), and natural processes (e.g., ecological succession) would be allowed to occur without disturbance or impacts from humans.

There would be no lasting signs of recreational use, and no manipulation of natural or cultural resources would be permitted (except those aimed at restoring natural conditions or preserving special cultural resources). There would be extremely low tolerance for resource degradation or disturbance. The preservation and maintenance of biological and genetic diversity would be an important objective. Research natural areas would offer outstanding opportunities for scientific research and learning about natural systems, and public education and interpretation would be important activities in this zone. Visitors would experience a sense of remoteness and peace in a vast expanse of sea and sky. Areas and resources would be interpreted so that visitors could understand the reasons for establishing the research natural area.

There would be a low to moderate expectation of seeing NPS staff, and a high expectation of encountering commercial guides. There would be a low expectation of encountering other tour groups, and tour group sizes would be small. Under certain conditions chances would exist to experience solitude, tranquility, quiet, and to view rare or sensitive species.

Activities occurring within a research natural area would be restricted to nonmanipulative research, education, and other activities that do not detract from the area's research values. Nonconsumptive activities, such as wildlife viewing, snorkeling, sightseeing, boating, photography, and diving, would be managed so that resources would not be degraded. Recreational fishing and other consumptive activities would not be allowed. Commercial tour providers and private boaters would be required to use mooring buoys. The use of anchors would be prohibited in the research natural area.

Most development and facilities would not be appropriate, but signs, mooring buoys, and scientific research equipment such as site markers or small sampling devices would be permitted. For further information on research natural areas, see the previous "Background for Developing the Management Zones" section and the "Impacts on Natural Resources" section.

SPECIAL PROTECTION ZONE

The special protection zone would be established to provide added protection for certain exceptional and critical resources and would be managed to allow natural processes to occur without disturbance or impacts from humans — i.e., no activity, except research, would be allowed. This zone could be established to include bird and sea turtle nesting areas, areas of shallow or sensitive coral, or significant submerged cultural resources. The boundaries of the zone could be adjusted, or management could be changed, to respond to changing resource conditions. In certain cases, areas in this zone might be closed for extended periods to permit natural processes to proceed. Thus, the special protection zone is a management tool and "overlay" zone that allows protection of resources at certain times and in certain places throughout the park. For example, although the eastern shore of Loggerhead Key may be a natural/cultural zone for part of the year, when turtle nesting is taking place, this area would be zoned as a special protection zone.

Natural land, sea, and soundscapes would predominate within the zone. Lasting signs of recreational use would not be apparent, and no manipulation of resources would be permitted, except actions aimed at restoring natural conditions or preserving special

cultural resources. There would be no tolerance for resource degradation or disturbance.

MANAGING FOR VISITOR EXPERIENCE AND RESOURCE PROTECTION (VERP)

The desired resource conditions and visitor experiences are described in each management zone. Indicators of resource condition and visitor experiences would be developed that would reflect the overall condition of the zone and allow measurement of visitor impacts on biological, physical, and cultural resources of the park, as well as measurement of the impacts on visitor experiences. Standards for each indicator would be set that establish the maximum amount of deterioration of resource or experience quality that would be allowed before management action is taken. Monitoring programs that would measure the condition of resources and visitor experiences would be initiated.

A starting point was set with the preliminary numbers in table 1. A group of staff and researchers who have extensive experience in managing coral reefs and have observed the relationship between visitor use and the condition of the resource was assembled to develop these preliminary numbers, which were then reviewed by several other experts. Their experience includes research in similar resources as well as the implementation of management practices elsewhere and at Dry Tortugas. The purpose of these numbers is to provide a best estimate of use so that the impacts of the management approaches in each alternative can be assessed and to estimate the feasibility of commercial service options. Through monitoring, the park staff will determine if these numbers are viable/acceptable; if not, the numbers may be modified. The process of determining how much use is too much is a dynamic one. Identifying standards and indicators to monitor success of these numbers, and adjusting the numbers or management strategies when monitoring indicates conditions are out of standard, will be critical to the success of this process. There will be follow-up plans such as a revised resource management plan and a VERP implementation plan to test these numbers.

TABLE 1. RANGES OF VISITOR USE AT SPECIFIC LOCATIONS

Garden Key	Maximum total people per day = 330. This includes the 24-36 people who might visit Loggerhead Key during the day, either via commercial tour or private boat. Permits for concession contract holders would be written to (1) ensure that arrivals and departures are staggered throughout the day, (2) reduce point-loading at any given site, especially the dock, and (3) reduce the total number of people at one time on the key. Arrivals of people and allotments would be as follows: 150 by two or more boats by the ferry concession contract holder 60 by the seaplane concession contract holder 50 by private boats or commercial use authorization (CUA) holders 68 maximum number of campers at one time (regardless of arrival time or day) 328 Campground: A reservation system would be implemented. Campers must have a reservation to stay overnight on Garden Key. The campground maximum capacities shall be as follows: 8 individual sites with 6 campers each = 48 1 group site with a maximum of 20 = 20 68 Total campers Tours: Tours of the fort or any other tours in the future on or around Garden Key would be limited to a maximum of 20–25 people. Tours would be staggered so that concurrent tours are not visible to each other except for brief periods of time. Other destinations on Garden Key would be managed to minimize crowding by offering simultaneous alternative activities, by sequencing lunch service, by staggering arrivals and departures, and by encouraging private boaters to visit the key after the commercial day visitors have departed. Mooring buoys: Mooring buoys would be located in the research natural area, and in other zones, after additional analysis of the resources and attractions that are appropriate for visitation in each zone. The final number and location of these buoys would be determined as a result of this analysis. Buoys may be clustered according to the size of the attraction, i.e., coral reef or submerged shipwreck. Group size for snorkeling and diving with commercial guides in waters in the research natural area shall be a maximum of 6 including the guide.

Loggerhead Key	Maximum total people per day = 24–36. 24 would be the maximum capacity initially to (1) allow the collection of baseline data and the establishment of a monitoring program, and (2) allow the revegetation that is currently underway to be completed. These 24–36 people are included in the maximum of 330 arrivals at Garden Key. Of these 24 visitors, a maximum of 12 shall be from commercial use authorizations or concession tours, and a maximum of 12 shall be from private boats. More private boats might be allowed if the CUA or concession allotment is not filled; however, the concession/CUA allotment would not be adjusted based upon private boat capacity. Uses shall be directed as follows: In the historic/adaptive use zone, uses such as picnicking, hiking, and exploring would be unrestricted, except there would be no access to buildings unless the superintendent determines access is safe and appropriate to the purposes of the park Access to all beach/tidal areas would be restricted to the area between the low water line and where the dune grasses begin. There would be no access to shallow (6 feet or less) near shore coral reefs. Swimming would not be allowed from Loggerhead Key beaches. Access into the upland areas within the research natural area would be allowed only on a designated trail on the northeast end of the key that would follow the existing hardened path; the trail would go to cultural sites and to the beach.

MONITORING TO MAINTAIN VISITOR EXPERIENCE AND RESOURCE PROTECTION

To ensure that the key desired conditions (described below) remain as prescribed, monitoring would take place to evaluate resource conditions and visitor experiences. (Not all conditions listed above are key conditions.) Work would be needed following this general management plan amendment to refine the indicators, standards, and monitoring methods described below.

Anchorages

Where the use of anchors would be allowed, the damage to coral reef structures or to sea grass beds would be measured. Surveys would be conducted at specified times and places to determine the frequency of inappropriate anchoring. Park staff would contact owners of anchored boats to inform them of the monitoring activity and then use a glass window tube or snorkel/dive gear to investigate the location of the boat's anchor. If it were on coral or sea grass, measurements would be taken to determine the area of disturbance and the extent of resource damage. Indicators would be the number of incidents of improper anchorage and area of disturbance.

Submerged Cultural Resources

- Damage to exposed resources — Rapid "swim-by" surveys would be conducted

to look for recent damage attributable to visitor use. A condition class rating would be developed that combines number of occurrences with severity and significance of damage. Surveys would be conducted several times/year on the most popular dive wrecks and less frequently on less popular wrecks.

- Loss of artifacts — Photography would be used to document the theft of artifacts. A condition class rating would be developed that combines the number of missing artifacts with their significance. Surveys would be completed annually for popular dive wrecks and less frequently on less popular wrecks.

Coral Reefs

- Damage to coral structures and other attached organisms — Anonymous snorkeling/diving observation surveys would be conducted by NPS staff or researchers at specific times and places with both unaffiliated and commercially led visitor groups. Visitor contact with reef organisms would be visually monitored, and the number of incidents per observational time would be recorded, e.g., three contact incidents/ 20-minute survey period. Contacts would be categorized by type of contact (i.e., standing up, fins, hands), whether contact is intentional, whether damage was done, severity of damage, etc.

- Theft of coral reef organisms — Observation surveys would be conducted as described above or at greater distances with binoculars to see if organisms were brought into boats.

- Broken corals and sea fans — A limited number of line transects could be surveyed on an annual basis to examine the number of broken corals and sea fans. This data would need to be compared to an unused control area that is environmentally similar (possibly difficult to find). The difference between measures would be attributed to visitor use.

Visitor Experience

The density of use occurring at use sites would measure the quality of the visitor's experience. Observational surveys would be conducted at specific times and places to determine whether or not the desired conditions are being met.

PARKWIDE MANAGEMENT ACTIONS

This section describes actions or the lack of actions that would be taken, in addition to the servicewide policies and mandates previously described in this document, to fulfill the park's mission goals regardless of which alternative is chosen.

TABLE 2. PARKWIDE MANAGEMENT ACTIONS, ALL ALTERNATIVES

Parkwide Management Actions, All Alternatives	
Visitor Experience	**Visitor Facilities and Services.** Visitor travel to the park would continue to be by commercial ferry or plane or by private boat. Most visitors would be day users, and because of time constraints, Fort Jefferson would likely remain the primary destination site. In addition to touring the fort, other recreational opportunities would include snorkeling, scuba diving, boating, swimming, camping, and wildlife viewing. (Fishing opportunities would vary between alternatives, but under all alternatives recreational fishing would be allowed at Garden Key.) Because of physical and operational constraints, and to maintain the near-pristine resources and sense of remoteness important to fulfilling the purpose of the park, visitor services and facilities would remain much as they are today. Visitors would need to be self-sufficient and provide their own food, water, equipment, and other supplies. An interagency visitor center would be established in Key West under all alternatives (a visitor contact facility in Key West was called for in the 1983 *General Management Plan*). The agencies participating would be the Florida Keys National Marine Sanctuary, the National Park Service, and the U.S. Fish and Wildlife Service. The center would have general park information and interactive exhibits and give potential visitors pre-visit information to make their experience more meaningful and help them be better prepared for the trip, including transportation information. The center could also serve as an alternative to visiting the park for those who cannot visit the park. Information and exhibits about the Florida Keys National Marine Sanctuary and national wildlife refuges in the Florida Keys would be provided, as well as help for visitors to plan ways to visit and enjoy these areas. The three agencies would share staffing responsibilities and would jointly plan and coordinate the stories to be told and the exhibits and programs to tell them. The visitor center staff would also coordinate information dissemination to the Chamber of Commence, the Internet, and other travel information sources. The visitor center at Fort Jefferson would be expanded into additional casemates to support recommendations of a new interpretive plan that would be developed after adoption of this management plan. The new plan will expand interpretation to address all the management objectives in the park's enabling legislation. Adaptation of historic buildings or expansion into the historic landscape would be limited to modifications necessary for docking boats, providing accommodations for seaplanes. Snorkeling around the outside of the moat wall might be accommodated by installing dive buoys and a ladder to access the moat wall at interim locations. The Loggerhead Key facilities, including the dock, would remain for administrative and research use; they are not for general visitor use and that situation would continue in all alternatives due to safety and capacity restraints on the dock and staff on the island.

Parkwide Management Actions, All Alternatives	
Visitor Experience (cont.)	**Interpretive Direction and Topics for Dry Tortugas National Park** Opportunities for visitors to learn vary by alternative, but all alternatives would emphasize understanding and appreciating the resources of the park and the appropriate use of those resources. Because of the park's remote location and sensitive resources — natural and cultural — the interpretive program would be high profile and directed toward orientation, education, and protection of resources. All visitors to the park must have access to resource interpretation and orientation before arrival as well as on site. Studies of visitor behavior in other marine and coral reef parks has shown very positive results when visitors are given information about the effects of their behavior on park resources. After receiving information and education, visitors significantly reduce detrimental behavior such as swimming near coral in shallow water, touching or brushing against coral, or anchoring on coral. To this end, every interpretive opportunity outside the park's boundaries would be identified and developed to the fullest extent. Dry Tortugas National Park is a one-of-a kind resource. It offers unique opportunities for cognitive, affective, sensory, and physical experiences to visitors. As such, visitors to Dry Tortugas National Park would be able to: • Experience the essence of the park's wild and remote nature — from wildlife, coral reefs, and scenery to wonder, quiet, solitude, and personal inspiration. • Hear the echoes of the past through the stories the park preserves. • Develop a sense of appreciation and responsibility that will result in actions to protect, support, and promote the park and the national park system (e.g., politically, financially, and through volunteer activities). • Successfully plan their visits and orient themselves to facilities, attractions, features, and experiences. • Behave in ways that do not hurt themselves or park resources. • Enjoy themselves, have memorable experiences, and go home feeling enriched. • Understand the park's significance and the park's primary interpretive themes. • Encounter programs, media, and facilities that enhance their educational experiences. • Learn about the fragility of the park and threats to its resources. The following primary interpretive topics for the park derive directly from the establishing legislation and fall into two major categories: the interpretation of (1) **park resources** and (2) **park management** activities. The marrying of these two elements leads directly to both protection of and appreciation for the park. (1) park resources • the subtropical marine ecosystem • the pristine natural island environment • the human history and strategic locale of Dry Tortugas • the submerged cultural resources (2) park management activities • managing vegetative and wildlife populations • appropriate public use and enjoyment • park research activities Each of these interpretive topics has many subtopics that may be used to help visitors understand and appreciate the sensitive nature of park resources.

Parkwide Management Actions, All Alternatives	
Visitor Experience (cont.)	**Interpretive Strategies** Opportunities to reach visitors ashore and onsite would be numerous. Opportunities for education/interpretation/information on topics such as resource protection would exist at Key West, Fort Jefferson, and en route to the park by commercial operator. The interagency visitor center at Key West would be a logical place for pre-visit orientation for visitors arriving via concession-operated ferries. The development of a short video, for all to see before their visit, could be a cost-effective way to communicate critical issues and ways to interact with the park's sensitive resources. Seaplane operators could also use this video. Through publicity, all visitors planning to visit the park, including those via private boat, could be encouraged to go to the visitor center. The park staff would engage in additional planning to improve visitor information, facilities, and outreach programs. Visitors would be educated through a combination of nonpersonal interpretive services (exhibits, waysides, radio and television media, and publications) and personal services (daily ranger-led interpretive programs, visitor center staffing, and law enforcement monitoring. Other forms of outreach ashore include local Chambers of Commerce, marina operators, and the Internet. Printed messages could be included in concessions sales brochures. Currently, the National Park Service partners with the National Oceanic and Atmospheric Administration in developing a series of television shows, some of which could address resources preservation and sensitive use of park resources. The expansion of Everglades National Park's environmental education program to the southern keys, and other partnerships, could further disseminate park messages. As commercial contracts are developed, provisions for training concession interpretive staff by the National Park Service could be required. Even requirements to place an NPS ranger on each ferry could be considered. Once in the park, the interpretive message could effectively be conveyed through the expansion of the visitor center in Fort Jefferson. Other nonpersonal interpretive media could include exhibits on the Garden Key dock, the development of a film, the installation of self-guided trails (surface and submerged), audio tours, publications, etc. Cooperating association sales would remain a critical means to communicate important messages and offer more in-depth interpretive materials, such as books, trail guides, dive cards, etc. Personal services interpretation could be offered by the National Park Service, concessioners, volunteers, and special-interest groups. A comprehensive, integrated strategy to develop and implement interpretive programs would be an effective tool to communicating the interpretive themes. The goal, while preserving the park, would remain to allow visitors to experience the significant natural and cultural resources of Dry Tortugas National Park on their own terms.

Parkwide Management Actions, All Alternatives	
Resource Protection	**Natural Resources** The establishment of an ecological reserve adjacent to the park by the Florida Keys National Marine Sanctuary would be supported under all alternatives. The night sky in this remote location would remain unpolluted by man-made light sources as much as possible. This rare opportunity to see the pristine night sky would be protected under all alternatives. The natural soundscape — that is the sounds of nature absent man-made intrusions on them — would be protected under all alternatives. Management will include the following actions: ▪ Identify intruding noise sources. ▪ Identify and implement mitigation or prevention measures. ▪ Educate persons responsible for intrusive noises to change their behavior or practices. **Cultural Resources** Historic preservation/adaptive use zone areas would remain in effect for Garden Key (Fort Jefferson) and the central portion of Loggerhead Key. **Research** Supplemental support for research being done on the Dry Tortugas region, such as storage, would be established in Key West. This might be in conjunction with the staff office space mentioned in the "Park Operations" section. At a minimum this support would include boat dock space, offices, temporary housing, a laboratory, compressors for dive tanks, and storage space. It would constitute an offsite station for work within the sanctuary and the park. This support and facilities would not accommodate full-time permanent staff. Some park structures and places would be adaptively used as a modest support base for research in the park and the Florida Keys National Marine Sanctuary. Facility needs beyond what is available in existing park structures would be self-contained and would not place any burden on park resources or facilities. Such facilities might include a floating facility temporarily located within the park boundaries.
Park Operations and Facilities	Current patrol boats and the *Activa* (the NPS supply boat that makes weekly trips to the park from Key West) would continue their operations under all alternatives. Existing Key West dock space for the *Activa* would be maintained under all alternatives. The pier and storage structure across from the *Activa* dock space would be the subject of an agreement between the National Park Service and the Coast Guard to allow the National Park Service to use the area for storage. Besides space for storage, there is also a need for office space in this general vicinity. In all alternatives, office space would be sought. Offices might be with the sanctuary and the U.S. Fish and Wildlife Service. Decisions about this space should consider the interagency visitor facility (mentioned under "Visitor Experience" above) as one possible solution. **Park Boundary and Mooring System** The park boundary is marked with buoys, and there are other navigational aids throughout the park. (Some alternatives include additions to the mooring system to delineate zone boundaries and use sites and protect resources.) **Boundary Adjustments** Because the park boundary is adequate to support park purposes, no boundary adjustments are proposed in any of the alternatives.

Parkwide Management Actions, All Alternatives	
Park Operations and Facilities (cont.)	**Housing** Existing permanent and temporary employee housing within the casemates would be upgraded with energy-efficient inserts that do not further degrade the historic walls of the casemates. Additional conversions or modifications to the historic structure for housing or administrative uses would be limited to the 2 1/2" fronts" or sides of the fort that are already being used for that purpose. As staff increases in number, which could occur to varying degrees in any alternative, a new strategy for some of the personnel could be adopted. It could rely on permanent housing ashore, with personnel rotating to the park into shared temporary housing for tours of duty. Researchers and other staff from agencies who are doing research that supports the park purpose could be accommodated within the modified casemates for the term of their needs as space permits. No other staff, e.g., concessioner staff, would be housed within the park. **Visitor Center** The visitor center would be expanded. **Utilities** Utility capacities would not be expanded unless technological improvements make such expansion feasible. Renewable energy sources such as photo voltaic and geothermal would be pursued to replace petroleum for water heating and air conditioning. The reliance on petroleum for electric generation could be reduced further by managing load distributions during the day and meeting electric demand at night with battery storage. Renewable energy should be pursued to replace diesel electric generation on Loggerhead Key and reduce fossil fuel consumption on Garden Key. **Communication Systems at the Park** Management would continue to explore new technologies to improve communications, with an emphasis on improving visitor information and visitor safety. **Necessary and Appropriate Commercial Activities** Without commercial transportation most visitors would not be able to access or experience Dry Tortugas National Park. Because of the logistics and costs involved it is the most effective and efficient means for the average national park visitor to access the park. Without commercial transportation the park mission goals of educating the public and offering a quality recreational experience could not be achieved. Commercial transportation also reduces the number of vessels traveling to and within the park and the associated resource impacts, much the same as mass transit systems in other parks. For these reasons commercial transportation to the park is a necessary activity and is included in each alternative. However, there is a need to manage this activity within the capacity of the resources to withstand use.

ALTERNATIVE A: CONTINUE CURRENT MANAGEMENT (NO ACTION)

ALTERNATIVE A =				
The servicewide mandates and policies	+	The parkwide management actions	+	The actions described below that support the concept for this particular alternative

OVERALL CONCEPT

This alternative describes a continuation of current management and trends (see Alternative A map). Note that the management zones defined on this map are from the 1983 management plan and are therefore different than the management zones described for alternatives B–E. If the no-action alternative were selected, the park staff would try to accommodate visitor use while also protecting park resources according to current policy and legal requirements. The open access policy for visitation would continue within the constraints of current funding and staffing levels. Visitation would be expected to rise as commercial use authorization holders use larger vessels (up to 100 passengers) and private boaters increase in number. Increases would be limited or controlled only on an ad hoc basis in response to degrading resource conditions, crowding, or facility limitations.

MANAGEMENT ZONING

As shown on the Alternative A map, the park would continue to be divided into five management zones as presented in the 1983 management plan. The protected natural area designation would remain for Bush, Long, East, and Hospital Keys to strictly protect and perpetuate significant natural resource values (i.e., bird and turtle nesting habitat, and island vegetation). The natural environment designation would continue to apply to all park waters (except submerged land below Pulaski Light), Middle Key, and the northern and southern portions of Loggerhead Key. Natural resources conservation would continue to be emphasized within this zone, although appropriate recreational activities such as diving, sportfishing, and picnicking would continue.

The historic preservation/adaptive use zone would encompass Garden Key (the site of Fort Jefferson). Provided that significant historical values were not compromised, adaptive use of historic structures and areas in and around the fort would be permitted for visitor use and administrative purposes. The joint natural/historic zoning would remain in effect for all underwater areas (submerged lands) in the park to manage and protect the park's significant submerged cultural resources (shipwrecks and other underwater archeological resources) and aquatic natural resources. The central portion of Loggerhead Key and Pulaski Light would continue to be designated special use zones to accommodate U.S. Coast Guard operations. The map should be read in conjunction with the text because the map does not show all details that are explained above.

VISITOR EXPERIENCE

Under this alternative, commercial operators would continue to provide transportation to the park, but there would be very limited intrapark transportation. Most of these intrapark opportunities would be offered through guide services obtained offsite, e.g., in Key West. Consequently tour visitors would participate primarily in activities that occur at Fort Jefferson on Garden Key. Because of travel restraints, there would be a low level

Alternative A

map

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of challenge and adventure and little chance for quiet and solitude.

There would be no restrictions on private boaters' destinations or activities throughout the park except in special protection zone areas. Anchors could continue to be used throughout the park during the day, and at night all boats within park boundaries must be anchored or moored within the historic preservation/adaptive use zone around Garden Key. Use of the dock on Loggerhead would continue to be prohibited, however anchoring and swimming ashore would be permitted. Private boaters could expect to find challenge, adventure, and quiet and solitude. Visitors with a private boat or a guide hired offsite would have access to the offshore coral reefs, shipwrecks, and keys other than Garden Key.

Visitors could choose from a variety of unstructured or self-initiated activities, depending on what equipment they rent or bring, with few limitations on the type of allowed activities. Although visitors would expect a moderate to high level of staff and social encounters in historic preservation/ adaptive use zone areas such as Garden Key, they would still experience a feeling of remoteness and peace in most of the park. Recreational fishing with the necessary state license would be allowed throughout the park under this alternative.

Fort Jefferson would remain the focal point for visitor orientation. Interpretation of the fort and marine resources would continue, but ranger-guided tours would remain limited. There would be little opportunity for private boaters to receive information and orientation other than at the fort, but tour visitors would have additional opportunities through commercial operators at Key West and en route to Garden Key.

RESOURCE PROTECTION

Cultural and natural resources would continue to be managed as time and funding allow according to the park's resources management plan. Resources would be managed to allow natural processes to predominate, with management actions limited to those measures needed to protect resources or ensure visitor safety.

With few restrictions on visitor travel and activities, tolerance for impacts on marine, terrestrial, or submerged resources would remain moderate. Through random contacts, most visitors would receive a moderate level of education regarding resource protection. Opportunities to educate private boaters on resource protection issues would remain limited.

Boater education programs would urge caution in anchoring around coral reefs and sea grass beds to avoid damaging these resources. However, the level of patrols for monitoring and providing guidance for visitor activities would continue to be low, and the potential for impacts on resources from anchoring would remain high. Surveys and monitoring of resources would continue to be ad hoc, as time and funding permit. With no approved research plan in place, the level of research accomplished would remain low to moderate.

Limited monitoring and research would continue to be conducted primarily for water analysis related to wastewater facilities and some fisheries and cultural resources. However, this monitoring would not be accomplished within a well-integrated framework of goals.

COMMERCIAL SERVICES

All commercial services would continue to be authorized by commercial use authorizations. This would include transportation to and within the park, fishing charters, snorkeling, scuba diving, photography, and wildlife viewing. Current commercial use authorizations have conditions included in the permit to accommodate carrying capacities in the park, protect resources, and

enhance visitor experience. These conditions would continue at a minimum and be increased if warranted. One condition provides commercial operators with interpretive materials they can use on a voluntary basis with their clients. Another limits the number of passengers brought to the fort by the larger vessels to 150 passengers as a combined total. Commercial use authorizations would continue to be issued by the concessions staff at Everglades National Park and monitored by the staff at Dry Tortugas. Given the small staff at the park and their resource protection and visitor safety priorities, monitoring these authorizations would receive less than ideal attention.

PARK OPERATIONS AND FACILITIES

NPS operations throughout the park would be unchanged (see the "Affected Environment" section). The main concerns would continue to be that the park is understaffed and unable to adequately protect resources because of increasing visitation. Some facilities are already exceeding their capacity during peak visitation periods. Most management operations would be for protecting resources, preventing or minimizing impacts from visitor use, and restoring disturbed areas. In the historic preservation/adaptive use zone, operations would continue to focus on providing a quality visitor experience.

Because activities by visitors with access to intrapark transportation would continue to be largely unrestricted, patrols to monitor prohibited activities such as collection of corals and artifacts from shipwrecks would continue to be necessary and labor intensive. Regular patrols to ensure visitor safety and offer assistance would continue.

A high level of NPS commitment would continue to be needed to educate and inform visitors about the park's history, its resources, and the protection of those resources. However, staffing likely would remain too low to accomplish these tasks adequately. With few facilities to maintain, such as mooring buoys, the NPS maintenance effort would remain at a low level and focus primarily on the dock, campground, and fort.

ALTERNATIVE B

ALTERNATIVE B =				
The servicewide mandates and policies	+	The parkwide management actions	+	The actions described below that support the concept for this particular alternative

OVERALL CONCEPT

The concept of alternative B provides for greater protection of natural and cultural resources than under alternative A (see Alternative B map). The types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences. The total numbers of visitors transported to the park by commercial operators would be consistent with the aggregated carrying capacity targets of individual visitor destinations (see table 1). Where critical resource degradation was observed, the park staff would direct intensive protection and/or remediation measures to abate impacts. Visitors would be free to travel and experience a variety of recreational opportunities throughout much of the park provided that appropriate conditions were maintained.

MANAGEMENT ZONING

As shown on the Alternative B map, the majority of the park would be designated a natural/cultural zone. The historic preservation/adaptive use zone would be applied to Garden Key (Fort Jefferson), and would extend outwards for a radius of 1 nautical mile to encompass surrounding waters, including those around Bush and Long Keys. The central portion of Loggerhead Key, where the historic lighthouse and adjacent buildings are located, would also be designated historic preservation/ adaptive use. The remainder of Loggerhead Key, Bush, Middle and East Keys would be zoned natural/cultural, except during critical bird and sea turtle nesting/hatching seasons when special protection zoning would be selectively applied and public access would be prohibited. Hospital and Long Keys, and a rare elkhorn coral *(Acropora palmata)* community near the Long Key/Bush Key tidal channel, would be designated special protection zones year-round. The map should be read in conjunction with the text because the map does not show all details that are explained above.

VISITOR EXPERIENCE

Access to the park would be provided by commercial aircraft and by large and small vessels (holding commercial use authorizations) and private boats. Visitors would be able to travel freely throughout the park; however, visitors who arrive via commercial tours would have very limited opportunities to travel to sites other than Garden Key. The entire park, except in special protection zone areas, would be open to private boaters to dive and snorkel and for recreational fishing.

The number of visitors arriving at the park on large commercial vessels would be limited. The total number of visitors at one time on Garden Key or any other destination within the park has been tentatively determined by the desired resource condition and visitor experience for each site (see table 1).

Anchoring by private boaters and commercial carriers would be allowed. Although anchoring would be allowed, mooring buoys would be used to direct visitors to selected sites. However, overnight anchoring would be restricted to an area within the historic

preservation/adaptive use zone around Garden Key.

Various and mostly unstructured self-guided or self-initiated experiences (e.g., snorkeling, diving, sailing) would be available to private boaters and could offer a high level of adventure and challenge. Visitors with a private boat or a guide hired offsite would have access to the offshore coral reefs, shipwrecks, and keys other than Garden Key. Because guided tours would be very limited, tour visitors would enjoy those activities available at Garden Key, such as the fort tour, snorkeling, walking the moat, and swimming, which would require fewer skills and offer less adventure. However, these visitors could experience the sense of remoteness and peace that the location of Garden Key in the Straits of Florida provides even though many visitors would be present at one time. True quiet and solitude would likely be experienced only by the private boaters. Their opportunities for such peace would be high.

In this alternative, visitors would be moderately to highly likely to encounter staff or other visitors, especially on Garden Key.

Opportunities for visitors arriving by private boats to learn would be moderate due to limited interpretive media and tours. Visitors arriving by commercial transportation would have an enhanced opportunity for education/interpretation/information as part of their tour package at Key West, in transit, at the fort, and at any other tour destination.

Recreational fishing with the required state license would remain unrestricted under this alternative.

RESOURCE PROTECTION

Although anchoring would be permitted, visitors would be directed to anchor in areas where there would be little risk for damaging the underwater resources.

In this alternative there would be low tolerance for impacts from recreational use.

Systematic, scheduled monitoring would document changes in species and communities to provide direction for resource management and research. Monitoring and research would be conducted on impacts on resources from visitor use, such as the affect on coral reefs from anchoring or concentrating visitor use with mooring buoys. Other monitoring actions would include determining population and biodiversity of marine and terrestrial species.

Submerged Cultural Resource Strategy

The NPS Submerged Resources Center has undertaken a comprehensive archeological survey and inventory of submerged sites within the park. The project began in 1992 with the compilation and assessment of natural and cultural resource data that provided the foundation for development of the survey research design. GIS (geographic information system) computer applications were incorporated into the survey methodology. The project is a model for a wide-area survey of submerged NPS areas.

Using remote sensing magnetometer methods, surveys have been completed for more than 95% of the park's waters at depths of less than 30 feet. The technique was designed to detect ferrous metal objects, indicating potential site locations. Survey coverage of the entire park waters at all depths will eventually be completed.

A comprehensive and multidisciplinary monitoring program would be implemented to provide both annual site assessments and long-term detailed assessments for selected locations. As needed, more frequent assessments would evaluate reports of diver impacts, conditions following storms, etc. Site research would be conducted in accordance with approved research designs that support park management objectives. Archeological research and investigations would meet

Alternative B

map

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applicable NPS standards and would have minimal site impacts.

The park would also implement measures to enhance site protection. Diving at shipwrecks would be permitted only in approved areas by means of mooring buoys and other methods. Visitors would be directed away from sensitive locations, and remote sensing surveillance systems would assist park patrol efforts to protect significant sites.

COMMERCIAL SERVICES

Commercial use authorizations would authorize all commercial operations for activities determined to be appropriate for Dry Tortugas National Park. All commercial use authorizations would include, but not be limited to, conditions for operations, carrying capacity, resource protection, environmental awareness, interpretation, and visitor safety. Because the carrying capacity of the park for passengers arriving by large commercial vessels is 150, operators of these vessels would share equally in bringing these 150 visitors to the park (e.g., two vessels could each bring 75 visitors, three vessels could each bring 50 visitors).

The conditions for interpretation would include the provision of interpretive materials as in alternative A and personal service training from NPS staff. Training would also be available from NPS staff for resource protection and visitor safety. Participation in this training would not be required but strongly encouraged. Commercial use authorizations would be issued by the concessions staff at Everglades National Park and monitored by the staff at Dry Tortugas National Park. The monitoring of these authorizations would be a higher priority than it is currently, and therefore staff would be dedicated to this activity.

Although not required, commercial vessel operators would be encouraged to provide intrapark transportation and tours to sites throughout the park, subject to the carrying capacity limits identified for the natural/cultural zone. Commercial operators, as well as private boaters, would be required to stay out of closed areas and would be directed to areas thought to be less sensitive by the National Park Service. They would not be assigned any facilities in the park and would be subject to regulations and policies such as use of the NPS dock at Garden Key.

PARK OPERATIONS AND FACILITIES

NPS operations throughout the park would be unchanged (see the "Affected Environment" section). The main concerns include that the park is understaffed and unable to adequately protect resources because of increasing visitation and some facilities are exceeding their capacity during peak visitation periods. Most management operations would be for protecting resources, preventing or minimizing impacts from visitor use, and restoring disturbed areas. In the historic preservation/ adaptive use zone, operations would continue to focus on providing a quality visitor experience.

Because visitors would be permitted to travel freely throughout the park with few restrictions on activities, a high level of patrols would be needed to monitor visitor use especially by private boaters. A high level of NPS commitment would continue to be needed to educate and inform visitors about the park's history, its resources, and the protection of those resources. With few facilities to maintain, the NPS maintenance efforts would remain at a low level and focus primarily on the dock, campground, and fort.

PARK ENTRANCE FEE

A park entrance fee would be instituted to help support the additional costs incurred for managing carrying capacities, visitor safety and enjoyment, resource protection activities, and monitoring. (The authority to charge fees may end; however, the park would charge an entrance fee as long as this authority exists.)

ALTERNATIVE C: PROPOSED ACTION

ALTERNATIVE C =				
The servicewide mandates and policies	+	The parkwide management actions	+	The actions described below that support the concept for this particular alternative

OVERALL CONCEPT

The intent of this alternative is to afford a high level of protection to significant park resources through the selective application of the research natural area zone, instituting a permit system for private boaters, and using commercial services to direct and structure visitor use (see Alternative C map). A wide range of recreational and educational opportunities would be available to visitors provided that appropriate resource conditions were maintained. Visitor experience would be enhanced due to expanded access throughout the park and higher quality resources to enjoy. The goal for the commercial service operations would be to be self-contained, thus reducing the strain on the limited park facilities. The types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences. The total numbers of visitors transported to the park by commercial operators would be consistent with the aggregated carrying capacity targets of individual visitor destinations (see table 1).

The research natural area zone in this alternative would be compatible with the ecological reserve that is proposed by the National Oceanic and Atmospheric Administration for the Florida Keys National Marine Sanctuary, having the same goals and subsequent constraints on fishing. When implemented, the Tortugas Ecological Reserve (which includes the park's 46-square-nautical-mile research natural area and the about 151-square-nautical-mile ecological reserve established by the Florida Keys National Marine Sanctuary) would be the third largest no-take marine reserve in the world (according to the National Fisheries Conservation Center).

See appendix E for the rationale for selecting this alternative as the National Park Service's proposed action.

MANAGEMENT ZONING

As shown on the Alternative C map, the majority of the park would be about equally divided between a research natural area on the west, and a natural/cultural zone on the east and south. The boundary dividing these two zones would align with a longitude of 82°51'W, extending from the northern park boundary to a latitude of 24°36'N (this latitude would mark the southern boundary of the research natural area).

The historic preservation/adaptive use zone would be applied to Garden Key (Fort Jefferson), and would extend outwards for a radius of 1 nautical mile to encompass surrounding waters, including those around Bush and Long Keys. The central portion of Loggerhead Key, where the historic lighthouse and adjacent buildings are located, would also be designated historic preservation/adaptive use. The remainder of Loggerhead Key would be zoned research natural area, except during critical bird and sea turtle nesting/hatching seasons when special protection zoning would be selectively applied and public access would be prohibited. Bush, Middle, and East Keys would be zoned natural/cultural. Bush and East Keys would also be designated as special protection zones during the critical

Alternative C

map

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sea turtle and bird nesting/hatching season. Hospital and Long Keys, and a rare elkhorn coral *(Acropora palmata)* community near the Long Key/Bush Key tidal channel, would be designated special protection zones year-round. The map should be read in conjunction with the text because the map does not show all details that are explained above.

VISITOR EXPERIENCE

Under this alternative, commercial operators would continue to provide transportation to the park, but the role of the commercial operators would be significantly expanded for day use activities. This expanded role would be to provide intrapark transportation and guide services. A limited number of overnight/multiday tours would be conducted by operators holding a commercial use authorization.

The distribution of visitors to key destinations throughout the park would be managed largely through these commercial tours. Visitors would be required to use commercial tours or private boats (by permit) to visit and enjoy attractions in the research natural area zone. For recreational activities inside the park, including the research natural area, all private boaters would be required to obtain a permit, pay a park entrance fee at Garden Key, learn about the protection of park features, and adhere to established maximum numbers of visitors to individual sites and attractions (see table 1). The tour providers and private boaters would be required to moor at buoys in the research natural area zone. Neither anchoring nor recreational fishing would be allowed in the research natural area zone, but these activities would be allowed in the remaining zones. All private and commercial vessels must overnight in the historic preservation/ adaptive use zone around Garden Key (see Alternative C map). A reservation system would be instituted for the campground in the future.

Although the experiences for tour visitors in this alternative would be highly structured, the opportunities would be more diverse than in the previous alternatives. In the previous alternatives, visitors with a private boat or a guide hired offsite would have access to the offshore coral reefs, shipwrecks, and keys other than Garden Key. Under this alternative, all visitors to the park would have the opportunity to visit remote park attractions. Activities would include snorkeling and diving at selected coral reefs and shipwrecks, swimming, and bird watching, in addition to the activities available at Garden Key.

Opportunities for challenge and adventure on tours throughout the park would be high. Likely encounters with other visitors who are not part of one's individual tour would be low, especially in the research natural area. The presence of commercial staff, especially in the research natural area, would be high.

It is anticipated that this would be the first time many of these visitors would have the opportunity to engage in activities in a near-pristine environment like the Dry Tortugas. All of these visitors would encounter commercial staff, but the potential to encounter NPS staff or other groups would be low to moderate in the entire park except in the historic preservation /adaptive use zone near the fort. Although individuals would be in small groups, the opportunity level for the group to experience quiet and solitude would be high.

Opportunities for all visitors to learn more about the Dry Tortugas and its environs would be very high. Private boaters would have contact with NPS staff through the permit process, thus increasing their opportunities to gain knowledge and information about the park. Visitors arriving on the commercial ferries for day use, or with commercial guides for overnight/ multiday use, would have a high level of opportunity to gain knowledge, information, and interpretation from trained commercial tour staff at

the docking facility in Key West, en route to the park, and on tours. All visitors would have an orientation to the purpose and significance of the research natural area zone from NPS or commercial tour staff. All visitors would have access to information and interpretation at Fort Jefferson through media such as wayside exhibits, bulletin boards, visitor center exhibits, videos, and publications.

The zoning and visitor use management schemes in this alternative would strive to create a high-quality experience for visitors through the sustained integrity of the natural and cultural resources, the lack of intrusions and alterations to the natural landscape and seascape, the even dispersal of visitors, the interpretation methods used, and the enhanced knowledge gained from research. Visitors would also receive the benefit of new information coming to light as a result of research activities of park scientists and investigators.

RESOURCE PROTECTION

There would be very low tolerance for impacts on terrestrial, marine, or submerged cultural resources due to visitor use in the research natural area zone portion of the park. There would be a low tolerance for impacts from visitor use on these resources in the natural/cultural zone. There would be low to moderate tolerance for impacts on these resources from visitor use in the historic preservation/adaptive use zone.

To protect marine resources, anchoring would be permitted only in the natural/ cultural and historic preservation/adaptive use zones, and the use of mooring buoys would be required in research natural area zones to direct visitors to selected sites. The use of mooring buoys as a resource protection management tool might also be required if anchoring restrictions are warranted.

An aggressive visitor education program would focus on park resources and history and resource protection. Education and interpretation would be incorporated into tour activities. The private boat permit system would include a high level of education in resource protection. All visitors would receive education on the purpose and significance of the research natural area zone and how the concept is being used internationally.

Commercial tour users and private boaters in the research natural area would be required to use mooring buoys. Private boat operators would be directed to less sensitive areas when possible, and patrols would monitor for inappropriate activities. Commercial tours in the other zones would be managed similarly to management in the research natural area zone.

No manipulation of resources by the Park Service, other agencies, researchers authorized by the park, or visitors would be allowed in the research natural area zone except for restoration. Minor manipulation of resources in the other zones would be allowed, but only for visitor safety or resource protection reasons. Consequently, the potential for biodiversity and increased populations of marine life would be high in the research natural area zone and moderate in the remainder of the park.

All natural and cultural resources in the park would be surveyed, and a regular monitoring program would be implemented, regardless of zone. A high level of nonmanipulative research would occur in the research natural area, and a moderate to high level would occur in the remainder of the park.

Systematic, scheduled monitoring would document changes in species and communities to provide direction for resource management and research. Monitoring and research would be conducted on impacts on resources from visitor use, such as the affect on coral reefs from anchoring or concentrating visitor use with mooring buoys.

Other monitoring actions would include determining population and biodiversity of marine and terrestrial species.

The National Park Service would work with the National Oceanic and Atmospheric Administration and the state of Florida to continue to study the importance of the Tortugas area to the fisheries of the region and the hemisphere.

Submerged Cultural Resource Strategy

The NPS Submerged Resources Center has undertaken a comprehensive archeological survey and inventory of submerged sites within the park. The project began in 1992 with the compilation and assessment of natural and cultural resource data that provided the foundation for development of the survey research design. The project is a model for a wide-area survey of submerged NPS areas.

Using remote sensing magnetometer methods, surveys have been completed for more than 95% of the park's waters at depths of less than 30 feet. The technique was designed to detect ferrous metal objects, indicating potential site locations. Survey coverage of the entire park waters at all depths will eventually be completed (see the "Affected Environment" section for survey results).

A comprehensive and multidisciplinary monitoring program would be implemented to provide both random sample annual site assessments and long-term detailed assessments for selected locations. As needed, more frequent assessments would evaluate reports of diver impacts, conditions following storms, etc. Site research would be conducted in accordance with approved research designs that support park management objectives. Archeological research and investigations would meet applicable NPS standards and would have minimal site impacts.

The park would also implement measures to enhance site protection. Diving would be permitted only in approved areas by means of mooring buoys or anchoring where permitted. Visitors would be directed away from sensitive site locations, and remote sensing surveillance systems would assist park patrol efforts to protect significant sites.

COMMERCIAL SERVICES

Access to the park for most visitors would be provided through two concession contracts. One contract would be for a single seaplane operator, who would be authorized to carry up to 60 visitors per day. The number of trips would depend on the capacity of the planes being used, but larger capacity planes would be encouraged to reduce the number of takeoffs and landings. Beach tie points would be assigned to the seaplane concessioner, and a section of the beach near the dock would be dedicated to the operation.

The other concession contract would be for a ferry operator who would be authorized to carry up to 150 visitors per day. More than one boat would be used in the operation, and staggered arrival and departure times at the fort would be used as a management tool to maintain carrying capacity numbers and disperse use. The ferry concessioner would be required to provide intrapark transportation and tours. The goal for the ferry/tour concession would be for the operation to be self-contained to not put any additional strain on the limited facilities at the park. This would include transporting all water and waste in and out of the park and providing shelter for visitors. Therefore, a concessioner's vessel would generally be docked and accessible for the duration of their visitors' stay in the park. Because there is limited space at the dock to accommodate this requirement, an additional structure, such as a dock, might be required.

The details of how the tour portion of the concession contract would operate would be determined later during prospectus development and/or during an evaluation period after the award of the contract. In the spirit of being self-contained, the intent is to bring as much of the equipment and vessels required back and forth to the park as possible, although mooring or docking some of the smaller vessels might be considered. Mandatory interpretive and resource protection training and auditing by NPS staff would be required for all concessioner tour staff.

A reservation system for the tours would be an integral part of the operations plan for the concessioner. Tours in the natural/cultural zone would be limited by established site carrying capacities. Tours in the research natural area zone would be managed the same as all other activities in the zone, with site carrying capacities enforced and the use of mooring buoys or other devices required. Group size for snorkeling and diving with commercial guides in the research natural area zone would be limited to six. Because most visitor use would be generated by commercial tours, the concessioner would be allocated 60%–80% of the available sites or a separate mooring system would be established. Authorized tours could include Fort Jefferson, Loggerhead Key, snorkeling, scuba diving, kayaking, glass bottom boat rides, and scenic/wildlife tours. Fort tours would be coordinated with NPS staff and limited to a maximum of 20 to25 visitors. Loggerhead Key tours would be limited to 12 visitors and subject to the use restrictions described on table 1.

The concessioner might be authorized to rent or provide the necessary goods and equipment such as masks, fins, snorkels, diving tanks, compressed air, and kayaks. The concessioner would also be authorized to provide food and beverage service (lunch) similar to what occurs now. The ferry concessioner would also be authorized to sell a limited amount of merchandise that enhances the visitors' experiences, including health and safety-related items. The ferry and air taxi concessioners would have exclusive rights to any day use commercial tours that begin or end within park boundaries.

Other appropriate commercial uses in the park would be authorized by commercial use authorizations (CUAs) or another appropriate concession authorization tool. These other operators would provide overnight/multiday commercial tours. Clients would stay overnight on the vessels. If clients stay in the campground they would be subject to reservations and other use regulations. The number of commercial use authorizations would not exceed 30 or the capacity of the resources to accommodate the use, which would be determined by monitoring. No facilities would be dedicated to these operators. CUA activities would be monitored and could be replaced by one or more concession contracts at a later time.

Sailing excursions would be permitted by commercial use authorizations or another appropriate concession authorization tool with limits of 20 to 25 visitors per trip. A limited number of commercial use authorizations or another appropriate concession authorization tool for bare boat sailing charter "captains" would also be permitted. CUA permits or another appropriate concession authorization tool for guided fishing charters in six-pack boats for fishing in the natural/cultural zone only would be subject to specific regulations to protect fisheries resources as warranted. No CUA permits would be issued for guided fishing charter boats in excess of six passengers per vessel. CUA permits would be issued to six-pack boat operators for multiday diving trips. CUA permits would be issued to conduct wildlife tours, including bird watching, provided the tours begin and end outside of the park boundary. CUA permit holders would be subject to established carrying capacity restrictions for the use of sites and areas within the park (see table 1).

The cooperating association would sell educational and interpretive merchandise related to the interpretive themes of the park in accordance with their cooperative agreement.

PARK OPERATIONS AND FACILITIES

To afford the high level of resource protection proposed in this alternative, a moderate to high amount of NPS patrolling and monitoring would occur in the natural/ cultural zone. A moderate to high level of patrolling and monitoring of visitor use would occur in the research natural area zone due to the permit and commercial tour operations proposed. However, private boats would continue to be present in the research natural area zone. To conduct/manage research and survey/ monitor resources, NPS staff would expend a moderate to high amount of effort.

Resource protection and interpretive training of all commercial operators would be required, calling for a moderate to high amount of effort by NPS staff. All private boaters obtaining permits would receive education in resource protection, which would require a moderate to high amount of effort by NPS staff. NPS staff would conduct most tours of the fort, although trained commercial staff would conduct some. Visitor information would be available at a new contact station in Key West, requiring NPS staff commitment.

NPS staff would maintain most of the facilities in the park, although facilities assigned to concessioners would have facility maintenance included in their contracts.

A reservation system would be established for the campground on Garden Key to ensure that visitor expectations were met.

PARK ENTRANCE FEE

A park entrance fee would be instituted to help support the additional costs incurred for managing carrying capacities, visitor safety and enjoyment, resource protection activities, and monitoring. (The authority to charge fees may end; however, the park would charge an entrance fee as long as this authority exists.)

ALTERNATIVE D

ALTERNATIVE D =				
The servicewide mandates and policies	+	The parkwide management actions	+	The actions described below that support the concept for this particular alternative

Alternative D is the same as alternative C except that (1) the research natural area zone boundaries would be slightly different (see Alternative D map) and align with the Florida Keys National Marine Sanctuary's preferred alternative for establishing ecological reserves in the Tortugas area, and (2) private boaters would not be allowed to anchor or tie up to a mooring buoy for diving, snorkeling, etc. in the research natural area (however, private boaters would be allowed to transit through the research natural area).

The research natural area zone in this alternative would be compatible with the ecological reserve that is proposed by the National Oceanic and Atmospheric Administration for the Florida Keys National Marine Sanctuary, having the same goals and subsequent constraints on fishing.

OVERALL CONCEPT

The intent of this alternative is to afford a high level of protection to significant park resources through the selective application of the research natural area zone, instituting a permit system, and using commercial services to direct and structure visitor use. The types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences. The total numbers of visitors transported to the park by commercial operators would be consistent with the aggregated carrying capacity targets of individual visitor destinations (see table1). Outside the research natural area zone, a wide range of recreational opportunities would be available to visitors provided that appropriate resource conditions were maintained. Visitor experience would be enhanced due to expanded opportunities throughout the park and higher quality resources to enjoy. Commercial service operators would also provide visitor comfort facilities on board, reducing the strain on the limited park facilities.

MANAGEMENT ZONING

As shown on the Alternative D map, a large part of the park would be zoned a research natural area. The eastern boundary of the research natural area would align with a longitude of 82°48'W, and the southern boundary of the zone would align with a latitude of 24°39'N. Waters to the east and south of the research natural area would be zoned natural/cultural.

The historic preservation/adaptive use zone would be applied to Garden Key (Fort Jefferson), and would extend outwards for a radius of 1 nautical mile to encompass surrounding waters, including those around Bush and Long Keys. The central portion of Loggerhead Key, where the historic lighthouse and adjacent buildings are located, would also be designated historic preservation/adaptive use. The remainder of Loggerhead Key, Bush, Middle and East Keys would be zoned natural/cultural, except during critical bird and sea turtle nesting/hatching seasons when special protection zoning would be selectively applied and public access would be prohibited. Hospital and Long Keys, and a rare elkhorn coral *(Acropora palmata)* community near the Long Key/Bush Key

Alternative D

map

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tidal channel, would be designated special protection zones year-round. The map should be read in conjunction with the text because the map does not show all details that are explained above.

VISITOR EXPERIENCE

Under this alternative, commercial operators would continue to provide transportation to the park, but the role of the commercial operators would be significantly expanded for day use activities. This expanded role would be to provide intrapark transportation and guide services. Overnight/multiday commercial tours would be conducted exclusively by CUA operators who begin and end tours in Key West or other offsite locations.

The distribution of visitors to key destinations throughout the park would be managed largely through these commercial tours. Visitors would be required to use commercial tours to visit and enjoy attractions in the research natural area zone. The tour providers would be required to moor at buoys in the research natural area zone. Neither anchors nor recreational fishing would be allowed in the research natural area zone, but these activities would be allowed in the remaining zones. For recreational activities inside the park but outside the research natural area, private boaters would be required to obtain a permit and pay an entrance fee at Garden Key, learn about the protection of park features, and adhere to established maximum numbers of visitors to individual sites and attractions (see table 1). All private and commercial vessels must overnight in the historic preservation/ adaptive use zone around Garden Key (see detail map of this zone in the chapter on alternative B). A reservation system might be instituted for the campground in the future.

Although the experiences for tour visitors in this alternative would be highly structured, the opportunities would be more diverse than in the previous alternatives. In the previous alternatives, visitors with a private boat or a guide hired offsite would have access to the offshore coral reefs, shipwrecks, and keys other than Garden Key. Under this alternative, all visitors to the park would have the opportunity to visit remote park attractions. Activities would include snorkeling and diving at selected coral reefs and shipwrecks, swimming, and bird watching, in addition to the activities available at Garden Key. Recreational fishing would not be permitted in the research natural area zone.

Opportunities for challenge and adventure on the tours throughout the park would be high. Likely encounters with other visitors not a part of ones individual tour would be low, and nonexistent in the research natural area. The presence of commercial staff, especially in the research natural area, would be high.

It is anticipated that this would be the first time many visitors would have the opportunity to engage in activities in a near-pristine environment like the Dry Tortugas. All of these visitors would encounter commercial staff, but the potential to encounter NPS staff or other groups would be low to moderate in the entire park except in the historic preservation /adaptive use zone near the fort. Although individuals would be in small groups, the opportunity level for the group to experience quiet and solitude would be high.

Opportunities for all visitors to learn more about the Dry Tortugas and its environs would be very high. Private boaters would have contact with NPS staff, thus increasing their opportunities to gain knowledge and information about the park through the permit process. Visitors arriving on the commercial ferries for day use, or commercial guides for overnight/multiday use, would have a high level of opportunity to gain knowledge, information, and interpretation from trained commercial tour staff at the docking facility in Key West, en route to the

park, and on tours. All visitors would have an orientation to the purpose and significance of the research natural area zone from NPS or commercial tour staff. All visitors would have access to information and interpretation at Fort Jefferson.

The potential for all visitors to have a high-quality experience would be great due to the integrity of the natural and cultural resources, the lack of intrusions and alterations to the natural landscape and seascape, the even dispersal of visitors, the low-key interpretation methods, and enhanced knowledge gained from research. The zoning and visitor use management schemes in this alternative create these conditions. Visitors would also receive the benefit of new information coming to light as a result of research activities of park scientists and investigators.

RESOURCE PROTECTION

There would be very low tolerance for impacts on terrestrial, marine, or submerged cultural resources due to visitor use in the research natural area zone portions of the park. There would be a low tolerance for impacts from visitor use on these resources in the natural/cultural zone. There would be low to moderate tolerance for impacts on these resources from visitor use in the historic preservation/adaptive use zone.

An aggressive visitor education program would focus on park resources and history and resource protection. Education and interpretation would be incorporated into tour activities. Through the process of getting a permit to enter the natural/cultural zone, private boaters would learn about the park features and resource protection and be informed about the established maximum numbers of visitors to individual sites and attractions. All visitors would receive education on the purpose and significance of the research natural area zone and how the concept is being used internationally. To protect marine resources, anchoring would be permitted only in the natural/cultural and historic preservation/ adaptive use zones, and the use of mooring buoys would be required in research natural area zones. The use of mooring buoys as a resource protection management tool might also be required if anchoring restrictions are warranted.

Commercial tour use in the research natural area would also be directed, and operators would be required to use mooring buoys. In the other zones in the park, private boat operators would be directed to less sensitive areas when possible, and patrols would monitor for inappropriate activities. Commercial tours in the other zones would be managed similarly to management in the research natural area zone.

No manipulation of resources by the Park Service, other agencies, researchers, or visitors would be allowed in the research natural area zone except for restoration. Minor manipulation of resources in the other zones would be allowed, but only for visitor safety and resource protection reasons.

All natural and cultural resources in the park would be surveyed, and a regular monitoring program would be implemented, regardless of zone. A high level of nonmanipulative research would occur in the research natural area, and a moderate to high level would occur in the remainder of the park.

Systematic, scheduled monitoring would document changes in species and communities to provide direction for resource management and research. Monitoring and research would be conducted on impacts on resources from visitor use, such as the affect on coral reefs from anchoring or concentrating visitor use with mooring buoys. Other monitoring actions would include determining population and biodiversity of marine and terrestrial species.

Submerged Cultural Resource Strategy

The NPS Submerged Resources Center has undertaken a comprehensive archeological survey and inventory of submerged sites within the park. The project began in 1992 with the compilation and assessment of natural and cultural resource data that provided the foundation for development of the survey research design. GIS (geographic information system) computer applications were incorporated into the survey methodology. The project is a model for a wide-area survey of submerged NPS areas.

Using remote sensing magnetometer methods, surveys have been completed for more than 95% of the park's waters at depths of less than 30 feet. The technique was designed to detect ferrous metal objects, indicating potential site locations. Survey coverage of the entire park waters at all depths will eventually be completed (see the "Affected Environment" section for survey results).

A comprehensive and multidisciplinary monitoring program would be implemented to provide both random sample annual site assessments and long-term detailed assessments for selected locations. As needed, more frequent assessments would evaluate reports of diver impacts, conditions following storms, etc. Site research would be conducted in accordance with approved research designs that support park management objectives. Archeological research and investigations would meet applicable NPS standards and would have minimal site impacts. Information would continue to be compiled in the GIS database.

The park would also implement measures to enhance site protection. Diving would be permitted only in approved areas by means of mooring buoys and other methods. Visitors would be directed away from sensitive site locations, and remote sensing surveillance systems would assist park patrol efforts to protect significant sites.

The National Park Service would work with the National Oceanic and Atmospheric Administration and the state of Florida to continue to study the importance of the Tortugas area to the fisheries of the region and the hemisphere.

COMMERCIAL SERVICES

Access to the park for most visitors would be provided through two concession contracts. One contract would be for a single seaplane operator, who would be authorized to carry up to 60 visitors per day. The number of trips would depend on the capacity of the planes being used, but larger capacity planes would be encouraged to reduce the number of takeoffs and landings. Beach tie points would be assigned to the seaplane concessioner, and a section of the beach near the dock would be dedicated to the operation.

The other concession contract would be for a ferry operator who would be authorized to carry up to 150 visitors per day. More than one boat would be used in the operation, and staggered arrival and departure times at the fort would be used as a management tool to maintain carrying capacity numbers and disperse use. The ferry concessioner would be required to provide intrapark transportation and tours. The goal for the ferry/tour concession would be for the operation to be self-contained to not put any additional strain on the limited facilities at the park. This would include transporting all water and waste in and out of the park and providing shelter for visitors. Therefore, a concessioner's vessel would generally be docked and accessible for the duration of their visitors' stay in the park. Because there is limited space at the dock to accommodate this requirement, an additional structure, such as a dock, might be required.

The details of how the tour portion of the concession contract would operate would be determined later during prospectus development and/or during an evaluation

period after the award of the contract. In the spirit of being self-contained, the intent is to bring as much of the equipment and vessels required back and forth to the park as possible, although mooring or docking some of the smaller vessels might be considered. Mandatory interpretive and resource protection training and auditing by NPS staff would be required for all concessioner tour staff.

A reservation system for the tours would be an integral part of the operations plan for the concessioner. Tours in the natural/cultural zone would be limited by established site carrying capacities. Tours in the research natural area zone would be managed the same as all other activities in the zone, with site carrying capacities enforced and the use of mooring buoys or other devices required. Group size for snorkeling and diving with commercial guides in the research natural area zone would be limited to six. Because all visitor use would be generated by commercial tours, the concessioner would be allocated 100% of the available sites. Authorized tours could include Fort Jefferson, Loggerhead Key, snorkeling, scuba diving, kayaking, glass bottom boat rides, and scenic/wildlife tours. Fort tours would be coordinated with NPS staff and limited to a maximum of 20 to 25 visitors. Loggerhead Key tours would be limited to 12 visitors and subject to the use restrictions described on table 1.

The concessioner might be authorized to rent or provide the necessary goods and equipment such as masks, fins, snorkels, diving tanks, compressed air, and kayaks. The concessioner would also be authorized to provide food and beverage service (lunch) similar to what occurs now. The ferry concessioner would also be authorized to sell a limited amount of merchandise that enhances the visitors' experiences, including health and safety-related items. The ferry and air taxi concessioners would have exclusive rights to any day use commercial tours that begin or end within park boundaries.

Other appropriate commercial uses in the park would be authorized by commercial use authorizations (CUAs) or another appropriate concession authorization tool. These other operators would provide overnight/multiday commercial tours. Clients would stay overnight on the vessels. If clients stay in the campground they would be subject to reservations and other use regulations. The number of commercial use authorizations would not exceed 30 or the capacity of the resources to accommodate the use, which would be determined by monitoring. No facilities would be dedicated to these operators. CUA activities would be monitored and could be replaced by one or more concession contracts at a later time.

Sailing excursions would be permitted by commercial use authorizations or another appropriate concession authorization tool with limits of 20 to 25 visitors per trip. A limited number of commercial use authorizations or another appropriate concession authorization tool for bare boat sailing charter "captains" would also be permitted. CUA permits or another appropriate concession authorization tool for guided fishing charters in six-pack boats for fishing in the natural/cultural zone only would be subject to specific regulations to protect fisheries resources as warranted. No CUA permits would be issued for guided fishing charter boats in excess of six passengers per vessel. CUA permits would be issued to six-pack boat operators for multiday diving trips. CUA permits would be issued to conduct wildlife tours, including bird watching, provided the tours begin and end outside of the park boundary. CUA permit holders would be subject to established carrying capacity restrictions for the use of sites and areas within the park (see table 1).

The cooperating association would sell educational and interpretive merchandise related to the interpretive themes of the park in accordance with their cooperative agreement.

PARK OPERATIONS AND FACILITIES

A high level of patrolling of visitor use would occur in the natural/ cultural zone and the research natural area zone due to the permit system and commercial tour operations proposed. To conduct/manage research and survey/ monitor resources, NPS staff would expend a moderate to high amount of effort.

Resource protection and interpretive training of all commercial operators would be required, calling for a moderate to high amount of effort by NPS staff. All private boaters obtaining permits would receive education in resource protection, which would require a moderate to high amount of effort by NPS staff. NPS staff would conduct most tours of the fort, although trained commercial staff would conduct some. Visitor information would be available at a new contact station in Key West, requiring NPS staff commitment.

NPS staff would maintain most of the facilities in the park, although facilities assigned to concessioners would have facility maintenance included in their contracts.

A reservation system would be established for the campground on Garden Key to ensure that visitor expectations were met.

PARK ENTRANCE FEE

A park entrance fee would be instituted to help support the additional costs incurred for managing carrying capacities, visitor safety and enjoyment, resource protection activities, and monitoring. (The authority to charge fees may end; however, the park would charge an entrance fee as long as this authority exists.)

ALTERNATIVE E

ALTERNATIVE E =				
The servicewide mandates and policies	+	The parkwide management actions	+	The actions described below that support the concept for this particular alternative

OVERALL CONCEPT

Under this alternative, the majority of the park would be designated as a research natural area and managed accordingly, with primary emphasis on resource protection and conservation (see Alternative E map). The alternative recognizes the paramount importance of preserving the park's near-pristine and fragile ecological resources and takes steps to closely direct visitor activities that could result in resource degradation. Most visitor use would be highly structured through commercial service providers. The goal for commercial service operations would be to be self-contained, thus reducing the strain on the limited park facilities. . Private boaters would moor at Garden Key and join tour operations. The types and levels of visitor use would be managed to protect resources and the quality of the visitor experiences. The total numbers of visitors transported to the park by commercial operators would be consistent with the aggregated carrying capacity targets of individual visitor destinations (see table1).

The research natural area zone in this alternative would be compatible with the ecological reserve that is proposed by the National Oceanic and Atmospheric Administration for the Florida Keys National Marine Sanctuary, having the same goals and subsequent constraints on fishing.

MANAGEMENT ZONING

As shown on the Alternative E map, the majority of the park would be zoned a research natural area. The historic preservation/adaptive use zone would be applied to Garden Key (Fort Jefferson), and would extend outwards for a radius of 1 nautical mile to encompass surrounding waters, including those around Bush and Long Keys. The central portion of Loggerhead Key, where the historic lighthouse and adjacent buildings are located, would also be designated historic preservation/adaptive use. The remainder of Loggerhead Key, Bush, Middle and East Keys would be zoned research natural area, except during critical bird and sea turtle nesting/hatching seasons when special protection zoning would be selectively applied and public access would be prohibited. Hospital and Long Keys, and a rare elkhorn coral *(Acropora palmata)* community near the Long Key/Bush Key tidal channel, would be designated special protection zones year-round. The map should be read in conjunction with the text because the map does not show all details that are explained above.

VISITOR EXPERIENCE

To achieve these objectives, visitation would be strictly managed throughout most of the park to reduce or avoid the adverse effects of park visitors on the fragile resource base. Overnight private boaters would need a permit. The numbers of visitors allowed in certain areas at any given time, restrictions on the size of boats, limitations on arrival times, etc. would be according to the carrying capacity determinations for each area. A park entrance fee would be charged. No recreational fishing would be allowed

Alternative E

Map, one page

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in the research natural area. Also in the research natural area, commercial boat operators would be required to use mooring buoys, and anchoring would be prohibited. Overnight anchoring/mooring would be allowed only in the historic preservation/ adaptive use zone around Garden Key.

Although a variety of challenging activities would be available to park visitors, most would find a highly structured experience as part of the guided tours. Visitor uses on and under the water would be highly directed and monitored by NPS and concession staff in this alternative. Opportunities for individual discovery or choice of activities would be limited and would instead fall more under the prerogative of the tour operator/guide.

Visitor uses on Garden and Loggerhead Keys would be highly structured under this alternative. The visitor experience would be enhanced by limiting the size of tour groups and the number of people at the swim beach and moat wall. On the remaining keys, a staff member would always accompany visitors.

Visitors would occasionally encounter NPS personnel, but most visitors would more frequently encounter concessioner or tour operator staff. Nevertheless, because visitation would be dispersed throughout the park, ample opportunities for quiet and solitude would be expected for all visitors.

Because this alternative places a premium on resource protection, the integrity of the resources likely to be encountered would be high, which in turn would enhance the overall quality of the visitor experience. The trade-off of a highly structured visitor experience would be the opportunity to experience relatively unaltered natural landscapes and seascapes, with little likelihood of encountering other groups or other visible/audible intrusions on the natural environment.

A high-quality experience would be further enhanced by many opportunities for visitors to receive education and interpretation at the Key West docking facilities, while en route to the park, at Fort Jefferson, and at all commercial tour sites. All visitors would have access to basic park orientation and resource protection education by NPS staff or concession operator. Visitors would also receive the benefit of new information coming to light as a result of research activities of park scientists and investigators.

RESOURCE PROTECTION

In most of the park, except within the historic preservation/adaptive use zone, the resource protection strategy would be to maintain the park's near-pristine, intact ecosystem. There would be extremely low tolerance for impacts of recreational use on marine or terrestrial resources, and visitor travel and behavior would be highly regulated. Through the National Park Service and through concessioners, visitors would receive a high level of education about resource protection issues. This would include appropriate behavior in and around sensitive natural and cultural resources, appropriate boat handling and navigation, and the benefits of controls and regulations. Resource protection education would be incorporated into most recreational activities, and those receiving private boat permits would receive such education as a part of the permitting process.

Concession services and restrictions on private boat travel would strictly control all visitor use outside of the historic preservation/adaptive use zone and would direct use to nonsensitive resources. Anchoring would be prohibited throughout the park to avoid indiscriminate damage to marine resources. Although private boaters could still come to the park, to help protect the resources they would be required to moor at fixed buoys and use concession tour boats for intrapark transportation. Buoys would be placed only in areas where human use would pose little risk of resource damage.

With maximum protection of the park's near-pristine ecosystems and intact cultural resources, the park would provide outstanding opportunities for scientific research. All research within the research natural area would be nonmanipulative. Some sampling would be allowed, but no change in resource condition would be permitted. Manipulative research would be allowed elsewhere where consistent with park purposes and an approved plan.

Systematic, scheduled monitoring would document changes in species and communities to provide direction for resource management and research. Monitoring and research would be conducted on impacts on resources from visitor use, such as the affect on coral reefs from anchoring or concentrating visitor use with mooring buoys. Other monitoring actions would include determining population and biodiversity of marine and terrestrial species.

Submerged Cultural Resource Strategy

The NPS Submerged Resources Center has undertaken a comprehensive archeological survey and inventory of submerged sites within the park. The project began in 1992 with the compilation and assessment of natural and cultural resource data that provided the foundation for development of the survey research design. GIS (geographic information system) computer applications were incorporated into the survey methodology. The project is a model for a wide-area survey of submerged NPS areas.

Using remote sensing magnetometer methods, surveys have been completed for more than 95% of the park's waters at depths of less than 30 feet. The technique was designed to detect ferrous metal objects, indicating potential site locations. Survey coverage of the entire park waters at all depths will eventually be completed.

A comprehensive and multidisciplinary monitoring program would be implemented to provide both annual site assessments and long-term detailed assessments for selected locations. As needed, more frequent assessments would evaluate reports of diver impacts, conditions following storms, etc. Site research would be conducted in accordance with approved research designs that support park management objectives. Archeological research and investigations would meet applicable NPS standards and would have minimal site impacts. Information would continue to be compiled in the GIS database.

The park would also implement measures to enhance site protection. Diving would be permitted only in approved areas by means of mooring buoys and other methods. Visitors would be directed away from sensitive site locations, and remote sensing surveillance systems would assist park patrol efforts to protect significant sites.

COMMERCIAL SERVICES

Air access would be provided by a single concession contract with the same limits as described in alternatives C and D. Water access, intrapark transportation, and tours would be provided as described in alternatives C and D. The activities, operations, facilities, and conditions described in alternatives C and D would also be applicable in this alternative. There would be no commercial use authorizations issued in this alternative. Recreational fishing would not be permitted in the park due to the extensive use of the research natural area zone, and the concessioner would offer all wildlife and birdwatching tours. Unless sailing excursions were provided in the concession contract, they would not occur in the park.

PARK OPERATIONS AND FACILITIES

A moderate to high level of NPS staff and resources would be required to manage and maintain facilities such as the dock, campground, fort, mooring buoys, and sanitary

facilities. The dock at Garden Key or alternative docking facilities would be required accommodate private boaters who leave their boats to go on a commercial tour. A moderate to high NPS interpretive staff effort would be required to train concession employees and conduct fort tours. A moderate to high NPS patrol effort would be required to protect resources and monitor activities due to the structured concession services. Additional law enforcement staff would not be required due to the highly structured experiences planned.

PARK ENTRANCE FEE

A park entrance fee would be instituted to help support the additional costs incurred for managing carrying capacities, visitor safety and enjoyment, resource protection activities, and monitoring. (The authority to charge fees may end; however, the park would charge an entrance fee as long as this authority exists.)

MITIGATION MEASURES

Under any alternative, certain measures would be taken to mitigate, to the degree possible, impacts that might or would occur because of actions proposed. The following describes these mitigation measures.

CULTURAL RESOURCES

Although no adverse effects on cultural resources would be anticipated from any of the undertakings proposed in these alternatives, currently unknown cultural resources might be discovered during project construction (e.g., perhaps in the vicinity of the boat dock should that structure be extended). Should archeological resources be discovered, work in that location would stop until the resources were properly recorded by the National Park Service and evaluated under the eligibility criteria of the National Register of Historic Places. If (in consultation with the Florida state historic preservation officer) the resources were determined eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate the loss or disturbance of the resources.

MARINE LIFE AND WILDLIFE

A survey for sensitive marine species would be completed before any construction activities took place for extending the dock. If any species of concern were identified in the vicinity, appropriate mitigation measures would be undertaken.

If a shore-based permanent design were selected for expanding the dock, mitigating measures intended to protect water quality and marine life and wildlife from the effects of sedimentation, turbidity, and noise would be carried out during construction. The construction work area would be restricted to the minimum area needed, and direct disturbance would be avoided to the extent possible. Construction practices would be designed to have minimal impact on sensitive areas and to avoid these areas to the extent possible. Special care would be taken to avoid spills when using and handling fuels and lubricating oils. Construction noise would be kept to a minimum to avoid disturbing wildlife, and construction activities would not occur during bird and turtle nesting periods.

TRAFFIC

Construction activities involving rehabilitation of a building for the Key West multi-agency visitor facility would be conducted in a manner that would ensure the least possible restriction of traffic from construction vehicles. Safety and convenience of the general public would be provided at all times.

VISITOR EXPERIENCE

The expansion of the visitor center would be carried out during a period of the year when visitation is low. Before construction activities begin, the park staff would develop an interim operations plan to deal with staff and visitor issues during the expansion project.

TABLE 3. SUMMARY OF PARKWIDE MANAGEMENT ACTIONS

Parkwide Management Actions, All Alternatives	
Visitor Experience	**Visitor Facilities and Services:** Continue commercial vessel, plane, or private boat access to the park. Continue most existing day use recreational activities, although fishing opportunities vary between alternatives (see table 4 below). Continue to require visitors to be self-sufficient. Establish interagency visitor center in Key West. Keep facilities on Loggerhead Key for administrative and research use. Expand visitor center on Garden Key into one or two additional casemates; allow no other expansion or adaptation of historic buildings. Educate visitors through a combination of nonpersonal interpretive services (exhibits, waysides, radio and television media, and publications) and personal services (daily ranger-led interpretive programs, visitor center staffing, and law enforcement monitoring. **Interpretive Direction and Topics for the Park**: Although opportunities for visitors to learn vary by alternative, all alternatives would emphasize understanding and appreciating the resources and appropriate use of those resources. Provide high-profile interpretive program that is directed toward orientation, education, and protection of resources. Provide access to resource interpretation and orientation before arrival and onsite. Emphasize understanding and appreciating the resources of the park and the appropriate use of those resources. (Studies of visitor behavior in other marine and coral reef parks have shown very positive results when visitors are given information about the effects of their behavior on park resources.) Interpret the major topics and subtopics, including the subtropical marine ecosystem, the pristine natural island environment, the human history and strategic locale of Dry Tortugas, the submerged cultural resources, the management of vegetative and wildlife populations, appropriate public use and enjoyment of the park, and park research activities. **Interpretive Strategies**: Take advantage of numerous opportunities to reach visitors onsite. Use interagency visitor center at Key West for pre-visit orientation. Expand opportunities for education/interpretation/information also at Fort Jefferson and en route to the park with commercial operators. Improve visitor information, facilities, and outreach programs. Develop a short video. Include other forms of outreach such as Chambers of Commerce, marina operators, and the Internet. Expand Everglade's environmental education program to the southern keys. Provide training for concession interpretive staff as commercial contracts are developed. Convey effective interpretive messages at the expanded Fort Jefferson visitor center. Develop other nonpersonal interpretive media such as exhibits on the Garden Key dock, a film, self-guided trails (surface and submerged), audio tours, and publications. Perhaps offer personal services. Strive to allow visitors to experience the park's resources on their own terms.
Resource Protection	**Natural Resources:** Support establishment of ecological reserve adjacent to the park. Protect opportunity to see the pristine night sky and protect the natural soundscape. **Cultural Resources:** Continue use of historic preservation/adaptive use zone areas at Garden Key and the central portion of Loggerhead Key. **Research:** Establish supplemental support for park research, such as storage, in Key West. Adaptively use some structures as a modest support base for research in the park and the sanctuary. Require any additional in-park research facilities to be self-contained.

Park Operations	Continue use of patrol and supply boats and dock space at Key West for these boats. Develop an agreement with the U.S. Coast Guard to use pier and storage structure across from this dock space. Seek office space in vicinity of this dock space, possibly in conjunction with the U.S. Fish and Wildlife Service or the Florida Keys National Marine Sanctuary. Keep existing park-maintained employee quarters and utility systems in the fort. **Park Boundary and Mooring System:** Continue existing buoy navigational system. **Boundary Adjustments:** Continue existing boundary. **Housing:** Upgrade temporary and permanent employee housing in casemates with energy-efficient inserts that do not further degrade the historic walls of the casemates. Limit additional conversions or modifications for housing or administrative uses to the 2 ½ "fronts" or sides that have already been modified. Establish permanent employee housing ashore, with some personnel rotating to the park. Accommodate researchers and other staff from agencies doing research within the modified casemates for the term of their needs as space permits. **Visitor Center:** Expand visitor center. **Utilities:** Do not expand utility system unless technological improvements make such expansion possible. Use renewable energy sources. **Communication Systems at the Park:** Continue to explore new technologies to improve communications, emphasizing improvements for visitor information and safety. **Necessary and Appropriate Commercial Activities:** Manage commercial activities within the capacity of the resources to withstand use.

TABLE 4: SUMMARY OF ALTERNATIVE ACTIONS

	ALTERNATIVE A: CONTINUATION OF CURRENT MANAGEMENT AND TRENDS	ALTERNATIVE B: INITIATE CARRYING CAPACITIES, CONTINUE CONCESSIONS AND CUA PERMITS AS EXISTING	ALTERNATIVE C: INITIATE RESEARCH NATURAL AREA (RNA) AND EXPAND COMMERCIAL SERVICES (PROPOSED ACTION)	ALTERNATIVE D: ALIGN RNA ZONE AND SANCTUARY RESERVE; EXPAND COMMERCIAL SERVICES	ALTERNATIVE E: ALL RNA ZONE EXCEPT GARDEN KEY AND EXPAND COMMERCIAL SERVICES
Visitor Activities Allowed	Recreational fishing, swimming, snorkeling, diving, private boating, wildlife viewing, and fort tours.	Same as alternative A.	Swimming, snorkeling, diving, boating, wildlife viewing, and fort tours. No recreational fishing allowed in the RNA zone. Private boaters would be permitted in the research natural area zone by permit.	Same as alternative C, except no private boaters would be permitted in the research natural area.	Same as alternative D.
Tolerance for Resource Degradation	Low. Few controls are in place to limit damage from overuse or impacts from visitor use.	Low. Visitor numbers at one place at one time would be set to control damage. Monitoring would be in place.	Very low. Carrying capacity would be assigned to zones and areas to control damage. Concession staff would facilitate use in RNA zone. Use would be dispersed. Permits would be required for private boaters. Monitoring would be in place.	Same as alternative C.	Extremely low because of large RNA zone; otherwise, same as C.
Commercial Services	Authorized by commercial use authorizations with capacity limits.	Same as A.	Authorized by two concession contracts for all day use travel to park and CUA permits for multiple-day tours that begin and end outside of park	Same as alternative C.	Same as alternative C except there would be no CUA permits.
Entrance Fee	No fee would be charged.	As authorized, an entrance fee would be instituted.	Same as alternative B.	Same as alternative B.	Same as alternative B.

	Alternative A: Continuation of Current Management and Trends	Alternative B: Initiate Carrying Capacities, Continue Concessions and CUA Permits as Existing	Alternative C: Initiate Research Natural Area (RNA) and Expand Commercial Services (Proposed Action)	Alternative D: Align RNA zone and Sanctuary Reserve; Expand Commercial Services	Alternative E: All RNA zone except Garden Key and Expand Commercial Services
Ability of Visitors to Visit Multiple Locations in the Park	Most visitors would be limited to Garden Key.	Most visitors would be limited to Garden Key.	Ferry concessioner would be required to offer opportunities to visit selected sites throughout park. Private boaters would need to obtain permits for activities throughout the park, including the research natural area zone.	Same as alternative C except that all visits to destinations in the research natural area zone would be by guided tour only (no permits for private boats would be allowed).	Same as alternative D.
Opportunity for Challenge/Adventure	High (for private boaters) to low (for tour visitors)	High (for private boaters) to low (for tour visitors)	High	High	Moderate
Opportunity for Solitude	Low	Low	Very high	Very high	Very high
Noise Levels for Visitors	Moderate, especially from boats and other visitors.	Same as alternative A.	Very low except at fort.	Same as alternative C.	Same as alternative C.
Permits for Private Boaters Required?	No	No	Yes	Yes	Yes
Mooring/Anchoring	Anchoring permitted throughout park. Overnight anchoring would be permitted only around Garden Key.	Anchoring would be permitted throughout park. Overnight anchoring would be permitted only in the historic preservation/ adaptive use zone.	No anchoring would be permitted in research natural area zone only; mooring would be permitted in the research natural area zone by permit only. Overnight anchoring would be permitted only in the historic preservation/ adaptive use zone.	No anchoring would be permitted in the research natural area zone. Mooring would be permitted in the research natural area zone only for the concessioner. Overnight anchoring would be permitted only in the historic preservation/ adaptive use zone.	Same as D.
Encounters with Others	High (for tour visitors) to low (for private boaters)	High (for tour visitors) to low (for private boaters)	Moderate at Garden Key. Low at other destinations.	Same as alternative C.	Same as alternative C.

	Alternative A: Continuation of Current Management and Trends	Alternative B: Initiate Carrying Capacities, Continue Concessions and CUA Permits as Existing	Alternative C: Initiate Research Natural Area (RNA) and Expand Commercial Services (Proposed Action)	Alternative D: Align RNA zone and Sanctuary Reserve; Expand Commercial Services	Alternative E: All RNA zone except Garden Key and Expand Commercial Services
Level of Interpretation	Moderate; some orientation on ferry tour. Fort tours would be available.	Same as alternative A.	High, especially on RNA zone tours and when obtaining permits for private boats.	Same as alternative C.	Same as alternative C.
Level of Resource Monitoring	Intermittent	Systematic monitoring of specific resource indicators and standards.	Same as alternative B.	Same as alternative B.	Same as alternative B.
Level of Visitor Use Patrols	High need but limited staffing	High	Moderate	Low to moderate	Low

A matrix summarizing and comparing the impacts of implementing the various alternative management plans is given below.

TABLE 5. SUMMARY OF IMPACTS

This table is a brief comparison of the alternative-specific impacts. For information on topics such as the cumulative, unavoidable, irreversible/irretrievable impacts, please refer to the narrative text.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
IMPACTS ON NATURAL RESOURCES					
Essential and Unique Habitats					
Coral Reefs	The current high levels of unrestricted boat access and use within all areas of the park under this alternative would continue to cause major short-and long-term adverse localized impacts on coral reefs. Current levels of unrestricted access to coral reefs, particularly reefs in shallow areas, by fishermen, scuba divers, snorkelers, and swimmers result in moderate levels of long-term adverse impacts on the reefs. The continuation of these use patterns would allow stress and damage accumulation in conjunction with boat damage. Because alternative A provides no RNA zone protection to the park's essential and unique habitats, this alternative would continue to provide no improvement over current conditions or protection from future increased use.	Management tools available under alternative B would control the maximum number of visitors in certain areas of the park. If in the unrestricted areas established standards for resource quality for the management zone were exceeded, additional use restrictions would be established to prevent further impairment of these resources. Because alternative B provides no research natural area zone protection to the park's essential and unique habitats, this alternative would provide little improvement over current conditions, but would enhance protection from the impacts of future increased use. Protection of at-risk elkhorn and staghorn coral formations in the Long-Key-Bush Key channel would increase through special protection zoning.	The introduction of a research natural area zone in the park would significantly reduce the short- and long-term adverse impacts on coral reefs within that zone. This level of RNA zone protection would provide a significant increase in habitat quality compared to alternative A, and would protect several extraordinary coral reef formations (e.g., Loggerhead Forest). This increased protection would have a beneficial impact on reef formation and associated aquatic life in the research natural area. Aquatic habitats outside this zone would continue to face moderate to major long-term adverse impacts Protection of at-risk elkhorn and staghorn coral formations in the Long-Key-Bush Key channel would increase through special protection zoning.	This level of RNA zone protection would provide a significant increase in habitat quality compared to alternative A. The aquatic habitats outside the boundaries of the research natural area zone would still face moderate to major long-term adverse impacts due to use by boaters, fishermen, scuba divers, snorkelers, and swimmers. Protection of at-risk elkhorn and staghorn coral formations in the Long-Key-Bush Key channel would increase through special protection zoning.	The creation of an RNA zone for essentially the entire park would almost eliminate the short-and long-term adverse impacts on coral reefs. Protection of at-risk elkhorn and staghorn coral formations in the Long-Key-Bush Key channel would increase through special protection zoning. This level of RNA zone protection would provide a significant increase in habitat quality compared to alternative A.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
Sea Grass Beds and Hardbottom Communities	The current high levels of unrestricted boat use and access within all areas of the park under alternative A would continue to cause major short- and moderate long-term adverse localized impacts on sea grass beds and hardbottom communities.	Same as Coral Reefs above.	Same as Coral Reefs above.	Same as Coral Reefs above.	Same as Coral Reefs above.
Sand Bottoms	Minor short-term impacts would occur when boats are run over shallow areas, causing increased turbidity in surrounding areas. Future increases in boat use would pose moderate short-term impacts because there are no restrictions on boat use or access under this alternative.	Same as Coral Reefs above	Same as Coral Reefs above.	Same as Coral Reefs above.	Same as Coral Reefs above.
Terrestrial Habitats	Unmonitored use of terrestrial habitats for picnicking, camping, wildlife viewing, walking, etc. would likely continue to cause major short-term and moderate long-term deterioration of island flora. The prevention of any further facility construction would provide some level of protection to the terrestrial resources by preventing the major damage caused by such an undertaking.	Improved monitoring of the use of terrestrial habitats for picnicking, camping, wildlife viewing, walking, etc. would reduce some of the major short-term and moderate long-term deterioration of island flora due to these uses. If established standards for resource quality for the management zone were exceeded, added use restrictions would be established to prevent further impairment of these resources. The prevention of any further facility construction would provide some level of protection to the terrestrial resources by preventing the major damage caused by such an undertaking.	Monitored and/or restricted access to much of the terrestrial habitat and the use of guided tours would provide increased protection to land-based resources compared to alternative A. The restriction of any further construction of facilities, except dock expansion, and the shifting of visitor loads to commercial services would provide increased protection to the essential habitats of the park, further decreasing long-term adverse impacts.	Same as alternative C.	Same as alternative C, but for most of the park.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
Fishery Resources					
Exploited Reef Fish	Current levels of exploitation would continue to result in long-term major adverse impacts on the exploited reef fish stocks in the park, reducing the value of the park to almost all users. As reef fish stocks begin to collapse and become more rare, the diversity, abundance, size, distribution, and balance of the reef fish community would become further degraded. Because alternative A contains no research natural area zone, it offers no further protection to the diversity of the reef fish community or protection from increased impacts.	Current levels of exploitation would continue to result in short- and long-term major adverse impacts on the exploited reef fish populations in the park, reducing the value of the park to almost all user groups, including fishermen, scuba divers, and snorkelers.	The research natural area would provide greatly increased levels of protection for about 88% of the reef fish species found in the park and 97% of the species in the snapper-grouper-grunt complex. There would be a major short-term and minor long-term adverse impact on fishing yields in the park; however, these yields would be higher and more sustainable over the long term. These larger fish could leave the research natural area boundary at times, which would benefit recreational trophy and commercial fishing yields in waters adjacent to the research natural area zone. Alternative C would provide excellent protection to the exploited reef fish stocks (groupers, snappers, and grunts) and would result in only moderate long-term risks of adverse impacts on the population due to expected fishing around the research natural area.	The research natural area would provide greatly increased levels of protection for about 80% of the reef fish species found in the park and 83% of the species in the snapper-grouper-grunt complex. There would be a major short-term and minor long-term adverse impact on fishery yields taken in the park; however, these yields would be sustainable over the long term. These larger fish could leave the research natural area boundary at times, which would benefit recreational trophy and commercial fishing yields in waters adjacent to the research natural area. Alternative D would provide excellent protection to the exploited reef fish stocks (groupers, snappers, and grunts) and would result in only moderate long-term risks of adverse impacts on the reef fish population due to expected fishing around the research natural area.	Alternative E would protect nearly 100% of the reef fish species in the park and thus provide stability to the community and excellent protection to the exploited reef fish populations (groupers, snappers, and grunts). Implementing this alternative would result in only minor long-term risks of adverse impacts on those populations due to fishing around the park. With no fishing allowed in most all of the park, fishery yields would be nearly eliminated. The presence of substantially larger individual fish within the park would benefit recreational trophy and commercial fishermen in waters adjacent to the park.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
Other Species	The nonexploited species of reef fish would be impacted indirectly, through habitat degradation and the dynamics of the exploited reef fishery, and directly through accidental catches by recreational fisherman. The delicate balance of the reef ecosystem is easily upset by the impacts of habitat degradation and selective fishing on key predator species. This combination of factors, under current levels of park access and fishing mortality, would continue to present major short- and long-term adverse impacts on these exploited & unexploited fish populations.	Because alternative B contains no RNA zone, it offers no further protection to the diversity, abundance, size, and distribution of the reef fish community or protection from increased impacts. The combination of these factors, under current levels of park access and fishing mortality, would result in major short- and long-term adverse impacts on these populations.	The creation of the research natural area would also provide major short-term and long-term benefits to the diversity, abundance, size, and distribution of unexploited and protected/ threatened fish and invertebrate populations through the protection of coral reef habitats and the elimination of accidental-catch mortality in the research natural area zone.	Same as alternative C.	Same as alternative C.
Wildlife Resources					
Birds	Although most birds and their nesting sites are protected now, the level of human use and access in the park would continue to present major long-term adverse impacts on the adult birds, because these uses often result in death. The major sources of degradation and/or loss of nesting sites include disturbance by visitors, noise from planes and boats, exotic plant invasions, erosion, and exotic rats that eat eggs and young, resulting in major short- and long-term damages.	Alternative B would slightly increase protection to the birds and their nesting sites in the park due to limiting overcrowding in areas, spreading out resource use, and applying management tools to limit visitor impacts after certain management zone standards have been reached. Application of the special protection zone to highly sensitive sites during critical nesting periods would significantly limit adverse impacts.	Measures to control access to land-based environments in the research natural area through guided tours under alternative C should significantly reduce short- and long-term adverse impacts on bird nests and eggs. Eliminating fishing and restricting boat use within the research natural area zone would greatly reduce the risks to birds that are caused by boating and fishing.	Same as alternative C.	Measures to control access to land-based environments through guided tours under alternative E should significantly reduce short-term and long-term adverse impacts on bird nests and eggs. Eliminating fishing and restricting boat use within almost the entire park would nearly eliminate the risks to birds that are caused by boating and fishing.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
Turtles	The current levels and access throughout the park of recreational boaters with little knowledge of the area would continue to result in major short- and long-term adverse impacts on turtles swimming in the park due to mortality from collisions with boats and/or propellers. Although much time and effort is put into protecting nesting turtles and their nests, the current levels of visitor use, noise, and unmonitored access to many beach areas would continue to be a moderate short- and long-term threat to the nesting behaviors and nests of the turtles.	Same as Birds above. Also, unlimited boater access to the park would still present major short- and long-term adverse impacts on swimming turtles.	Measures to control access to land-based environments in the research natural area through guided tours under alternative C should significantly reduce short- and long-term adverse impacts on turtle nests and eggs. Eliminating fishing and restricting boat use within the research natural area zone would greatly reduce the risks to swimming turtles that are caused by boating and fishing.	Same as alternative C.	Measures to control access to land-based environments through guided tours under alternative E should significantly reduce short-term and long-term adverse impacts on turtle nests and eggs. Eliminating fishing and restricting boat use within the almost the entire park would nearly eliminate the risks to swimming turtles that are caused by boating and fishing.
Marine Mammals	Current levels of boat use and unrestricted access to all portions of the park, particularly areas frequented by manatees and coastal dolphins, would continue to present major short- and long-term adverse impacts on marine mammals from collisions and propeller contact, particularly for very young and old individuals that are less mobile and less able to avoid collisions.	Alternative B would slightly increase protection to the marine mammals in the park due to spreading out resource use and applying management tools to limit visitor impacts after certain management zone standards have been reached. However, the management zone standards allow some adverse impacts. Unlimited boater access to the park would still present major short- and long-term adverse impacts on marine mammals.	Eliminating fishing and restricting boat use within the research natural area zone would greatly reduce the risks to marine mammals that are caused by boating and fishing.	Same as alternative C.	Eliminating fishing and restricting boat use within the park would nearly eliminate the risks to marine mammals that are caused by boating and fishing.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
Environmental Setting					
Soundscape and Night Lighting	The current levels of visitation focused during certain periods of the year provide a moderate short-term adverse impact on the soundscape and the opportunities to see the night sky in the park. Noise levels also threaten successful turtle and bird nesting. Visitor education and compliance with rules would mitigate these impacts somewhat. As levels of visitation increase, the current management plan would be insufficient to control the escalation in light and noise pollution and would present a major short-term risk. Low tolerance for activities that degrade the natural soundscape and the natural lighting in the park would decrease these impacts, as would education and compliance with night sky and soundscape protection regulations.	The current levels of visitation during periods of the year result in a moderate short-term adverse impact on the natural sounds and night lighting in the park. However, as levels of visitation increase, the application of management tools and standards (visitor capacity limitations within areas, the reduction of boat use, and controls on noise levels) would ensure the protection of the night view of the sky and the natural soundscape.	Visitor capacity limitations within areas, the reduction of boat use, and controls on noise levels) would ensure the protection of the natural soundscape and opportunities to see the night sky. Low tolerance for activities that degrade the natural soundscape and lighting in the park would decrease these impacts, as would education and compliance with night sky and soundscape protection regulations.	Same as alternative C.	Same as alternative C.
Wetlands	There would be no impacts on wetlands.	There would be no impacts on wetlands.	Potential impacts would occur on the marine intertidal unconsolidated shore wetlands around Garden Key as a result of dock expansion. The extent of impacts cannot be determined at this time.	Same as alternative C.	Same as alternative C.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
Water Quality	The water quality within the park constantly faces the potential of a minor or major oil or fuel spill caused by grounding of recreational boats, and this threat constitutes a potential major short-term and moderate long-term adverse impact on the park. Under alternative A, this threat would continue. The restriction of any further construction of facilities would provide increased protection of water quality.	Water quality in the park always faces the potential of a minor or major oil or fuel spill caused by grounding of recreational boats; this risk would continue under alternative B. However, as visitation increases, applying management tools and standards (visitor capacity limitations in areas and the reduction of boat use) would help decrease the risk to water quality. The restriction on constructing facilities would provide more protection of water quality.	In the research natural area, restricted private boat use would decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.). The restriction of any further construction of facilities, except the dock expansion, would provide increased protection of water quality.	Same as alternative C.	Restricted private boat use throughout most of the park would greatly decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.). The restriction of any further construction of facilities, except the dock expansion, would provide increased protection of water quality.
IMPACTS ON CULTURAL RESOURCES					
	Cultural resources (e.g., shipwreck sites, historic structures, etc.) might be adversely affected by increasing park visitation if current staffing/ funding levels provide insufficient protection. Proposed rehabilitation of the Fort Jefferson visitor center and staff/ administrative use quarters, along with ongoing preservation undertakings, would have no adverse effect on significant historic properties.	Cultural resources would receive moderate long-term benefits by limiting visitor numbers in sensitive areas of the park, adopting the *Submerged Cultural Resources Strategy*, and providing adequate staff to carry out and enforce resource protection measures. Proposed rehabilitation of the Fort Jefferson visitor center and staff/ administrative use quarters, along with ongoing preservation undertakings, would have no adverse effect on significant historic properties.	Cultural resources would receive major long-term benefits by limiting visitor numbers in sensitive areas of the park, adopting the *Submerged Cultural Resources Strategy*, requiring visitor permits, and adopting a research natural area zone. Proposed rehabilitation of the Fort Jefferson visitor center and staff/ administrative use quarters, along with ongoing preservation undertakings, would have no adverse effect on significant historic properties.	Cultural resources would receive major long-term benefits by limiting visitor numbers in sensitive areas of the park, adopting the *Submerged Cultural Resources Strategy*, requiring visitor permits, and adopting a research natural area zone (and prohibiting private boat access in this zone). Proposed rehab of the Fort Jefferson visitor center and staff/ administrative use quarters, plus ongoing preservation undertakings, would have no adverse effect on significant historic properties.	Cultural resources would receive major long-term benefits by limiting visitor numbers in sensitive areas, adopting the *Submerged Cultural Resources Strategy,* requiring visitor permits, and adopting a widespread research natural area zone. Proposed rehabilitation of the Fort Jefferson visitor center and staff/administrative use quarters, along with ongoing preservation undertakings, would have no adverse effect on significant historic properties.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
IMPACTS ON VISITOR EXPERIENCE					
	Increases in the number of park visitors could result in minor to moderate long-term adverse impacts on the visitor experience. NPS interpretive programs would still be conducted on a limited basis, especially in contacting private boaters. Establishing a visitor contact facility in Key West would have a major long-term beneficial impact on the visitor experience. Implementing interpretive and wayside exhibit plans would have major long-tem benefits on the visitor experience. Visitors would benefit from enhanced information as a result of NPS coordination with other south Florida planning efforts.	Establishing maximum numbers of visitors at specific sites and dispersing them more broadly would improve opportunities for solitude, tranquility, challenge, and adventure and reduce crowding — a long-term minor beneficial impact. Establishing a visitor contact facility in Key West would have a major long-term beneficial impact on the visitor experience. Implementing interpretive and wayside exhibit plans would have major long-tem benefits on the visitor experience. Visitors would benefit from increased information as a result of NPS coordination with other south Florida planning efforts.	Establishing opportunities for tour visitors to go beyond Garden Key and see/ experience near-pristine resources, solitude, tranquility, and challenge would be a long-term moderate to major beneficial impact. Prohibiting recreational fishing in and requiring a permit for entering the research natural area would have a long-term minor effect on recreational fishermen and a short-term minor adverse effect on some private boaters. Establishing a visitor contact facility in Key West, educating visitors on tours, and requiring private boaters to have a permit would have a major long-term beneficial impact on the visitor experience. Implementing interpretive and wayside exhibit plans would have major long-tem benefits on the visitor experience. Visitors would benefit from enhanced information as a result of NPS coordination with other south Florida planning efforts. Future fishermen would benefit from the establishment of a zone that would improve spawning population.	Same as alternative C except that prohibiting fishing and boating in the research natural area zone would have long-term minor adverse impacts on visitors seeking these opportunities in the park.	Same as alternative C except that prohibiting fishing and restricting boating in the park would have long-term moderate adverse effects on visitors seeking these opportunities in the park. Also, private boaters who currently might experience a solitary remote marine environment would experience a moderate long-term impact due to the loss of freedom now available.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT					
	Implementing alternative A would have negligible effects on county and regional tourism or recreational opportunities. Establishing the visitor contact facility in Key West might attract more visitors to Key West, resulting in minor long-term benefits for the county's economy. Impacts on commercial use authorization holders and charter fishing operators would be anticipated to be minor.	Implementing alternative B would have negligible effects on county or regional tourism or recreational opportunities. Establishing the visitor contact facility in Key West might attract more visitors to Key West, resulting in minor long-term benefits for the county's economy. Limiting use for carrying capacity and resource protection purposes could decrease the level of commercial use in the park, with a proportional reduction in some operators' income. Impacts on charter fishing operators would be minor.	Implementing alternative C would have negligible effects on county or regional tourism or recreational opportunities. Establishing the visitor contact facility in Key West might attract more visitors to Key West, resulting in minor long-term benefits for the county's economy. Awarding a concessions contract to one ferryboat business and one seaplane business would be a long-term major economic benefit to those businesses and a long-term major adverse impact on current operators who were not awarded the contracts. Establishing intrapark transportation would provide added revenue opportunities for the concessioner and more employment opportunities in the county. Charter fishing operators could experience a minor reduction in revenues from eliminating recreational fishing from the research natural area of the park. However, other opportunities would be available for charter fishing operators in other nearby waters. The cumulative impacts of establishing no-fishing areas would have moderate long-term beneficial impacts on marine populations, recreational and commercial fishing, and the regional economy.	Same as alternative C except that concessioner could increase income by picking up private boaters and taking them into the research natural area.	Implementing alternative E would have negligible effects on county or regional tourism or recreational opportunities. Establishing the visitor contact facility in Key West might attract more visitors to Key West, resulting in minor long-term benefits for the county's economy. Awarding a concessions contract to one ferryboat business and one seaplane business would be a long-term major economic benefit to those businesses and a long-term major adverse impact on current operators who were not awarded the contracts. Establishing intrapark transportation, restricting private boat use, and permitting the concessioner to provide all commercial services would provide additional revenue opportunities for the concessioner and more employment opportunities in the county. Charter fishing operators and other current CUA operators could experience a minor reduction in revenues because of the requirement for all activities in the park to be done through the two concessioners. The cumulative impacts of establishing no-fishing areas would have moderate long-term beneficial impacts on marine populations, recreational and commercial fishing, and the regional economy.

IMPACT TOPIC	ALTERNATIVE A — NO ACTION	ALTERNATIVE B	ALTERNATIVE C — PROPOSED ACTION	ALTERNATIVE D	ALTERNATIVE E
IMPACTS ON LAND USE					
	The land exchange for the facility in Key West would not conflict with any known land use plans or regulations. Therefore, the impacts on land use of implementing this alternative would be minor.	Same as alternative A.	Same as alternative A.	Same as alternative A.	Same as alternative A.
IMPACTS ON PARK OPERATIONS AND FACILITIES					
	Implementing alternative A would have long-term moderate adverse impacts on park operations and facilities in terms of the staff's ability to meet the demands of increasing visitor numbers. Installing energy-efficient insets in the casemates, improving the utilities and communications systems, providing adequate office and storage space, using renewable energy resources, and dispersing pre-visit information would have major long-term beneficial impacts on park operations and facilities. Visitor facilities would not accommodate all visitors during peak periods.	Implementing alternative B would have long-term moderate beneficial impacts on park operations as a result of increasing staff numbers and establishing visitor capacities at selected park sites. Installing energy-efficient insets in the casemates, improving the utilities and communications systems, providing adequate office and storage space, using renewable energy resources, and dispersing pre-visit information would have major long-term beneficial impacts on park operations and facilities. Using mooring buoys or other devices would be labor intensive and require special equipment, knowledgeable personnel, and a dedicated cyclic budget — a minor adverse impact under this alternative.	Implementing alternative C would have long-term moderate to high adverse impacts on park operations due to establishing visitor capacities and increasing staff numbers. More patrols would be required. Operations would be more efficient and safe. The burden on the park's limited facilities would be eased with a concession self-contained ferry operation. Using mooring buoys or other devices would be labor intensive and require special equipment, knowledgeable personnel, and a dedicated cyclic budget — a moderate to high adverse impact. Awarding concession contracts would increase NPS staff time needed to manage and monitor the commercial services program. Concessioners would provide a park funding source.	Same as alternative C.	Same as alternative C except that NPS effort to manage the commercial services program would be further increased and implementing and maintaining the mooring system would be a major impact on park operations under this alternative.

RECOMMENDATIONS FOR FURTHER RESEARCH AND PLANNING

Natural resource management programs would be based on research coordinated with the Florida Keys National Marine Sanctuary, the state, the U.S. Fish and Wildlife Service, the U.S. Biological Service, and others. Priorities for research would be based on the park's primary purpose to preserve and protect the natural, historic, scenic, marine, and scientific values of the area while balancing opportunities for people to learn from them and enjoy and be inspired by them. To prevent significant long-term adverse impacts in the park, the following topics would require more study:

- threatened or endangered plants and animals and their habitats
- water quality and potential sources of pollution
- long-term monitoring of impacts of human use on resources
- long-term monitoring of impacts of natural forces on resources
- refinement of indicator species and communities
- effects of recreational fishing in the zones in which it is allowed
- soundscape management
- effects of establishment of areas in which no fishing is allowed
- historic structure reports
- cultural landscape reports
- archeological research design and data recovery reports
- submerged cultural resources plan

There is an unusually strong emphasis on public education and interpretation in Dry Tortugas National Park's enabling legislation, significance statements, and mission goals. The first thing stated in the park's enabling legislation (PL 102-525) is that the park has been established "to preserve and protect for the education, inspiration, and enjoyment of present and future generations…" Within the management purposes identified in the legislation, interpretation is twice mentioned. In addition to historical, cultural and natural values, two of the park's statements of significance are directly tied to its educational value.

Interpretation has many roles in a national park. Interpretation is a form of resource management — educating visitors to reduce resource damage. However, the greater goal of interpretation is to provide visitors with an understanding and appreciation of the significance of Dry Tortugas National Park, its resources, and the roles of those resources in the ecosystem, history, and the world. Beyond that, an overlying role is to actively contribute to increasing a scientifically, historically, and culturally literate society — a constituency that supports and understands the value of preservation and conservation. The future of Dry Tortugas National Park depends on not only responsible management, but also an informed and involved public. Interpretation is a NPS tool that fosters public awareness and appreciation of the natural and historical features of the parks, promotes an understanding of ecological concepts and relevance of historical knowledge, and instills a sense of stewardship towards the national park system, the earth, and all of its inhabitants.

The following plans and documents might be completed to help implement the recommendations of this management plan

- concessions contract prospectus
- water resource management plan (includes water quality monitoring program plan)
- research plan
- vegetation management plan
- rare, threatened, and endangered species management plan
- park interpretation plan
- collections management plans
- park administrative history
- visitor use management plan
- exhibit plans (an Everglades/Dry Tortugas wayside exhibit plan is in progress)
- cultural resource management plan, with submerged cultural resources component
- soundscape management plan
- resource management plan
- regulations
- monitoring programs that need to be initiated to measure the condition of the resources and visitor experiences to ensure that the desired conditions stated in the plan are being met.

ACTIONS CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

The fisheries protection practice called "catch and release" — that is to catch fish but to return them to the water immediately, was considered but rejected as a protection strategy. Data show that injury and mortality rates to fish caught and then released do not support the intent and goals of the research natural area zone. If management in this zone and in the similarly managed areas of the Florida Keys National Marine Sanctuary are successful, catch and release in the natural/cultural and the historic preservation/ adaptive use zones is unnecessary. This management action was therefore eliminated from further study.

There were no other actions that were within the scope of this plan that were considered and then eliminated.

AFFECTED ENVIRONMENT

NATURAL RESOURCES

Dry Tortugas National Park, a 100-square-mile (250-square-kilometer) area about 70 miles (118 kilometers) is west of Key West, Florida. The park is a unique tropical marine environment of national significance, renowned for its productive coral reef ecosystem, diverse and abundant natural resources, and spectacular scenic beauty. The park is comprised of seven atoll-like tropical islands that are in an elliptical pattern. The elevation of land masses range from sea level to 82 feet (25 meters) below sea level in the park — part of the extension of the Florida shelf. The Dry Tortugas region extends westward from the Marquesas Keys to the southwestern end of the Florida Keys, which is a 236-mile- (380-kilometer-) long chain of about 1,200 islands that separates the shallow waters of Florida Bay to the north from the Atlantic Ocean in the east and the Gulf of Mexico and Straits of Florida in the west and south, respectively.

The Tortugas region plays a critical role in the function and dynamics of the larger Florida Keys coral reef ecosystem. The Florida Keys encompass many varied inter-dependent habitats including subtropical embayments and lagoons, mangrove stands, coral islands, sponge and gorgonian and sea grass beds, and coral reefs. The abundance, distribution, and productivity of many natural resources, such as reef fishes, macroinvertebrates, soft and hard corals, sea grasses, etc., are tightly linked to the oceanographic environment and biophysical connections between these habitats.

Spawning migrations, oceanographic processes, and the life stages of many key reef species help to provide critical sources of essential nutrients, foods, larvae, and adult animals that support the region's productivity (Lee et al. 1994, Lindeman et al. 2000a). Oceanographic features such as gyres, eddys, and seasonal current reversals (Lee et al. 1999) facilitate transport and dispersion of larvae to suitable downstream coastal bays and near-shore habitats. These nursery areas in Biscayne and Everglades National Parks and Florida Bay provide sanctuary for spiny lobster and many juvenile fishes that occupy reefs as adults, including barracuda, hogfish, lobsters, pink shrimp, many grunts, and most snappers and groupers (Chester and Thayer 1990). The region also provides essential food resources for a host of key predator-prey interactions in the coral reef ecosystem, and for support of migrating sea turtles, sea birds, marine mammals, and large fishlike mackerels, tunas, and billfishes.

The unique biophysical environment of the Dry Tortugas National Park supports a rich base of natural resources, including an extraordinary diversity of essential and unique habitats, fishery resources, wildlife resources, and environmental settings. As in the Florida Keys National Marine Sanctuary's environmental impact statement, a summary of scientific studies conducted at the park can be found in Schmidt and Pikula's annotated bibliography (NPS 1997b).

ESSENTIAL AND UNIQUE HABITATS

Coral Reefs

Coral reefs are among the most diverse and biologically complex ecosystems on earth. These "rainforests of the sea" provide economic and environmental benefits to millions of people as areas of natural beauty and recreation, sources of food, jobs, chemicals, pharmaceuticals, and shoreline protection. Now under threat from multiple stresses that are overwhelming their natural resilience, coral reefs are deteriorating worldwide at alarming rates. An estimated 10% of the world's reefs have already been lost and 60% are threatened by bleaching, disease, and a variety of human activities including shoreline development, polluted

runoff from agricultural and land-use practices, ship groundings, overharvesting and destructive fishing practices, and global climate change. Sustained downward trends in coral reef health suggest that these ancient ecosystems are in peril.

The coral reefs of the park and the Tortugas region have some of the best developed and most luxuriant corals found in the Caribbean. The Tortugas region has a full range of hard and soft corals with more than 75 species, some of which are rare elsewhere (Miller and Swanson 2000; table A1). In fact, some of the most pristine and vibrant portions of the Florida Keys coral reef ecosystem are protected within the park's boundaries, and others are just outside park boundaries on the Tortugas Bank. A small community of elkhorn *(Acropora palmata)* and fused staghorn *(Acropora prolifera)* coral formations in the Long Key/Bush Key tidal channel is at risk of local extinction. This community is the only place in the Dry Tortugas where elkhorn coral is found.

The park and surrounding region contain both deep and shallow reef formations that support different fish faunas as well as different life stages (larval, juvenile, and adult). These different stages have different distribution patterns among habitats. A unique feature is the exceptional deep coral reef resources of the area, e.g., "Sherwood Forest" and "Loggerhead Forest." These luxuriant coral formations are exquisitely developed and may be the oldest living coral reefs found throughout the Americas (R.N. Ginsburg, Professor of Marine Geology, pers. comm., 1999). These formations provide excellent habitat for reef fishes and lobsters and are well known by fishermen for their productivity.

These resources also play a vital role in South Florida's efforts to recover and maintain a balanced and sustainable marine ecosystem. However, observations of coral disease outbreaks throughout the upper Keys, coupled with declining water quality, make coral reefs a particular concern (Porter and Meier 1992; Porter et al. 1994). Increased use and human contact may further diminish the quality and productivity of corals to the regional ecosystem.

Other Underwater (Benthic) Habitats

Other underwater habitats in the park include immense and relatively diverse hardbottom communities of sponges and gorgonians, many of which are unique to the Tortugas. Sea grasses provide unique links in nutritional cycles, cover that animals use to avoid predators, and the sustained production of debris that is essential to food web productivity. The Tortugas area has the highest diversity of sea grass species compared to waters around the Florida Keys (Fourqurean et al. 1999). Many of these habitats are extremely important to juvenile reef fishes. The park also contains large areas of sand and mixed-hardbottom communities. The distribution and abundance of these various communities are important considerations in resource management and assessment.

Underwater Habitat Distribution

The distribution of coral reef, hardbottom, and sea grass interpreted from aerial photographs and side-scan sonar are shown in figure B1 for both the park and the Tortugas Bank. Within the park, a mixture of shallow-water sea grasses, deepwater bare sand, and hardbottoms with moderate shallow-water patch and bank reef development prevail. The north and west areas of the Tortugas Bank form a mosaic of extensive, robust, deepwater reefs adjacent to low-relief, hardbottom and sand-covered areas (Bohnsack and McClellan 1998). The coral reef habitat is further broken down into four distinct reef types: patch reefs, fore reefs, reef flats, and deep reefs (appendix F, table A2a). Each of these reef types is used differentially by the reef fish community. The distribution of reef type and sea grass, sand, and hardbottom communities for the park only is shown on figure B2. Figure B3 presents community types with an overlay of the proposed action, which shows that 10 of the 11 community types are represented in the proposed alternative. The total area of each of these park habitats, by depth category, is shown in table A2b (appendix F). The deep reefs, although not represented on the map of figure B2 because they are too deep to be

Table A1: List of stony coral, gorgonian, and sponge species sampled in the Florida Keys coral reef tract by NURC divers, 1998–99.

STONY CORALS (45 TAXA)

Phylum Cnidaria
Class Anthozoa
Orders Scleractinia & Millenorina
Acropora cervicornis
Acropora palmata
Agaricia agaricites
Agaricia fragilis
Agaricia humilis
Cladocora arbuscula
Colpophyllia natans
Dendrogyra cylindrus
Dichocoenia stokesi
Diploria clivosa
Diploria labyrinthiformis
Diploria strigosa
Eusmilia fastigiata
Favia fragum
Isophyllastrea rigida
Isophyllia sinuosa
Leptoseris cucullata
Madracis decactis
Madracis formosa
Madracis mirabilis
Manicina areolata
Meandrina meandrites
Millepora alcicornis
Millepora complanata
Montastraea annularis (I)
Montastraea faveolata (II)
Montastraea franksi (III)
Montastraea annularis spp
Montastraea cavernosa
Mussa angulosa
Mycetophyllia aliciae
Mycetophyllia danaana
Mycetophyllia ferox
Mycetophyllia lamarckiana
Oculina diffusa
Porites astreoides
Porites branneri
Porites divaricata
Porites furcata
Porites porites
Scolymia spp
Siderastrea radians
Siderastrea siderea
Solenastrea bournoni
Stephanocoenia michelinii

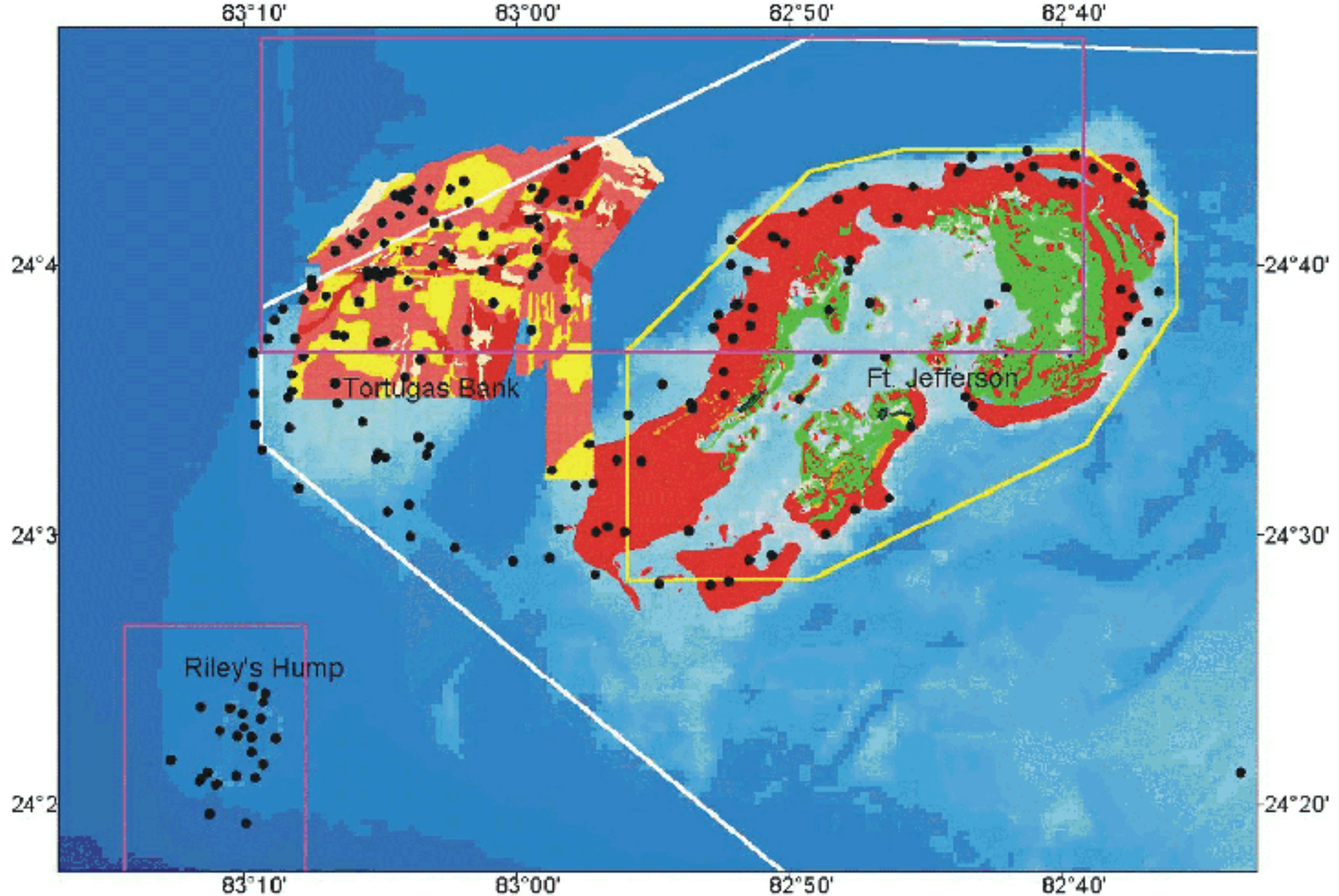
Gorgonians (30 Taxa)

Phylum Cnidaria
Class Anthozoa
Subclass Octocorallia
Briareum asbestinum
Erythropodium caribaeorum
Eunicea calyculata
Eunicea fusca
Eunicea knightii
Eunicea laciniata
Eunicea mammosa
Eunicea palmeri
Eunicea succinea
Eunicea tourneforti
Gorgonia ventalina
Muricea atlantica
Muricea elongata
Muricea muricata
Muriceopsis flavida
Plexaura flexuosa
Plexaura homomalla
Plexaurella dichotoma
Plexaurella grisea
Plexaurella nutans
Pseudoplexaura flagellosa
Pseudoplexaura porosa
Pseudoplexaura wagenaari
Pseudopterogorgia acerosa
Pseudopterogorgia americana
Pseudopterogorgia bipinnata
Pseudopterogorgia rigida
Pterogorgia anceps
Pterogorgia citrina
Pterogorgia guadalupensis

Sponges (59 Taxa)

Phylum Porifera
Class Demospongeae
Agelas clathrodes
Agelas conifera
Agelas dispar
Agelas schmidti
Agelas wiedenmayaari
Amphimedon compressa
Amphimedon viridis
Anthosigmella varians
Aplysina archeri
Aplysina cauliformis
Aplysina fistularis
Aplysina fulva
Aplysina lacunosa
Callyspongia plicifera
Callyspongia vaginalis
Chondrilla nucula
Chondrosia sp
Cinachyra sp
Clathria sp
Cliona deletrix
Cliona langae
Cliona sp (brown encrusting)
Cribochalina vasculum
Desmapsamma anchorata
Diplastrella megastellata
Dysidea etheria
Ectyoplasia ferox
Erylus formosus
Geodia neptuna
Haliclona hogarthi
Halisarca sp
Holopsamma helwigi
Iotrochota birotulata
Ircinia campana
Ircinia felix
Ircinia strobilina
Monanchora barbadensis
Monanchora unguifera
Mycale laevis
Neofibularia notilangere
Niphates digitalis
Niphates erecta
Oligoceras hemorrhages
Pandaros acanthifolium
Plakortis angulospiculatis
Phorbas sp
Pseudoceratina crassa
Pseudoaxinella lunaecharta
Ptilocaulis sp
Rhaphidophlus venenosus
Siphonodictyon
Siphonodictyon siphonum
Spheciospongia vesparium
Spirastrella coccinea
Strongylacidon sp
Ulosa ruetzleri
Verongula gigantea
Verongula rigida
Xestospongia muta

Figure B1: Spatial distribution of coral reef (red and pink), hardbottom (orange and yellow), and seagrass (green) habitats in the Dry Tortugas region interpreted from aerial photogrammetry and side-scan sonar (data sources: Florida Marine Research Institute and NOAA). Black dots indicate fish and habitat sampling sites from the 1999 NURC survey (Ault and Bohnsack 1999).



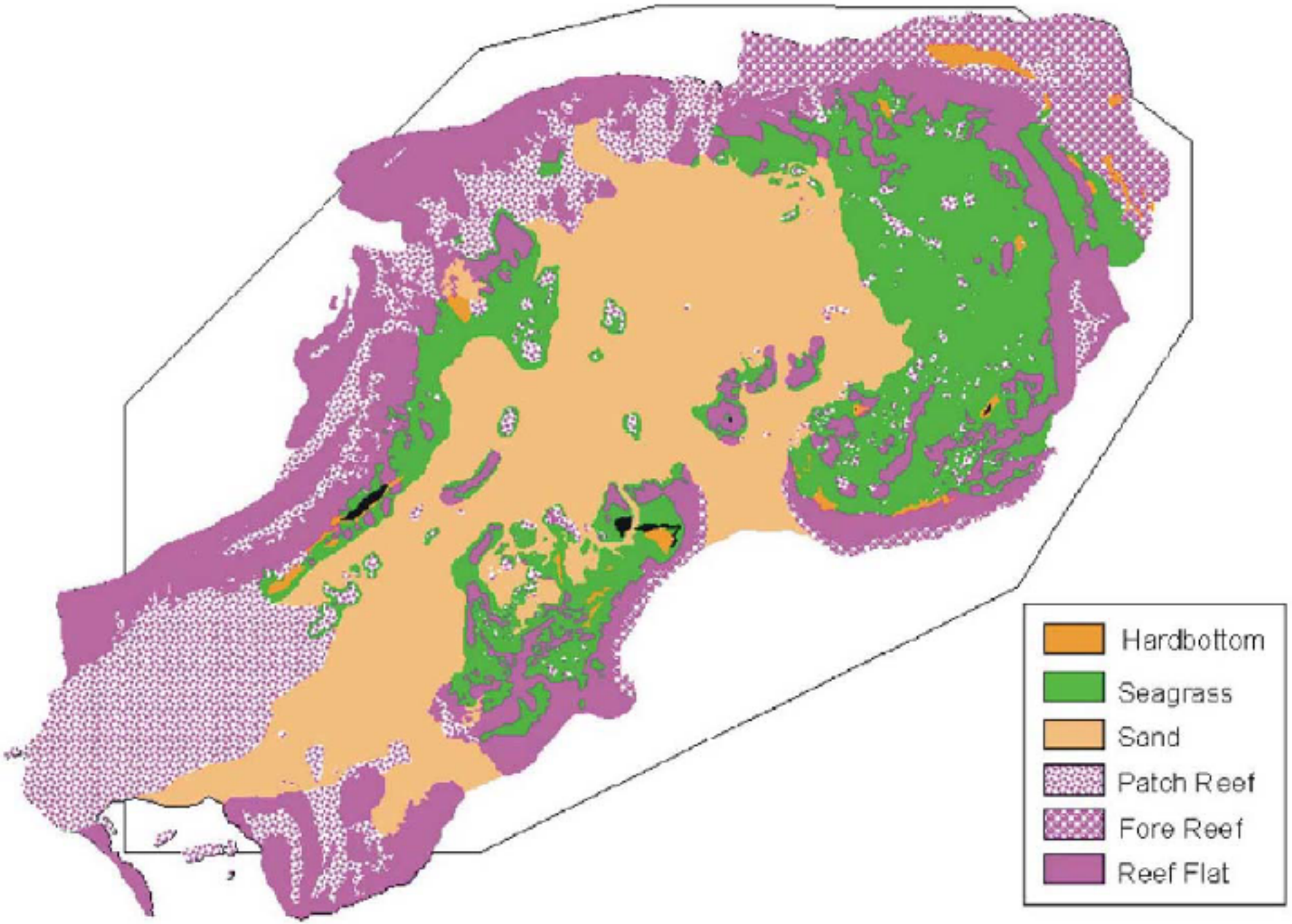
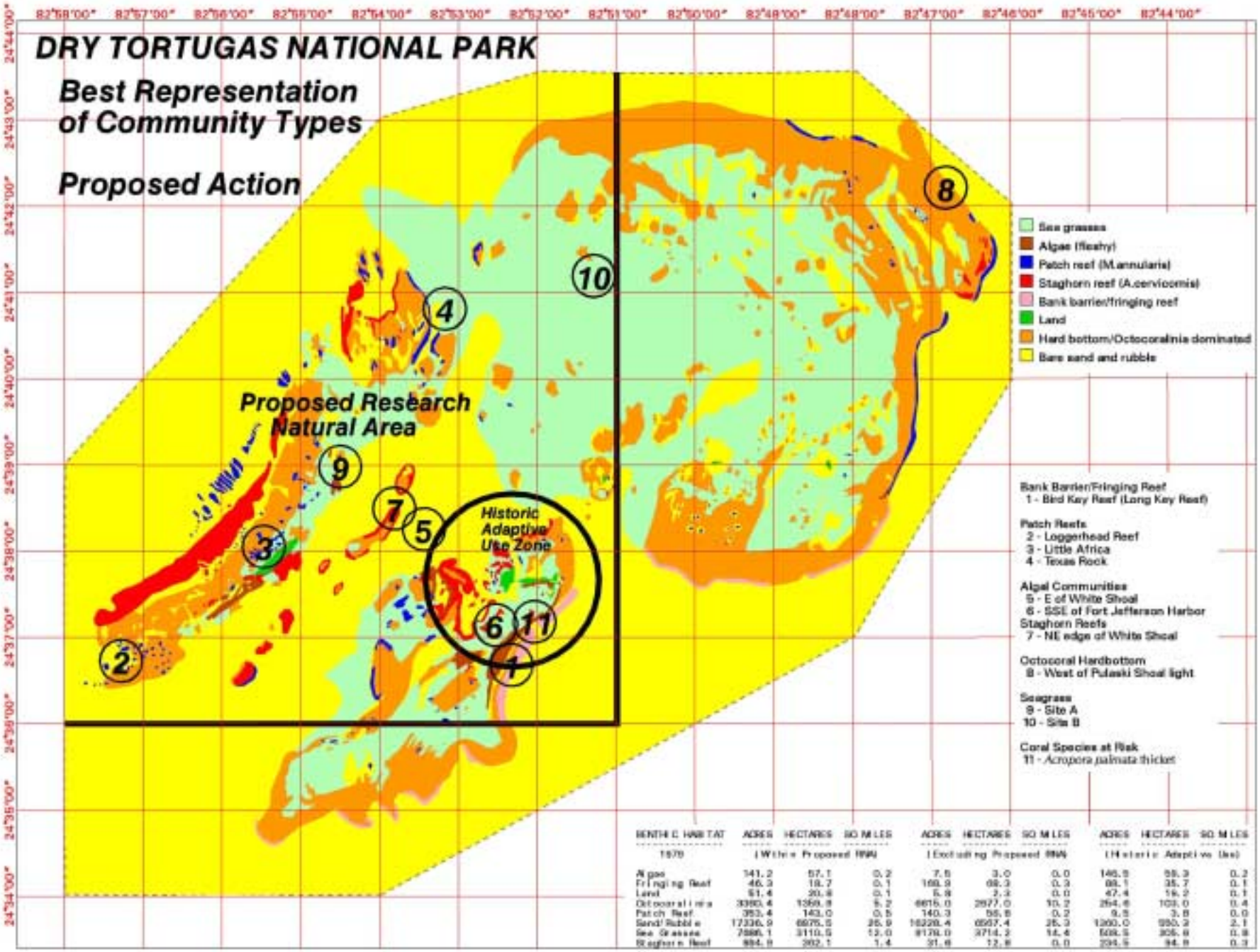


Figure B2: Distribution of benthic habitats within the park boundaries synthesized according to reef-type scheme developed by Meester (2000).



BENTHIC HABITAT 1979	ACRES (Within Proposed RNA)	HECTARES (Within Proposed RNA)	SQ MILES (Within Proposed RNA)	ACRES (Excluding Proposed RNA)	HECTARES (Excluding Proposed RNA)	SQ MILES (Excluding Proposed RNA)	ACRES (Historic Adaptive Use)	HECTARES (Historic Adaptive Use)	SQ MILES (Historic Adaptive Use)
Algae	141.2	57.1	0.2	7.5	3.0	0.0	146.8	59.3	0.2
Fringing Reef	46.3	18.7	0.1	169.9	68.3	0.3	88.1	35.7	0.1
Land	61.4	20.8	0.1	5.8	3.3	0.0	47.4	19.2	0.1
Octocoralinia	3360.4	1359.8	5.2	6615.0	2677.0	10.2	264.6	103.0	0.4
Patch Reef	353.4	143.0	0.5	140.3	56.8	0.2	9.5	3.8	0.0
Sand/Rubble	17336.9	6975.5	26.9	16228.4	6567.4	25.3	1260.0	950.3	2.1
Sea Grasses	7886.1	3110.5	13.0	8178.0	3714.3	14.4	508.5	205.8	0.8
Staghorn Reef	884.9	282.1	1.4	31.6	12.8	0.0	234.5	94.9	0.3

seen from aerial photos, are along the outer boundaries of the represented reef.

Deep reef areal extent was estimated based on bathymetry, shelf location, sampling, and expert opinion. Notably, the most pronounced differences in habitat distributions in the Tortugas region occur from east to northeast.

Terrestrial Habitats

The terrestrial environment of the park consists of seven islands that contain more than 200 species of plants and fauna; less than 50 of these species are native (NPS 1997a). The smaller keys, East, Bush, and Long, have mainly native plants due to limited visitation by large vessels and no permanent habitation by humans. Garden Key contains a large percentage of introduced plant species. All of the islands also contain beaches and associated intertidal habitats. These unique coral and sand island environments provide buffers to inclement seas and shallow-water habitats, and also provide critical shelter and vegetation resources for birds and turtles.

FISHERY RESOURCES

Dry Tortugas National Park fishery resources play important ecological and socioeconomic roles. The sheer number of different fishes (species) and fisheries (different kinds of fish communities and human-related fishing activities) in this region is extraordinary. More than 300 species of reef fish have been identified in the park (table A3) (Longley and Hildebrand 1941, Ault and Bohnsack 1999). The distribution and abundance of reef fish in coral reef environments is greater in the park than outside the park (Bohnsack et al. 1994). A number of important reef fishes and macroinvertebrates like groupers, snappers, spiny lobster, and pink shrimp have substantial regional economic and ecological value to the dynamics, productivity, and functioning of the broader Keys marine environment (Bohnsack et al. 1994). The productive marine environment of the Tortugas is also important to a host of other important bait, pelagic, and reef fishery resources (Meyer et al. 1983). Reef fishes can be used as sensitive indicators of environmental stress, because during their migrations from coastal bays as juveniles to the coral reefs as adults they encounter most natural and human-induced stresses found across the ecosystem.

The reef community can be divided into the following categories: (1) exploited (harvestable) reef fishes, such as snappers, groupers, and grunts; (2) exploited macroinvertebrates such as pink shrimp, spiny lobster, and queen conch; (3) unexploited prey including invertebrates, blennys, gobies, and the reef herbivore community such as butterflyfishes, damselfishes, surgeonfishes, and parrotfishes; (4) sharks and rays; (5) migrating pelagic fishes such as kingfish, Spanish mackerel, dolphinfish, billfishes, tuna, and tarpon; and (6) baitfish like anchovy, sardine, herring, killifishes, mojarras, and scads that support much of the large migrating fishes and large piscivorous (fish-eating) reef fishes.

A comprehensive quantitative study of reef fish resources and essential habitats in the park and surrounding region was conducted through a cooperative effort of the University of Miami, the National Marine Fisheries Service, the University of North Carolina at Wilmington, the Florida Keys National Marine Sanctuary, the National Park Service, and the National Oceanic and Atmospheric Administration from late May to mid-July 1999, covering an area of about 350 square miles with 450 sites and more than 1,150 unique reef fish visual survey scuba diver samples. The distribution of diver sampling sites from the survey is shown in the previous figure B1. This data was used to determine spatial density distributions of juvenile reef fish and the distribution of the average length of harvestable individuals in the exploitable phase of the stock (e.g., Ault et al. 1998, Ault and Bohnsack 1999).

Table A3: List of families (52) and species (238) of fishes observed in visual samples from the Florida Keys by NOAA and University of Miami divers, 1979–1998 (Bohnsack et al. 1999). About 200 of these species were observed in the 1999 visual census of the Dry Tortugas region.

Rhincodontidae
Ginglymostoma cirratum
Carcharhinidae
Carcharhinus limbatus
Sphyrnidae
Sphyma lewini
Sphyma mokarran
Dasyatidae
Dasyatis americana
Urolophidae
Urolophus jamaicensis
Mylobatidae
Aetobatus narinari

Mobulidae
Manta birostris
Elopidae
Megalops atlanticus
Muraenidae
Gymnothorax funebris
Gymnothorax milaris
Gymnothorax moringa
Gymnothorax saxicola
Gymnothorax vicinus
Clupeidae
Harengula jaguana
Jenkinsia lamprotaenia
Exocetidae
Hemiramphus brasiliensis
Belonidae
Tylosurus crocodilus
Atherinidae
Atherinomorus stipes
Hypoatherina harringtonensis

Holocentridae
Holocentrus adscensionis
Holocentrus coruscus
Holocentrus marianus
Holocentrus rufus
Holocentrus vexillarius
Myripristis jacobus
Ostichthys trachypoma

Gobiidae
Coryphopterus dicrus
Coryphopterus eidolon
Coryphopterus glaucofraenum
Coryphopterus personatus
Gnatholepis thompsoni
Gobiosoma evelynae
Gobiosoma macrodon
Gobiosoma oceanops
Gobiosoma randalli
Ioglossus calliurus
Ioglossus helenae
Microgobius carri
Microgobius microlepis
Callionymidae
Paradiplogrammus bairdi
Fistularidae
Fistularia tabacaria

Serranidae
Diplectrum formosum
Epinephelus adscensionis
Epinephelus cruentatus
Epinephelus fulvus
Epinephelus guttatus
Epinephelus inermis
Epinephelus itajara
Epinephelus morio
Epinephelus striatus
Hypoplectrus chlorurus
Hypoplectrus gemma
Hypoplectrus guttavarius
Hypoplectrus indigo
Hypoplectrus nigricans
Hypoplectrus puella
Hypoplectrus unicolor
Liopropoma eukrines
Mycteroperca bonaci
Mycteroperca interstitialis
Mycteroperca microlepis
Mycteroperca phenax
Mycteroperca tigris
Mycteroperca venenosa
Paranthias furcifer
Rypticus saponaceus
Serranus baldwini
Serranus tabacarius
Serranus tigrinus
Serranus tortugarum
Priacanthidae
Priacanthus arenatus
Priacanthus cruentatus

Apogonidae
Apogon binotatus
Apogon psuedomaculatus
Malacanthidae
Malacanthus plumieri
Echeneidae
Echeneis naucrates
Gerreidae
Eucinostomus argenteus
Gerres cinereus
Inermidae
Inermia vittata

Sciaenidae
Equetus acuminatus
Equetus lanceolatus
Equetus punctatus
Equetus umbrosus
Odontoscion dentex
Scombridae
Scomberomorus cavalla
Scomberomorus maculatus
Scomberomorus regalis
Aulostomidae
Aulostomus maculatus
Scorpaenidae
Scorpaena plumieri

Carangidae
Alectis ciliaris
Caranx bartholomaei
Caranx crysos
Caranx hippos
Caranx latus
Caranx ruber
Decapterus macarellus
Decapterus punctatus
Elagatis bipinnulata
Seriola dumerili
Seriola rivoliana
Trachinotus falcatus

Lutjanidae
Lutjanus analis
Lutjanus apodus
Lutjanus buccanella
Lutjanus cyanopterus
Lutjanus griseus
Lutjanus jocu
Lutjanus mahogoni
Lutjanus synagris
Ocyurus chrysurus
Pristipomoides aquilonaris
Rhomboplites aurorubens
Haemulidae
Anisotremus surinamensis
Anisotremus virginicus
Haemulon album
Haemulon aurolineatum
Haemulon carbonarium
Haemulon chrysargyreum
Haemulon flavolineatum
Haemulon macrostomium
Haemulon melanurum
Haemulon parra
Haemulon plumieri
Haemulon sciurus
Haemulon striatum
Sparidae
Archosargus probatocephalus
Archosargus rhomboidalis
Calamus bajonado
Calamus calamus
Calamus penna
Calamus proridens
Diplodus argenteus
Diplodus holbrooki
Lagodon rhomboides
Ostraciidae
Lactophrys bicaudalis
Lactophrys polygonia
Lactophrys quadricornis
Lactophrys trigonius
Lactophrys triqueter
Centropomidae
Centropomus undecimalis

Mullidae
Mulloidichthys martinicus
Pseudopeneus maculatus
Pempheridae
Pempheris schomburgki
Kyphosidae
Kyphosus sectatrix
Ephippidae
Chaetodiperus faber
Chaetodontidae
Chaetodon capistratus
Chaetodon ocellatus
Chaetodon sedentarius
Chaetodon striatus
Pomacanthidae
Centropye argi
Holacanthus bermudensis
Holocanthus ciliaris
Holocanthus tricolor
Pomacanthus arcuatus
Pomacanthus paru
Pomacentridae
Abudefduf saxatilis
Chromis cyanea
Chromis enchrysurus
Chromis insolata
Chromis scotti
Microspathodon chrysurus
Pomacentrus diencæus
Pomacentrus fuscus
Pomacentrus leucostictus
Pomacentrus partitus
Pomacentrus planifrons
Pomacentrus variabilis
Cirrhitidae
Amblycirrhitus pinos
Sphyraenidae
Sphyraena barracuda
Sphyraena picudilla
Opistognathidae
Opistognathus aurifrons
Opistognathus whitehursti
Blenniidae
Hypleurochilus bermudensis
Ophioblennius atlanticus

Scartella cristata
Balistidae
Aluterus monoceros
Aluterus schoepfi
Aluterus scriptus
Balistes capriscus
Balistes vetula
Cantherhines macrocerus
Cantherhines pullus
Canthidermis sufflamen
Melichthys niger
Monacanthus hispidus
Monacanthus tuckeri

Labridae
Bodianus pulchellus
Bodianus rufus
Clepticus parrae
Doratonotus megalepis
Halichoeres bivittatus
Halichoeres cyanocephalus
Halichoeres garnoti
Halichoeres maculipinna
Halichoeres pictus
Halichoeres poeyi
Halichoeres radiatus
Hemipteronotus martinicensis
Hemipteronotus novacula
Hemipteronotus splendins
Lachnolaimus maximus
Thalassoma bifasciatum
Scaridae
Cryptotomus roseus
Nicholsina usta
Scarus coelestinus
Scarus coeruleus
Scarus croicensis
Scarus guacamaia
Scarus taeniopterus
Scarus vetula
Sparisoma atomarium
Sparisoma aurofrenatum
Sparisoma chrysopterum
Sparisoma rubripinne
Sparisoma viride
Clinnidae
Acanthemblemaria aspera
Acanthemblemaria chaplini
Emblemaria pandionis
Hemiemblemaria simulus
Labrisiomus nuchipinnus
Malacoctenus gilli
Malacoctenus macrops
Malacoctenus triangulatus
Malacoctenus versicolor
Paraclinus marmoratus
Paraclinus nigripinnis
Acanthuridae
Acanthurus bahianus
Acanthurus chirurgus
Acanthurus coeruleus
Bothidae
Bothus lunatus
Bothus ocellatus
Tetradontidae
Canthigaster rostrata
Chilomycterus antennatus
Chilomycterus schoepfi
Diodon holocanthus
Diodon hystrix
Sphoeroides splengleri

The data was also used to determine the spatial distribution of diversity, abundance, size, and distribution of the entire reef fish community and the snapper-grouper-grunt complex. A total of 194 reef fish species were seen throughout the Dry Tortugas region, with 141 of those seen in the park. The snapper-grouper-grunt complex is comprised of 35 species for the region, and 28 of those species reside in the park, including the endangered and/or protected Nassau grouper *(Epinephelus striatus)* and Jewfish *(Epinephelus itajara)*.

WILDLIFE RESOURCES

Rare, Threatened, or Endangered Animal Species

The Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service were consulted regarding the presence of threatened, endangered, and special concern species that may occur in the park or are migrating species. According to the U.S. Fish and Wildlife Service, five species of sea turtles may be found in the waters of the park, and the loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles nest on park islands. In addition, the West Indian manatee (*Trichechus manatus*) and a number of bird species use the islands and waters within the park. The U.S. Fish and Wildlife Service reports there is no designated critical habitat within park boundaries. (See appendix G for complete list of species in Monroe County.)

Endangered, threatened, or special concern species listed by the Florida Fish and Wildlife Conservation Commission as potentially occurring in or adjacent to Dry Tortugas include one fish, seven amphibians and reptiles, 18 bird species, three mammals, and one invertebrate (see appendix G).

The park is also home to several species of fish protected by the National Marine Fisheries Service, including the Jewfish *(Epinephelus itajara)* and the Nassau grouper *(Epinephelus striatus)*.

Birds

About 300 migratory bird species occur in South Florida that the U.S. Fish and Wildlife Service is required to protect and conserve under authorities such as the Fish and Wildlife Coordination Act and the Migratory Bird Treaty Act. (See appendix G.) The seven small coral-sand islands at the park provide critical nesting and feeding habitats for substantial numbers of sea birds, including the white-tailed tropicbird *(Phaethon lepturus)*, magnificent frigate bird *(Fregata magnificens)*, masked bobby *(Sula dactylatra)*, red-footed booby *(Sula leucogaster)*, brown pelican *(Pelecanus occidentalis)*, laughing gull *(Larua articilla)*, royal tern *(Sterna maxima)*, sandwich tern *(Sterna sandvicensis)*, roseate tern *(Sterna dougallii)*, sooty tern *(Sterna fuscata)*, least tern *(Sterna antillarum)*, brown noddy *(Anous stolidus)*, and black noddy *(Anous minutus)* (NPS 1994). The park affords unique opportunities for seeing tropical seabirds, including the only significant nesting colonies in the United States for sooty and noddy terns and harbors the only frigate bird nesting colonies in the continental United States.

Sea Turtles

The park area includes the most isolated and least disturbed nesting habitat for several endangered and threatened sea turtles in the United States. Loggerhead turtles *(Caretta caretta)* are the most abundant species to nest in the Dry Tortugas and have the largest population size of any sea turtles in the United States (NPS 1998). The earliest accounts of green turtle *(Chelonia mydas)* nesting in Florida are from the Dry Tortugas (Audubon 1926; Gifford 1934). Turtles were so abundant that between 1858 and 1859 more than 39,588 pounds of turtle meat was consumed by soldiers stationed at Fort

Jefferson. More current information reveals that the park is one of the most significant Florida green turtle nesting colonies in the Caribbean (Meylan et al. 1995). During recent years of monitoring throughout the nesting season, a total of 1,652 turtle crawls produced 728 nests and an estimated 58,958 eggs (NPS 1998). Available evidence suggests that this population differs genetically from other significant Caribbean populations (Allard et al. 1994). Three other species of turtles are known from Florida Keys waters that might be found in or near park waters on occasion.

Marine Mammals

Nineteen species of marine mammals are known from South Florida waters, and 10 additional species may occur there, based on strandings and sightings in nearby waters (NPS 1998). Only two of the 19 species are known to occur in the park from live, nonstranded sightings — the bottlenose dolphin and the Florida manatee; another three species have been found stranded within the park or in nearby waters — (Fraser's dolphin, short-finned pilot whale, and false killer whale (NPS 1998). The remaining species may occur or pass through park waters from time to time.

ENVIRONMENTAL SETTING

Soundscape/Night Lighting

The Dry Tortugas National Park provides a very unique and rare natural setting due to its remote location and remarkable environmental makeup. The remote location of the park provides an ambience of extreme quiet and natural soundscapes, including a backdrop of migrating birds and the ocean. The distance from civilization also provides a rare opportunity for people to experience the night sky without the interference of city lights that dramatically inhibit the view of the stars.

Wetlands

Wetlands are identified on the U.S. Fish and Wildlife Service's *National Wetland Inventory* 7.5-minute quadrangle map for the Dry Tortugas area. The map classifies areas around the islands in the park and large areas south of the fort and west of Loggerhead Key primarily as marine subtidal and intertidal wetlands. The marine system consists of the open ocean overlying the continental shelf and its associated coastline. Marine habitats are exposed to the waves and currents of the open ocean, and the ebb and flow of oceanic tides is the primary determinant of whether the area is subtidal (continuously submerged) or intertidal (exposed and flooded by tides). Large areas of wetlands in the park are in the aquatic bed class and rooted vascular subclass, also called sea grass beds, among other terms. Wetlands occurring primarily immediately around the islands are in the unconsolidated shore class and the irregularly exposed or regularly flooded subclasses.

Small areas of estuarine subtidal and intertidal wetlands occur in the northwestern portion of Garden Key and near Bush, Long and East Keys. The estuarine system consists of deepwater tidal habitats and adjacent tidal wetlands that are usually partially enclosed by land and have partly obstructed or sporadic access to the open ocean. The ocean water is at least occasionally diluted by freshwater runoff from the land. (Cowardin et al 1979)

Water Quality

The lack of major sewage and runoff areas, along with the dynamic ocean currents running through the park, provide fairly pollution-free waters for natural resources and human enjoyment. Results of a long-term monitoring project conducted by Florida International University (Boyer and Jones, 2000) provide trends in water quality over the last decade in the western part of Florida Bay, an area that directly influences

the water quality around the park. During the period of observation, the salinity declined by 5.6 ppt (parts/thousand), most likely due to increased average rainfall. Turbidity has increased by a factor of 4 due most likely to the loss of sea grass coverage and its stabilizing influence on the bottom and sediments. Although there was a significant increase in chlorophyll *a* concentrations in the western part of the bay, these levels are still modest by estuarine standards.

RESOURCE MONITORING

Dry Tortugas National Park was established in 1992 "to preserve and protect nationally significant natural, historic, scenic, marine, and scientific values in South Florida." To assess if current management activities are fulfilling this congressional mandate, a number of scientific projects systematically monitor the natural and cultural resources of the park. In addition to Florida International University's long-term monitoring project for water quality mentioned above, as part of the Florida Keys National Marine Sanctuary's and the Environmental Protection Agency's water quality protection program, Florida International University's Southeast Environmental Research Center monitors various water quality parameters inside the park on a quarterly basis. Likewise, the university also monitors sea grass presence and density at a number of stations inside the park. These projects have been ongoing since 1996.

The Americorps Program, Florida International University, and now the University of Florida's Center for Sea Turtle Research have monitored the status and trends of nesting sea turtles since 1995. Data collected include the number and location of successful nests as well as histological analysis of randomly selected hatchlings. The Florida Marine Research Institute (FMRI) has monitored six long-term (1989–present) coral habitat stations on an annual basis, documenting coral diversity and percent cover. The sanctuary's coral reef monitoring program set up four permanent coral sampling locations inside park waters in 1999. During the last three years, FMRI scientists have also noted the abundance, size, and fecundity of spiny lobsters *(Panulirus argus*) inside park waters (Bertleson and Hunt 1997).

Scientists at the University of Miami's Rosenstiel School, the National Marine Fisheries Service, and the University of North Carolina at Wilmington have been conducting spatially intensive assessments of the Tortugas multispecies coral reef fish populations and habitats inside the park since 1994. On at least an annual basis, collaborating scientists using scuba gear visually survey all reef fish populations, assessing and quantifying the spatial distribution of diversity, abundance, numbers and sizes (biomass), exploitation levels, surplus yields of the multispecies coral reef fish community, and reef fish habitat preferences. In a substantially more limited effort, volunteers from The Reef Environmental Educational Foundation also list species and give rough counts of coral reef fishes at sites within the park on an annual basis as part of their roving diver field technique.

Because of the park's remoteness (about 70 miles or 118 kilometers west of Key West), monitoring projects are very expensive to fund, require collaborative efforts, and rarely involve more than annual or semiannual sampling. Because of the park's extreme importance as a regional reference site, sampling has taken place after any extreme or unusual events have occurred. Examples of these include the passage of Hurricane George, strong thermal stresses such as pronounced upwelling events, or coral bleaching and disease outbreaks.

CULTURAL RESOURCES

PREHISTORIC ARCHEOLOGY

There are no recorded prehistoric sites in the Dry Tortugas, and aboriginal occupation or use of the islands is not well documented in historical records. The scarcity of readily available fresh water would likely have been a limiting factor, impeding extensive or long-term habitation. The possibility, however, that prehistoric or early historic period activity did occur may be borne out through further ethnographic research and controlled surveys. Previous ground disturbance, from both human activities (e.g., the construction of Fort Jefferson) or natural events (such as wave erosion and storms) have likely obliterated or obscured land-based prehistoric remains that may have existed.

Despite the lack of surface discoveries, many archeologists consider it reasonable for submerged prehistoric artifacts and sites to be present in the area (Cockrell 1993, pp. 63-95). Paleo-Indian hunters and gatherers, for example, are known to have been in south Florida approximately 10,000 to 12,000 years before the present (B. P.). Sea levels at the beginning of that period were considerably lower (by 60 to 100 meters), and the region encompassing the Tortugas was then connected to the mainland peninsula by dry limestone uplands of the Florida continental shelf. Access to the Tortugas would therefore have been possible for these early nomadic people.

By the beginning of the Archaic cultural period (ca. 8,500 B. P.) seawaters had risen to within 25 meters of the current coastline. Archaic period people took advantage of the increased biological diversity that accompanied the period's warmer and wetter climate. They relied on an abundance of shellfish and other coastal resources, and supplemented fishing with intensive hunting and plant gathering. Populations increased significantly, and village communities were in existence by 7,000 B.P. in south Florida. They also used watercraft, and therefore had the means to travel between regional islands and mainland areas for cultural exchange and subsistence purposes.

Submerged areas in the Tortugas that were once accessible to prehistoric people are in many instances buried under several meters of coral reef, rubble, and accumulated sediments. Under favorable circumstances, cultural remains from these early inhabitants may have been preserved, and evidence might be uncovered by future archeological investigations. Consideration of submerged prehistoric resources should be addressed by project undertakings having the potential to disturb deep sediment layers.

SHIPWRECKS

The Dry Tortugas have served as important navigational points since 1513 when Spanish explorer Ponce de León's discovery of the islands brought them to the attention of European seafaring nations. Located at the maritime crossroads linking the Gulf of Mexico, the western Caribbean, and the Atlantic Ocean, the Tortugas' treacherous shallow reefs have claimed numerous ships navigating the 75-mile-wide Straits of Florida. More than 275 maritime casualties (ships that are totally lost, stranded, or impaired), have been historically documented within the 100 square miles of park waters. This represents one of the largest assemblages of shipwreck sites in North America.

These sites provide a rich archeological record spanning more than four centuries of international economic and political activity in the region. One vessel thought to be of Spanish origin and dating to 1622 is among the earliest recorded sites in the park. It is also likely that earlier undiscovered wrecks are present in park waters; before 1600,

Spanish fleets returning to Spain from Vera Cruz followed a route that brought them close to the Tortugas as they hugged the shore around the Gulf of Mexico. Following the era of European exploration and early colonial activity, historical records document repeated maritime casualties continuing to recent times. Sites such as the "East Key Construction Wreck" and the "Bird Key Harbor Brick Wreck" represent 19th century vessels that were en route to Fort Jefferson to deliver bricks and other building materials.

To date, 36 separate sites have been listed in the archeological database for the park. Of these, about one third have received thorough archeological documentation. Multiple ship casualties occurring in the same location at different times sometimes complicate the archeological record. Material remains associated with these sites commonly include anchors, rock and iron ballast, cannon or gun tubes, iron chain, fasteners, hardware, ceramics, brick, etc. The Windjammer off Loggerhead Key, with a portion of its iron hull exposed above water, is one of the few sites for which historical documentation has been correlated to confirm its identity. Constructed in Scotland in 1875 and originally named the *Killean*, the ship was under Norwegian ownership and renamed the *Avanti* at the time it went down in 1907. Ongoing research may provide more accurate historical correlation for other identified shipwreck sites.

NPS archeologists have compiled site information into a database that allows comparative analysis of the frequency of reported ship casualties, weather or storm factors, the influence of supply and demand on the seasonal timing and types of cargo transported, home ports, and other variables. The database has facilitated analysis of wreck sites as an interrelated collection having associated research values. Approached from this broader regional perspective, research may provide clearer insight into maritime historical processes and patterns of activity. These processes ultimately reflect world economic and political systems. One objective of the park's "Submerged Cultural Resource Strategy" (summarized in alternatives B–E and described in more detail in appendix H) is the preparation of a multiple-property National Register of Historic Places nomination that would document the significance of recorded shipwreck sites within this broad historic context.

Shipwrecks are attractive places for divers to explore because of the sense of discovery and curiosity they evoke. They also serve as suitable locations for the establishment of coral and other marine growth, providing habitat for a wide variety of fish and other aquatic species. The park is seeking to expand opportunities for visitors to experience selected sites/areas and to receive interpretive information regarding their importance. Currently, the Windjammer and Bird Key Harbor Brick Wreck sites are the only ones that the park encourages divers to visit; they are stabilized, well documented, and have no associated artifacts that could easily be removed by visitors.

Other sites that could be opened to public interpretation would have to be approved on the basis of at least the following criteria: the site would need to: (1) have documented historical and cultural significance that would further the park's educational and interpretive objectives; (2) be clearly recognizable as a wreck site by its appearance/configuration; (3) be stabilized and "hardened" (archeological values could not be compromised by artifact removal or other destructive activities); (4) serve multiple visitor use purposes (underwater photography, snorkeling, etc.); (5) have wide public accessibility under optimal conditions of visitor safety; and (6) be feasible for the park to effectively manage through the maintenance of mooring buoys, patrols, etc. A monitoring program would be put in place before any site would be opened to public visitation to assess possible visitor use

impacts. Archeologically sensitive sites would remain off limits to the public.

FORT JEFFERSON

Fort Jefferson stands as an enduring monument to the strategic importance of the Dry Tortugas to American coastal defenses during the 19th century. Occupying about 16 acres on Garden Key, the fort was constructed as part of the federal program of integrated coastal defenses known as the Third System. The program, to bolster and upgrade perceived deficiencies among the nation's earlier fortification systems, was enacted in 1817 and placed under the direction of American military engineers. The construction of Fort Jefferson began in 1846, largely in response to unsettled international affairs affecting the region. Spain's diminished role in the Western Hemisphere had left a power vacuum, and British fortification of Bermuda alarmed U.S. officials. Likewise, the escalating conflict with Mexico posed serious concerns for Gulf commerce and other regional American interests. The United States considered a strong and permanent military presence in the area crucial for protecting Gulf trade and ports. It would also preempt use of the Tortugas' anchorages by hostile enemy fleets should attempts be made to blockade the United States.

The brick masonry fort was designed as a hexagonal structure intended for an armament of about 450 guns and a garrison of 1,500 men. Only about 140 guns were ever actually mounted. The fort's irregular shape (four of the faces are 476 feet long and two are 325 feet long) was a result of adapting it to the shape of Garden Key. Six bastions were constructed at the angles of the two-tier 50-foot-high scarp walls. The perimeter of the fort is nearly 0.5 mile in length, surrounded on all sides by a moat and outer counterscarp or seawall. The interior fort walls were constructed of more than 2,000 brick arches and vaults, partitioned into casemates that the park in some instances has converted to staff/administrative use quarters. Cisterns for the collection of rainwater were constructed below each lower tier casemate; subsequent settling of the fort cracked many of the cistern walls, making them unusable as seawater leaked in. The interior parade area is accessed by means of the single sally port with a granite entrance arch. A nonhistoric bridge spans the moat to the sally port. Within the parade grounds are the foundation remains of former soldier's barracks and officer's quarters. Two historic engineer officers' quarters remain, which have been used for park housing. There are also two partially completed brick magazines and a shot furnace (a furnace that was used to superheat cannonballs for the purpose of inflicting further damage on targeted enemy ships by setting them ablaze).

The construction of Fort Jefferson proceeded slowly because of its immense size, the large expense entailed, and technical/logistical problems. The fort remained under Union control throughout the Civil War, and construction continued during and following the war. The fort functioned as a prison for about 800 Union army deserters and other offenders. Four of those convicted of conspiracy in President Lincoln's assassination were incarcerated there, including Dr. Samuel Mudd who had set John Wilkes Booth's broken leg. Yellow fever epidemics, smallpox, and other diseases claimed many of the fort's population.

The fort's garrison departed in 1874, and construction activities were suspended in 1875, before the fort's full completion. None of the casemates were completed along the upper tier of the ramparts. Many of the embrasures (gun openings through the walls) were also never finished, remaining today as large irregular openings. In 1876 a hexagonal-shaped lighthouse was constructed of boilerplate iron atop bastion 6 to replace the original light, which was built in 1825 on Garden Key. The earlier light had sustained extensive hurricane damage in 1873.

The fort served as a coaling station during the Spanish-American War. The battleship *Maine,* which had refueled at the Tortugas, exploded in Havana Harbor in February 1898, propelling the United States to war with Spain. The ruins of two coaling docks built by the Navy at the turn of the century are at the north and south ends of Garden Key. Abandoned by the military after 1906, the Tortugas were declared a wildlife refuge in 1908 to protect sooty tern nesting areas from egg collectors. Fort Jefferson, however, continued to serve military purposes during subsequent conflicts — as a communications station and seaplane base during World War I, as a naval support station during World War II, and as a military outpost during the Cuban missile crisis of 1962. Fort Jefferson National Monument was established in 1935, and the fort property was listed on the National Register of Historic Places in 1970.

Fort Jefferson's masonry has severely deteriorated because of the harsh marine environment. In some areas large sections of the outer brick wall have crumbled into the moat. Stabilization projects are underway to preserve the masonry where feasible. One of these projects is to replace original gun shutters that were designed to close after artillery was fired to provide protection from incoming enemy fire. These shutters were made of iron, and they have expanded during the process of corrosion, displacing the surrounding masonry. Repairs have also recently been made to the sally port and its granite arch. Restoration of the parade magazine and shot furnace are additional preservation objectives.

Archeological investigations of land-based areas within and outside the fort have not been extensive, although some features, such as the foundations of the original 1825 Garden Key lighthouse and lighthouse keepers quarters, have been identified. The probability for subsurface features and artifacts remains high, including those potentially within the moat.

LOGGERHEAD KEY

The Loggerhead Key lighthouse is the most prominent historic structure on this key, which is about 2.5 miles west of Fort Jefferson. The 150-foot-high brick tower was completed in 1858 to provide improved warning of the Tortugas' dangerous reefs. The smaller 70-foot-high Garden Key light was then considered inadequate. The spiral stairway within the Loggerhead Key lighthouse has around 200 cut slate steps that lead to the watch room and lantern gallery. The tower was seriously damaged by a hurricane in 1873. Although Congress appropriated $75,000 in 1875 for complete replacement of the lighthouse, temporary masonry repairs were undertaken that proved so effective that replacement plans were canceled.

The first light was a 1st order Fresnel lens imported from France that could be seen from 20 miles on a clear night. It was replaced in 1909 by a revolving 2nd order bivalve lens that floated in a mercury pool. This light (reportedly observed at a distance of more than 53 miles in 1934) was removed in 1986 and is now on display at the United States Coast Guard Aids to Navigation School in Yorktown, Virginia. The current light is an electric generator-powered rotating beacon. The automated system has eliminated the need for a permanent on-site lighthouse keeper.

The original lighthouse keeper's house (built in 1856–58) was a two-story brick building with a detached kitchen. The house burned down in 1945 (its foundation exists), but the kitchen survived and was later converted to guest quarters. Other existing significant buildings and structures include the original two-story brick oil storage building (built in 1856–58 and converted to a radio room in 1926); the bosun's workshop (built in 1926 to house oil for the lighthouse following conversion of the original oil storage building); crew's quarters (a one-story brick bungalow built in 1922 to provide modernized accommodations for the principal

lighthouse keeper and his family); a boat house built around 1923; and cisterns (two built of brick in 1858, and two built of concrete in 1922).

Ruins of the Carnegie Institution of Washington, D.C., marine biology laboratory are on the north end of the key. The laboratory operated from about 1904 to 1939, when a disastrous fire destroyed the facilities. Researchers made notable contributions to scientific understanding of coral reefs and tropical marine life in the Western Hemisphere. The first underwater photographs (both black and white and color) were taken of nearby reefs by lab technicians. A metal plaque at the lab site commemorates the lab's founder and first director, Alfred G. Mayor. Preliminary NPS archeological investigations conducted in 1998 indicate that the site may yield significant archeological information associated with research operations.

The 1998 NPS archeological investigations also identified a significant site associated with the development and operations of the original lighthouse complex. Trash dumps and artifacts dating to the 1856–58 construction period and after were found that may further understanding of the station's construction and the lifeways of the residents. Another site, the grave of U.S. Navy seaman Thomas Lehay, who died in 1898, is near a coral rock wall along the east side of the island. The grave is not considered a site that contributes to Loggerhead Key's overall historical significance.

A National Register of Historic Places nomination has been prepared for the Loggerhead Key Historic District (draft, NPS 1999). The entire land area of Loggerhead Key is included in the historic district, although primary historical significance is attached to the areas of the lighthouse station complex and the Carnegie marine laboratory.

VISITOR EXPERIENCE

Visitors travel to Dry Tortugas by commercial or private boat or by seaplane. Two ferry vessels each bring up to 100 passengers from Key West to Garden Key daily. Travel time is about 2½ hours each way, and visitors spend about 4 hours on Garden Key. The ferry operators provide an in-transit orientation to the park along with a video describing park resources. They also conduct an interpretive tour of the fort and provide lunch for their passengers at the picnic area. Seaplanes carrying from five to nine passengers make trips daily from Key West. Flying time is about 35 minutes each way.

Recreational opportunities available to visitors include swimming, snorkeling, fishing from the dock, beach combing, bird and wildlife watching, photography, camping, kayaking, picnicking, and scuba diving to see coral, fish, and shipwrecks.

Visitors to the park currently receive information about the park in various ways. The park website and park headquarters at Everglades National Park provide basic information about the history, natural and cultural resources, recreational and educational opportunities, and how to obtain transportation to the park. If a person decides to travel to the park with one of the ferry operators, they receive an interpretive talk that expands on the same categories of information. Any visitor who arrives at Garden Key may take a tour of the fort guided by an NPS interpreter or by an employee of a ferry boat operator. A self-guiding tour permits visitors to follow an interpretive trail around the fort independently. Because of the small staff, ranger-led tours and special interpretive programs are limited.

Although commercial fishing is prohibited in the park, recreational saltwater fishing is allowed if visitors have a Florida fishing license. Charter fishing boats carrying up to six people are allowed if they have been granted permits by the National Park Service. Jet skis are prohibited.

There is no food service or freshwater showers for visitors on the islands; the only two freshwater drinking fountains are at the visitor center and outside the office. Visitors must bring their own supplies and must carry all trash with them when they leave the park.

A 1995 visitor survey identified the most common activities in Dry Tortugas as follows: visiting Fort Jefferson (98%), taking photographs (87%), and snorkeling (83%). Seventy-eight percent of visitors surveyed did not engage in fishing, but 46% of those who did fish rated their fishing experience a very important or extremely important part of their visit. The areas visitors most often fished were around the fort and near Loggerhead Key. The most common reasons for visiting the park were outdoor recreation pursuits (41%) and to learn the history of Fort Jefferson (31%). Thirty-two percent of the survey's respondents visited Loggerhead Key. The primary activities they participated in were snorkeling and diving (77%) and walking on the beach (71%).

Sixty-three percent of the visitors were Florida residents. The next largest groups were from Texas and California, with 4% each. For 90% of the visitors their trip during the survey period was their first in a year, and for 71% it was their first trip to the park in five years.

During the past six years, visitation to the park has increased from a low of 16,736 recreational visits in 1994 to more than 84,000 recreational visits in 1999. About 5,244 visitors camped overnight. In 1999 about half of the park's visitors arrived by ferry, nearly 25% traveled by private boats, about 10% came by seaplane, and about 10% were commercial boats (fishing). The

remainder (5%) were NPS staff and/or researchers. Conditions at the dock, campground, and restrooms become quite crowded during peak visitation periods because the number of staff and the capacity of utilities and facilities have not kept pace with the increase in visitors. In 1999 peak visitation occurred from April to July, and more than 8,000 visitors arrived each month. With the park's proximity to Cuba, the potential exists for a much greater increase in visitation in the future if political conditions in that country give residents freedom to travel.

SOCIOECONOMIC ENVIRONMENT

The Florida Keys are composed of 1,700 keys or islands, all of which are in Monroe County. Dry Tortugas National Park is the westernmost part of the Florida Keys and is about 70 miles west of Key West, Florida. The park contains seven of these keys and is administered by the National Park Service. Fewer than 70 of the 1,700 keys are inhabited, and 51 of the easternmost keys are connected to or by U.S. Highway 1. Most of Monroe County's landmass is on the mainland of Florida, and most of the population is in the keys, particularly in population centers such as Key West, the county seat.

The socioeconomic environment description will focus on Monroe County but will be discussed in the larger context of the South Florida Regional Planning Council region, which includes Dade and Broward Counties (State of Florida 1994 and South Florida Regional Planning Council 1995). These counties are closely linked in terms of tourism and tourist-based economies.

POPULATION AND INCOME

Possibly the most important factor influencing the South Florida region is its explosive growth. In 1970 there were nearly 2 million people living in the region; there were 3.4 million in 1994 and nearly 3.7 million in 1997. According to the *Strategic Regional Policy Plan for South Florida* (South Florida Regional Planning Council 1995), the population is expected to increase to about 4.3 million residents by the year 2015. This influx most likely will be led by international migration. The region has less than 8% of the state's land area but almost 25% of the state's total population.

Population growth has been lower in Monroe County than the rest of the region and the state because of the limited availability of land and an ordinance that was designed to limit future growth. The county's permanent resident population in 1997 was 81,169. The population fluctuates seasonally and increases dramatically during peak tourism periods. Dade County was the most populous in the region and state with 2,128,987 permanent residents, and Broward County had 1,472,927. Since the 1950s, south Florida has rapidly become urbanized. Dade and Broward counties were 99% urbanized by 1980, whereas 27% of Monroe County's population still lived outside urban areas in 1990.

About 17% (544,000) of the region's residents were at least 65 years old compared to the national average of 13%. Half of this population was at least 75 years old. Projections indicate that there will be more than 700,000 people 65 years old or older in 2015.

In both Monroe and Broward Counties, per capita personal income in 1997 — $29,657 and $27,661, respectively — was higher than the state average of $24,799. Dade County was below the state average with $21,688. In 1999 (January – November), unemployment rates in Monroe County ranged from 1.9% to 3.0%. The Ft. Lauderdale MSA (metropolitan statistical area) rates for the same period ranged from 3.9% to 4.9% and were similar to the state's range of 3.9% to 4.6%. The Miami metropolitan statistical area reported the region's highest unemployment rates with ranges from 5.7% to 7.1%.

TOURISM AND RECREATION

More than 10 million tourists annually are attracted to the region by the area's climate and resources including the Everglades and southern Florida's coastal resources. The number of tourists to the area results in a direct economic benefit of more than $13 billion for the region. Fifty-one percent of

South Florida's visitors are from the northeast part of the United States, 23% are from the north central region, 22% are from the south central region, and 6% are from the West Coast. The number of international visitors to Dade County increased to 4 million in 1994, up from 2.9 million in 1989. Foreign visitors to Broward County tripled to 1 million from 1989 to 1991.

More than 4 million people visit the Florida Keys every year. Peak tourist season is from January to March, and in the Upper Keys the tourist season is from January to August. Many tourists in the Upper Keys are week-end visitors from Miami and south Florida. Visitors to the Keys comprise 42% of the total population during the peak season.

According to Florida's 1994 statewide comprehensive *Outdoor Recreation Plan*, in 1992 the South Florida Region had nearly 2.7 million acres of land and water available for outdoor recreation from both public and private sources. The region provided about 72 miles of saltwater beach frontage, 1,907 miles of bicycle trails, 180 miles of nature trails, and 12,145 developed campsites. There were 341 saltwater and 196 freshwater boat ramp lanes and 376 saltwater marinas.

Federally administered lands comprised nearly 1.8 million acres of land and water that was available for outdoor recreation; about 70% of this acreage was in Everglades National Park in Monroe and Dade Counties. State-administered recreation land comprised 850,000 acres in 78 sites, including John Pennekamp Coral Reef State Park and Key Largo Coral Reef and Looe Key National Marine Sanctuaries. County and municipal governments also provided facilities for urban recreation activities. Local governments provided 191 saltwater beach areas and 97% of the region's freshwater beach area. Forty-three percent of demand for outdoor recreation in 1992 came from residents of the South Florida Region.

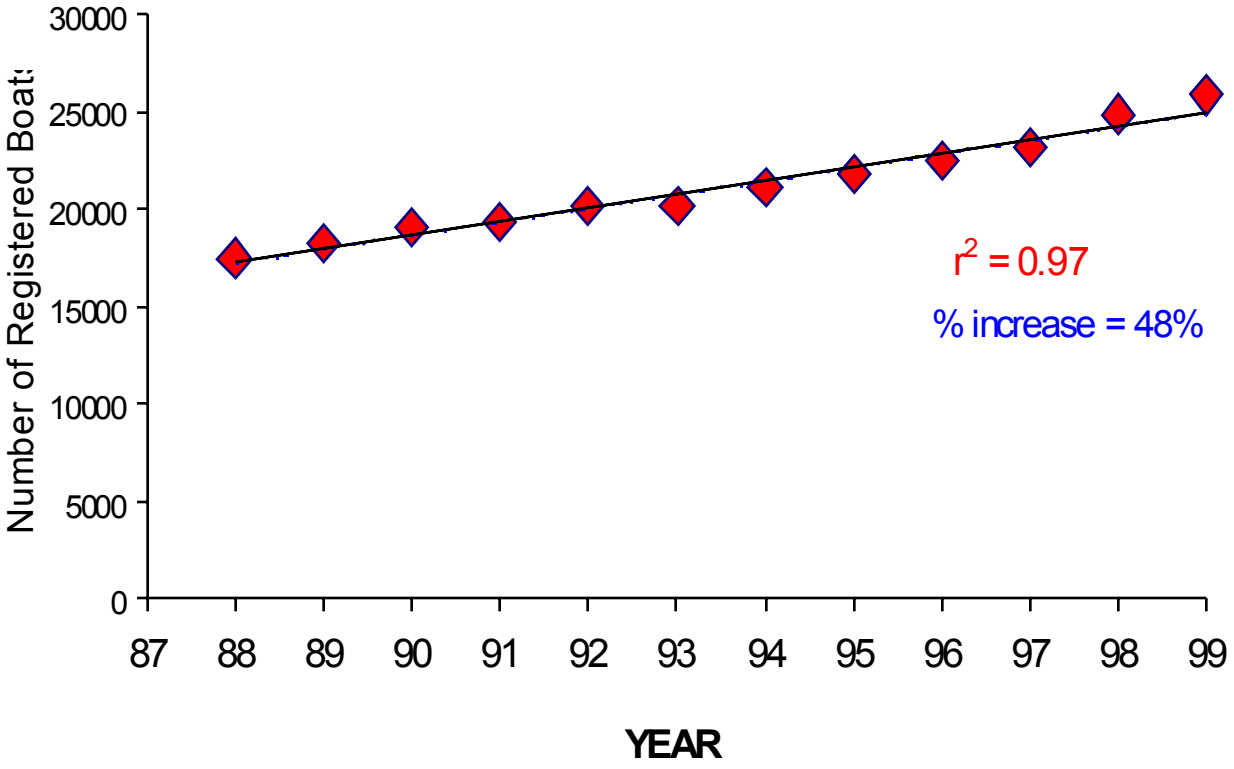
The most popular outdoor recreational activities in 1992 included saltwater beach activities, swimming pool use, bicycling, saltwater fishing (boat), golf, picnicking, and visiting archeological/historic sites. Other recreation opportunities include boating, hunting, camping, and nature study.

In the Keys most recreation activities are related to water. According to the *Florida Keys National Marine Sanctuary Final Management Plan / Environmental Impact Statement* (1996), boating activities account for about 13% of all visitor use. About 55% of all visiting boaters participate in fishing activities, and 29% of all tourist boating activities include scuba diving and snorkeling trips. About 20% to 30% of all visitors to the Keys snorkel or scuba dive to see fish, coral reefs, and shipwrecks. The Upper Keys contains almost 90% of the popular dive sites, including Key Largo National Marine Sanctuary and John Pennekamp Coral Reef State Park.

The number of registered boats in Monroe County (the Florida Keys) has increased by 48% between 1988 and 1999, as shown on figure A. Note that the number of registered boats increased every year during this period. The upward regression value of 0.97 means that there is no reason to believe that this upward trend will not continue. It is logical to believe, based on these figures, that the number of boats visiting the park has increased over this period as well.

Fishing-for-hire activities are important to the Keys' tourist industry, with reef fishing concentrated in the Middle and Lower Keys; the largest number of reef fishing boats is in Key West. However, fishing from one's own boat is the principal way of fishing in the Keys. The number of privately owned vessels has multiplied more than six times since 1965, and more than 106,000 boats were registered in Monroe, Broward, and Dade Counties in the mid-1990s. A survey of private boat fishermen in 1980–81 determined that 43% were from Dade and Broward Counties, 31% were from the

Figure A. The Number of Registered Boats in Monroe County, Florida
(1988-1999)



Source: Monroe County Tax Collector's Office
Note: This includes ALL types of registered boats.

Keys, 13% were from other areas of Florida, and 13% were from areas outside Florida.

ECONOMY

Tourism-related jobs rank in the top sectors of the regional economy in terms of employment, particularly lodging and eating and drinking establishments. As a result, the regional economy has become more service oriented and less oriented towards goods-producing industries. In 1997 in Monroe, Broward, and Dade Counties, the services industries produced the largest earnings, with 35.6%, 34.1%, and 33.8% of total earnings, respectively. Retail trade accounted for the second largest earnings in Monroe (19.0%) and Broward (12.9%) Counties, while state and local government was second (11.5%) in Dade County. Earnings in state and local government were third largest in Monroe County (11.9%) and Broward County (11.6%), and the transportation and public utilities sector produced the third-largest earnings in Dade County (10.3%.)

The basis of Monroe County's economy essentially is tourism and tourist-related service industries. Nearly 75% of new jobs created in Monroe County during the past decade were in the service and retail trade sectors. These two industries make up 52% of the total employment in the county. The service sector includes the hotel and restaurant trades, and the retail trade sector includes gift shops, apparel stores, and businesses that provide products such as fishing and boating equipment and photography supplies.

Employment levels are seasonal and are at their highest during the peak tourist season, December through April, decline from May through October, and begin increasing in November.

Retired people plus tourists account for the most income in Monroe County. The county has a large retirement population in which 29% of the residents are at least 55 years old and 16% are at least 65 years old. About 48% of all income is from nonwage sources, such as social security, retirement pensions, and interest income. When both retirement and tourist income flow into the area and are independent of employment, there is a demand for local goods and services and employment and additional income is created.

A visitor use survey to determine how much tourist recreation activities contribute to the Monroe County economy estimated that visitors spent $1.19 billion in the Keys during the periods of June through November 1995 and December 1995 through May 1996. Businesses that receive tourist dollars directly have a ripple effect on other businesses that sell supplies to them and on down the supply chain. This ripple effect can benefit the economy with 1.5 to 2 times more than the amount visitors originally spent. The total output, or value for all goods and services produced by an industry sector in the Keys economy during the periods mentioned above, was $2.20 billion. For the survey period the ripple effect of tourist spending resulted in an estimated contribution of 60.53% of total output, 45.03% of the total estimated income, and an estimated 46.49% of total employment in Monroe County.

Economic impacts from tourism in Monroe County extend to other counties in the region. Visitors to the Keys purchase items on the way, and many businesses in the county are supplied by businesses in Broward or Dade Counties. During the survey period, visitors to the Keys contributed about $1.61 billion in output, $1.37 billion in income, and about 8,300 full-time equivalent jobs to the two counties.

Table 6 shows responses to a mailback questionnaire used in the above visitor use survey to estimate spending per person per trip. The table reflects types of expenditures, total amount spent on the trip, location of expenditures, and percentages spent in the

locations of Monroe County only or in the south Florida region, which included Dade, Broward and Monroe Counties. The figures included not only expenditures related to the specific trip but also annual expenses for boat storage rental space and marina fees, condo/time-share fees, and annual RV site rentals in Monroe County. Annual expenses were divided by the number of people per group and number of trips made annually to the Keys.

TABLE 6: AVERAGE TRIP EXPENDITURES PER PERSON

Type of Expenditure	Total Expenditures for Trip	Amount Spent in S. Florida	% Spent in S. Florida	Amount Spent in Monroe County	% Spent in Monroe County
June – November 1995					
Lodging	$256.73	$195.06	76.0%	$150.4	58.6%
Food and Beverages	166.58	141.99	85.2%	112.0	67.2%
Transportation	238.66	98.25	41.2%	39.53	16.6%
Boating	78.38	76.75	97.9%	28.32	36.1%
Fishing	11.21	10.75	95.9%	10.14	90.5%
Scuba Diving/Snorkeling	19.75	19.08	96.6%	18.51	93.7%
Sightseeing	22.52	14.74	65.5%	9.84	43.7%
Other Activity Expenditures	9.58	7.47	78.0%	5.36	55.9%
Miscellaneous	66.58	48.69	73.1%	33.62	50.5%
Services	7.64	6.74	88.2%	5.29	69.2%
Total	$877.63	$619.52	70.6%	$413.00	47.1%
December – May 1996					
Lodging	$306.98	$243.03	79.2%	$187.38	61.0%
Food and Beverages	216.84	174.10	80.3%	138.93	64.1%
Transportation	224.02	104.13	46.5%	52.42	23.4%
Boating	26.72	24.47	91.6%	15.88	59.4%
Fishing	17.51	16.84	96.2%	16.36	93.4%
Scuba Diving/Snorkeling	7.18	6.90	96.1%	6.72	93.6%
Sightseeing	26.81	19.22	71.7%	13.04	48.6%
Other Activity Expenditures.	16.73	12.85	76.8%	7.34	43.9%
Miscellaneous Expenditures	60.39	48.96	81.1%	38.99	64.6%
Services	19.29	16.67	86.4%	12.98	67.3%
Total	$922.47	$667.17	72.3%	$490.04	53.1%

SOURCE: Economic Contribution of Recreating Visitors to the Florida Keys/Key West by English, Kriesel, Leeworthy and Wiley

The table indicates that the largest expenditures are for lodging, transportation, and food and beverages. Visitors during the winter/spring season spend slightly more money than during the summer/fall months.

By attracting visitors to the area, Dry Tortugas National Park has an effect on Monroe County's economy. The Office of Social Science, Socio-Economic Studies Division of the National Park Service has prepared a money generation model (MGM)

that provides a way to estimate economic benefits of parks to local areas. The local area is defined as the county in which the federal land is located. In fiscal year 1994, the Florida Atlantic University / Florida International University (FAU/FIU) Joint Center for Environmental and Urban Problems conducted a survey of federal lands. Using the money generation model, contributions to the county's economy from Dry Tortugas visitor expenditures were $10,486,792 in sales benefits, $734,075 in tax revenue benefits, and 315 jobs.

COMMERCIAL SERVICES

Commercial services is an umbrella term that is used in this document to encompass any service or facility use in a park that involves the exchange of money. The two main types of commercial services are concession contracts and commercial use authorizations (CUAs). Until recently, commercial use authorizations used to be called incidental business permits and are still referred to as permits or CUA permits. (NOTE: This kind of permit is not the same as the permit that visitors might be required to obtain under some alternatives to visit the park.)

Commercial services at Dry Tortugas are managed by personnel at Everglades National Park with assistance from operational staff at Dry Tortugas. They prepare and negotiate all concession contracts and issue all CUA permits. Their duties include monitoring commercial use authorizations, performing regular inspections and evaluations, and answering all questions related to commercial services from the public and interested businesspeople.

There are currently no major concession contracts to provide goods or services at Dry Tortugas National Park. All commercial services are authorized by commercial use authorizations. One of the objectives of this amendment is to give direction to managing commercial services at Dry Tortugas. Therefore, there is a temporary moratorium on issuing new CUA permits until this amendment is approved. Table 7 presents the number of CUA permits currently issued by activity.

TABLE 7. CUA PERMITS ISSUED FOR THE 1999 SEASON

Activity	Number of CUA Permits Issued
Airplane transportation	4
Water transportation	8
Sailing	11
Fishing	17
Scuba/Snorkeling	6
Birdwatching	9

NOTE: Some operators have CUA permits for more than one activity.

There are currently 55 CUA permits. They are issued for a two-year term, and a fee of $250 is charged to cover the administrative costs of issuing the CUA permit and monitoring the activity. No other fees are collected by the National Park Service. The CUA permits contain several conditions to manage the use depending on the activity. For instance, all operators must have liability insurance. Maximum vessel lengths and maximum passenger limits are stipulated and enforced through monitoring. Operational conditions such as time limits on the use of the dock at the fort are also stipulated. Seaplanes are limited to five at any given time, and they must have floats or beaching capabilities. CUA permits also outline which types of interpretation/ information are appropriate and how to research the information. Finally, those with CUA permits are subject to the same park regulations as other visitors, including area closures and use limits and fishing, trash, sanitation, anchoring, docking, and camping regulations.

The Park Services does not operate any public transportation. All visitor transportation services to the park are commercially operated through one-year or two-year-term commercial use authorizations. Two permit holders operate the *Yankee Freedom* and the *Sunny Days*, both of which operate out of Key West and can carry the maximum number of passengers currently allowed (100). Both operators recently upgraded their fleets with larger and faster boats. There are 40 CUA permits issued to smaller boats that bring customers to the park from all over south Florida, and there are four CUA permits issued to seaplane operators. Also, numerous private boaters come to the park from all over South Florida.

There are two other ways, currently, of managing commercial activities in the park. The National Park Service has a cooperative agreement with the Florida National Parks and Monuments Association to sell books, videos, and related products about the flora, fauna, and history of the park. Inside the fort on Garden Key there is a small book sales area in the visitor center. Through a limited concession permit, the association also sells convenience items such as water, film, and sunscreen. Also, requests for commercial filming are occasionally received at the park. Each request is evaluated independently and approved, approved with conditions, or rejected under a filming permit. Conditions include limits on resource impacts, the mitigation of any resource impacts that might occur, and no undue interference with the enjoyment and use of the park by the general public.

LAND USE

Dominant land uses in Key West include an urban mix of commercial, residential, recreational, and transportation. In addition, U.S. Naval Reservations and U.S. Military Reservations occupy parcels of land in Key West and on adjacent keys including Fleming and Dredgers. Various facilities including docks, light buoys, radio towers, piers, and warehouses are located along the waterfront in Key West and support commercial, recreational, and military marine activities.

Commercial establishments such as restaurants and retail shops cater primarily to tourists. Public facilities such as schools, fire stations, hospital and courthouse intersperse residential neighborhoods of single family and multi-family structures. The Key West International Airport is in the southeast portion of the city.

PARK OPERATIONS AND FACILITIES

Dry Tortugas National Park is administered by a park superintendent who is headquartered near Homestead, Florida. The superintendent is responsible for the management of both Everglades and Dry Tortugas National Parks, and the deputy superintendent functions as chief of operations for both areas.

Management of the Dry Tortugas is organized into the following divisions: administration, visitor protection, science and resource management, maintenance, and interpretation. Staff in each division is stationed at Fort Jefferson. Administrative functions including payroll, budget, procurement, contracting, and human resources are accomplished primarily at park headquarters. In addition, the headquarter's and South Florida National Resource Center's staffs coordinate research and resource monitoring activities.

Responsibilities of the visitor protection division include managing for visitor safety and experience, contacting visitors on board vessels, and performing search and rescue activities. Staff in this division also participates in some interpretive tasks and manages the campground. The maintenance division is responsible for the operation and maintenance of all park facilities and equipment including utilities (water, wastewater, power, and solid waste), buildings, grounds, employee housing, docks, and boats. The interpretation division is responsible for interpretive programs and exhibits and education, and division staff helps in the bookstore.

PARK OPERATIONS

Staff

Permanent full-time positions on site at the Fort include four park rangers in visitor protection, one park ranger in interpretation, one maintenance supervisor, one maintenance mechanic, one general equipment mechanic, one maintenance worker, and one administrative assistant. In addition, there is one seasonal maintenance worker. Park staff believe that the number of current employees would need to be doubled to stay current with facility maintenance and to make adequate contacts with visitors.

There is no park staff at Loggerhead Key. The park relies on a variable number of volunteers who commit to stay on the island for at least one month. The volunteers operate the generator and reverse osmosis plant, accomplish facility and site maintenance, and contact visitors who come to the island.

Health and Safety

New Florida state regulations require water quality monitoring of public beach areas. The regulations require the park to sample the water weekly for bacteria such as *enterro cocci* to determine if conditions are safe for swimmers. Water samples must reach a certified laboratory within six hours for testing. According to park staff, one high reading has occurred in the past. Potential sources include waste from the large number of birds in the area, boats pumping bilge water into the ocean near the fort, and leachate from a leachfield on Garden Key.

Another health issue involves the lack of freshwater facilities for visitors. There is a freshwater drinking fountain at the visitor center, but there are no showers for campground users and no freshwater sinks for visitors using the restrooms at the dock. One saltwater sink on Garden Key is used for fish cleaning, but saltwater is not appropriate for visitor bathing needs. Visitors can easily become dehydrated by not drinking enough fluids while in the area.

Potential safety hazards include sunburns for visitor using the beach area and visitors contacting and sustaining injuries from marine life such as coral, sting rays, and jelly fish; boats sinking; and boats tangling in anchor lines or one boat bumping and puncturing another. In addition, groundings have occurred at Long Key and on various reefs.

The trail around the top of the fort presents a safety hazard for visitors and employees. The top of the fort is 50 to 60 feet above the sea, and in some places the trail is only 3 to 4 feet wide. There are no safety railings along the wall, and the potential exists for a visitor to fall, especially when tour groups concentrate in one area of the trail. Also, bricks occasionally fall from the fort structure, presenting another safety hazard.

In the past, hazardous materials spills of gas, diesel fuel, and propane for cooking have occurred, primarily during transport, loading, and dispensing. The park now has a spill prevention and counter measure plan in place. Boom equipment for unloading and absorbent materials for spills are available. In addition, the U.S. Coast Guard licenses the person making deliveries. However, additional training is needed for staff handling these materials.

Old landfills have begun to emerge at the north coaling dock and on Loggerhead Key. The landfill at the north coaling dock likely contains heavy metal contaminants because it was an incinerator site. It is uncertain how hazardous materials were handled at Loggerhead Key before the U.S. Coast Guard left the site in 1994. No hazardous materials inventories have been conducted for either Garden Key or Loggerhead Key.

Utilities

On Garden Key electrical power is supplied for current housing needs by three 100-kilowatt generators and one 120-kilowatt generators; only one runs at any given time. Three 6,000-gallon underground tanks store diesel fuel to power the generators, which are running at 85% capacity. Seventy-six percent of the fuel consumption is related to humidity and air-conditioning. Power generation is adequate for current uses, but additional power requirements, such as an increase in facilities, would result in the need for additional power generation.

Potable water is supplied through a reverse osmosis (desalinization) process. The process provides about 800 gallons of water suitable for drinking in a 10-hour period. The water is stored in a cistern in the parade ground and is used primarily by park staff. The cistern's capacity will be 90,000 gallons when leaks are repaired, which will be sufficient for current and future needs of onsite staff. The capacity is not sufficient to handle visitors' freshwater needs. There also are cisterns beneath the casemates, which are not used for potable water storage because sea water leaks into them.

There are two septic systems on Garden Key with tanks feeding into one of four leach-fields. A 2,000-gallon tank, which feeds into one leachfield, is by the dock for the visitor restroom. A 2,390-gallon capacity tank in the parade ground services staff housing units and feeds into one of three leachfields, which are rotated on a monthly basis. The dock septic system is not adequate for current visitation and must be pumped at least three times a year. The parade ground septic system will not tolerate any further expansion. None of the leachfields meet regulations because tidal-influenced groundwater reaches the lower elevation of the field pipes.

On Loggerhead Key, two aboveground 3,000-gallon tanks store diesel fuel to operate three 50-kilowatt generators. These generators can provide more electrical power than is needed to support the residences. The lighthouse lantern runs on solar power. The reverse osmosis plant has the capacity to produce 500 gallons of potable water in a 10-hour period, but does

not operate at that capacity unless needed because consumption determines production. Detailed information regarding the septic system on Loggerhead Key is unavailable. The septic tanks are working but are constructed of cast iron that is badly corroded and needing replacement. On both Garden Key and Loggerhead Key the leachfields need replacement with a raised system or deep well injection system to meet current regulations.

All solid waste brought into the park must be removed and disposed of on the mainland. The *Activa* hauls refuse items such as glass, tin, aluminum, scrap metals, lubricants, batteries, and recyclables to Key West for disposal. The state of Florida has given the park permission to burn noncontaminating paper, vegetation, and wet trash within the park. The park has solicited proposals for the preparation of a solid waste management plan.

Marine Operations

The *Activa*, a 65-foot diesel-powered crew supply vessel with a crew of two, provides transportation to and from the park for NPS employees and their families as well as logistical support for transporting the mail, groceries, household goods, and operational supplies. The *Activa* runs trips for support of construction and rehabilitation projects, research work and search and rescue operations.

The park has several smaller boats ranging from 18 to 26 feet long, including three Boston whalers, a Mako, and a Parker. These boats are used for visitor protection, search and rescue, and research. The number of boats is adequate for the park's current needs. However, there is no cyclic funding or continued funding for upkeep of the boats and related navigational and safety gear, which presents a safety issue for staff.

Monitoring

See the discussions of monitoring in the "Natural Resources" and "Cultural Resources" sections.

Visitor Protection

Visitor protection staff is composed of three commissioned law enforcement positions (and another that is being hired), and one patrol ranger. Their tasks include maintaining radio, weather monitoring, and vessel navigational equipment; emergency medical services; search and rescue operations; pest, exotic plant, and endangered species management or surveys; fire protection service; equipment installation; ordering supplies and maintaining inventory records; campground management; boating safety inspections; fisheries inspections; demarcation buoy and mooring buoy management; park vessel and safety equipment upkeep; park dive team duties; transportation services for supplies, transporting personnel and equipment to other island sites; and assistance to other law enforcement agencies. During peak visitation periods, the patrol ranger spends much of his time performing harbor and dock master duties to allow use of the dock for as many visitors as possible. Because the park staff is small in number, rangers also become involved with day-to-day park operations and lend assistance to other divisions in completing necessary projects.

Conducting patrols in the park is another task that rangers perform. Sensitive areas are patrolled when visitor protection staff observes or receives notice of suspicious activities. Otherwise, patrols are conducted when time permits staff to be away from other duties and during nonpeak visitation periods. Two additional base patrol rangers are being hired, but this increase still will not allow for two law enforcement personnel to be on duty for each shift. The lack of adequate staff becomes a safety issue when a ranger must patrol and board a vessel

alone. The park needs a reliable radio communications system for patrolling rangers, especially when they might be dealing with drug or smuggling operations or performing search and rescue operations.

The park receives a variety of visitors including commercial fishing fleets seeking safe anchorage, live-aboard vessels, sailing and recreational fishing vessels, and daily ferryboats from the mainland. Rangers contact these park users to inform them of park regulations and check vessels for safety or resource violations such as illegal fishing or removal of resources. Park staff also uses radar to identify locations of visitors in the park and to determine if poaching or removal of objects from submerged cultural resources is occurring.

FACILITIES

Visitor Center

The visitor center at the fort is open year-round. Visitors can obtain park information, purchase materials in the bookstore, and see interpretive exhibits and a video describing the park's history and natural resources. The visitor center encompasses two casemate spaces and is in need of improvements. Water leaks into the spaces, and the climate control system does not adequately protect the exhibits. Also, the size of the visitor center is not adequate to permit updating and adding to the interpretive program.

There are no formal visitor services on Loggerhead Key, and ferry service vessels are not allowed to use the small dock. The facilities on the island include two quarters structures for volunteers, the lighthouse, and various support structures for the utility systems.

Campgrounds

On Garden Key there are 13 campsites available on a first-come, first-served basis for $3.00 per person per day. Eleven campsites are individual sites that accommodate up to six people or three tents each. There is one group site that accommodates about 40 people and an overflow site for 40 or more campers. Picnic tables and a charcoal grill are associated with the campground. Saltwater flush toilets at the dock are available for visitor use, but there are no shower facilities or freshwater sinks. Visitors must bring in all supplies, including fuel, water, ice, food, and convenience items, and carry out all trash and garbage when they leave. During peak periods such as the spring birding season or holiday weekends, the campground is overcrowded and the dock septic system is overstressed.

Anchorage and Buoys

Anchoring is currently permitted throughout the park, and overnight anchoring is restricted to within 1 nautical mile around the fort. Resource damage is occurring in some areas of the park due to anchors being dropped on or dragged through coral reefs.

There are 17 boundary buoys, nine of which are lighted, and about 25 daymarker navigational aids that mark the channel, directing boats in the harbor near the fort. The U.S. Coast Guard currently performs annual maintenance on the buoys.

Mooring buoys are used only for visitor services. Currently, there is only one buoy in use in the park at a shipwreck site (the *Windjammer* site), which is used for snorkeling and diving. Buoys require monthly inspections for damage and cleaning every three months, and mooring lines need replacement every two–three years. Each buoy costs between $400 to $800 to install including materials, special tools, and labor.

Park Housing

Most park employees at Garden Key live in housing units that are built into casemates of the fort. Of the 14 total housing units, 11 are constructed within the casemates using the historic walls and ceiling as part of the structure. One unit is a prototype that was installed in July 1999 and is self-contained and does not use any of the fort's historic fabric. The remaining two housing units are in former officers' quarters.

The casemate inserts that use part of the fort as structure have a limited life span, primarily because of humidity and large amounts of water that leak in when it rains. The quarters do not meet code and are an inconvenience when mortar from the fort falls into employee's food and onto furniture and clothes. On Loggerhead Key there are two single-family residences that provide housing for the researchers, volunteers, and work crews. There is a three-bedroom condominium in Key West for employees to share when they are off duty.

Dock

The Fort Jefferson dock at Garden Key is about 120 feet in length at the face of the pier. The front face can be used for public docking when not being used for operational needs such as the loading and unloading of supplies, fuel, etc. Docking is allowed between sunrise and sunset, and each vessel is allowed up to two hours docking time unless there are other vessels needing access. Ferry vessels are restricted to 100 feet in length. These vessels tie up to the dock at the fort only long enough to drop off passengers and then anchor elsewhere until it is time to pick up the passengers for departure.

The north end of the pier is the NPS supply vessel *Activa's* berth, although it may also be used by the public when the *Activa* is not in port.

Any vessel longer than 120 feet blocks the use of the north side dock area. Other vessels, such as U.S. Coast Guard vessels, research vessels, commercial scuba diving vessels, small yachts, recreational fishing vessels, etc., are often more than 60 feet long and take up the entire front face of the dock. In addition, vessels contracted for special services, including bringing fuel or large heavy supplies and pumping the septic tanks, require considerable dock time.

Crowding occurs at the dock between December and May and during major holiday weekends when many different visitor groups come to the island at the same time. In addition to the ferry services, these visitors include people from sailing boats, recreational fishing vessels, birdwatching groups, and people from commercial fishing boats who want to dock to use the picnic facilities.

Also needing dock time are vessels with mechanical problems that are seeking help at the fort and requiring communication with the mainland. However, the park does not have the resources to provide parts or assist with repairs. The park follows the marine tradition of granting safe harbor — granting free and open access to the protected area at Garden Key to vessels during storms or emergencies.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The National Environmental Policy Act (NEPA) 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 the proposed action is implemented. The following portion of the this management plan analyzes the environmental impacts of the five alternatives on natural resources, cultural resources, the visitor experience, the socioeconomic environment, and park operations and facilities. The analysis is the basis for comparing the beneficial and adverse effects of the alternatives.

The alternatives are primarily conceptual, and most potential consequences are presented in qualitative terms. If and when specific developments or other actions are proposed subsequent to this *General Management Plan Amendment / Environmental Impact Statement*, NPS staff will determine whether more detailed environmental documentation is needed in accord with NEPA requirements.

Impact analysis discussions are organized by impact topic and then by alternative under each topic. Methodologies used in the environmental impact analysis precede discussions of the impacts. Each resource topic discussion also details cumulative impacts and presents a conclusion. Alternatives B, C, D, and E follow a similar format but omit the methodology discussion.

According to regulations developed by the Council on Environmental Quality (CEQ), regulation 1508.7, a cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

There are several other plans by other organizations and agencies (see the "Relationship to Other Planning Efforts" section) that could also affect the park's natural and cultural resources as well as the socioeconomic conditions. The National Park Service is aware of these plans and is working in coordination with these other efforts.

IMPACTS ON NATURAL RESOURCES

The intensity of the impacts described below considers whether the impacts would be negligible, minor, moderate, or major. These designations are used to describe both beneficial and adverse impacts. Negligible impacts were effects considered detectable but would have no principal effect on biological resources and habitat. Minor impacts were effects that were detectable but not expected to have an overall effect on natural community structure. Moderate impacts would be clearly detectable and could have an appreciable effect on individual species dynamics, community ecology (e.g., the numbers of different kinds of fish present), or natural processes. Major impacts would have a substantial, highly noticeable influence on natural resources. This would include impacts that have a substantial effect on individual species, community ecology, or natural processes.

INTRODUCTION

During the past 14 years, visitation at Dry Tortugas National Park has quadrupled, rising from 18,000 visitors in 1984 to just under 72,000 visitors in 1998 and 84,000 in 1999. Most visitors come between March and July, averaging about 245 people per day in the park. The increased popularity is putting excessive stresses on park facilities, visitor safety, and the quality of the visitor experience. Human activities have been widely implicated for negatively impacting the ecological balance of the Florida Keys ecosystem (Voss 1988). Visitors to the Tortugas have been implicated in loss or degradation of vegetation, wildlife, and sensitive habitats through excessive use, improper contact, and physical manipulation of resources. Also, the direct effects of water, terrestrial, and noise pollution are of substantial concern to the quality of these sensitive environments that support economically important fisheries and ecologically important bird, fish, and turtle breeding, nesting, and feeding habitats. Other marine recreational activities like diving and boating have the potential to damage sensitive environments and habitats like coral reefs through contact.

Concern about habitat degradation and escalating resource uses from population growth in southern Florida resulted in the establishment of the Florida Keys National Marine Sanctuary in 1990 and the national park in 1992. The park's mission is to maintain near-pristine resource qualities, but forecasted trends in increased visitation may destroy the very resource qualities that make the area special as well as degrade the experience of some visitors. As described in this document, there are a variety of human uses that have the potential to impact the park's natural environment.

This section analyzes the potential effects or impacts of implementing five alternatives that have been proposed for the management of Dry Tortugas National Park (appendix F, figure B5). Each of these alternatives has a different application of the four management zones — the research natural area zone, the natural/cultural zone, the historic preservation/adaptive use zone, and the special use zone. Each zone provides different levels of protection and human use of the natural environment and resources, thereby providing varying levels of risk to the park's resources. The management zone providing the greatest level of protection to the park's resources is the research natural area (RNA) zone, referred to in the literature as marine reserves, marine protected areas, or ecological reserves. (The support for the use of the research natural areas and the impacts of establishing such an area was described in the "Alternatives, Including the Proposed Action" section.)

METHODOLOGY

The environmental impact analysis provides a framework for assessing the relative risk of implementing each management alternative to the natural resources of the park, as well as the expected level of degradation due to human use. The environmental impact analyses consists of two quantitative assessments — a simulation study of the impacts of implementing each of the alternatives on fisheries and their essential and unique habitats and an analytical hierarchy modeling process of the cumulative impacts on all relevant ecosystem components of the park's natural resource environment. The sampling cruise conducted in 1999 (Ault and Bohnsack 1999) provided excellent data from which to conduct quantitative analysis and modeling experiments on both the habitats and fishery resources of the park.

Methods used include analyzing the amount of area set aside for protection in conjunction with visitor carrying capacities (see table 1), the health of the coral reef system (the diversity, abundance, size, and distribution of the reef fish community), the use of a spatially and temporally dynamic population simulation model to simulate the impact of the alternative management plans on the snapper, grouper, and grunt reef fish populations (as well as hogfish) from Key West out to the Dry Tortugas region, and the use of an analytical hierarchical process (AHP) model to allow resource managers to structure and execute hundreds of quantitative and qualitative assessments simultaneously to evaluate alternatives and rapidly calculate summary values. (The analysis as to which management alternative provides the best protection for the park's resources is structured as an AHP model.) For further details on these methodologies, see appendix I.

ALTERNATIVE A

Impacts on Essential and Unique Habitats.

Coral Reefs. Boaters have been identified as sources of detrimental impacts on coral reefs, either through grounding (propeller damage) or inadvertent placement of anchors on these sensitive and valuable habitats (Davis 1977). Although anchor damage can be largely eliminated through the use of mooring buoys, the concentration of use in a small area and even the actual placement of the mooring buoys can damage sensitive corals, sponges, and seafans on the reefs. The current high levels of unrestricted boat use and access within all areas of the park under this alternative would continue to cause major short- and long-term adverse localized impacts on coral reefs.

The complexity and beauty of coral reefs make them an attractive and valuable resource for ecotourism (Davis and Tisdell 1995). However, coral reefs are very sensitive to disturbances, and assessment of their diver carrying capacity and damages caused by sport diving is essential for their management. Both snorkelers and scuba divers have been implicated in the loss of coral and coral productivity. Although the effects of other human activities on coral reefs have been documented (e.g., coral mining and dynamite fishing), a limited number of studies have focused on the damaging effects of sport diving.

These limited studies were reviewed by Davis and Tisdell (1995), who found that most were focused on spear-fishing and snorkeling, with the least attention given to scuba diving. Most studies have been based on observations of diver behavior (e.g., Rouphael and Inglis 1995 and 1997), and usually compare damage found on heavily dived reefs relative to undived areas (Davis and Tisdell 1995). Riegl and Velimirov (1991) established quantitatively that fast-growing, relatively brittle branching corals suffer the most damage in the Red Sea. Most

diver damage on reefs is unnecessary, but the intensity and severity is directly related to susceptibility to damage of certain coral species in the reef community and their use levels by humans (Riegl and Velimirov 1991, Hawkins and Roberts 1992, Rouphael and Inglis 1995 and 1997, Allison 1986). Diver damages might be avoided by modifying diver behaviors (Rouphael and Inglis 1995, Allison 1986, Medio et al. 1997, Hawkins and Roberts 1992), limiting diving to the sustainable carrying capacity of the reefs (Davis and Tisdell 1995, Hawkins and Roberts 1992), and managing coral reefs in terms of their susceptibility to damage (Rouphael and Inglis 1995).

Current levels of unrestricted access to coral reefs, particularly coral reefs in shallow areas, by fishermen, scuba divers, snorkelers, and swimmers result in moderate levels of long-term adverse impacts on these reefs. The continuation of these use patterns would allow stress and damage accumulation in conjunction with boat damage. Because alternative A provides no research natural area zone protection to the park's essential and unique habitats, this alternative would continue to provide no improvement over current conditions or protection from future increased use.

Sea Grass. Boaters have been identified as sources of detrimental impacts on sea grass beds either through grounding (propeller damage) or inadvertent placement of anchors on these sensitive and valuable habitats (Davis 1977). These human impacts are obvious in the Florida Keys, such as the approximately 30,000 acres of sea grass that have been propeller scarred by boaters (Sargent et al. 1995). The current high levels of unrestricted boat use and access within all areas of the park under this alternative would continue to cause major short- and moderate long-term adverse localized impacts on sea grass beds. The loss of sea grass has also been linked to increased levels of turbidity due to the destabilization of the bottom sediments.

Hardbottoms. Boaters have been identified as sources of detrimental impacts on hardbottom communities either through groundings (propeller damage) or inadvertent placement of anchors on these sensitive and valuable habitats (Davis 1977). Although anchor damage can be largely eliminated through the use of mooring buoys, the concentration of use in a small area and even the actual placement of the mooring buoys can damage the sensitive soft corals, sea fans, and sponges of the hardbottom communities. The current high levels of unrestricted boat use and access within all areas of the park under this alternative would continue to cause major short- and moderate long-term adverse localized impacts on these communities.

Sand Bottoms. Boat use over shallow sand areas can result in increased turbidity due to suspension of sand and particulate material. Although there is no direct damage done to the sand, increased turbidity can have detrimental impacts on surrounding coral reef, hardbottom, and sea grass communities by the reduction of ambient light levels and by sedimentation coating the surfaces of sensitive organisms like corals and sea grass, inhibiting normal growth and feeding. Current levels of boat use do not appear to present any long-term detrimental impacts. Minor short-term impacts would occur when boats are run over shallow areas, increasing turbidity in surrounding areas. Future increases in boat use would pose moderate short-term impacts because there are no restrictions on boat use or access under this alternative.

Terrestrial Habitats. Although access to some terrestrial areas of the park would continue to be restricted or prohibited under this alternative, other island areas would allow complete access to visitors. Unmonitored use of these terrestrial habitats for picnicking, camping, wildlife viewing, walking, etc. would likely continue to cause major short-term and moderate long-term deterioration of island flora. The prevention of any further facility construction would

provide some level of protection to the terrestrial resources by preventing the major damage caused by such an undertaking.

Impacts on Fishery Resources

Exploited Reef Fish. Reef fishing can target a number of economically and ecologically important species (e.g., groupers, snappers, lobsters, conch, sponges, and corals). The multispecies reef fisheries of the Florida Keys are under siege from fleet expansions and increased vessel fishing power that threaten to overexploit, destroy habitat, change marine environments, and reduce biodiversity (Bohnsack and Ault 1996). During the past several decades, public use and conflicts over fishery resources have increased sharply, while some fishery catches from the historically productive snapper and grouper stocks have declined (Bohnsack et al. 1994; Ault et al. 1997 and 1998). The Florida Keys are now considered an "ecosystem-at-risk" as one of the nation's most significant yet most stressed marine resources (NOAA/NMFS 1999). The reported serial overfishing of exploited reef fish stocks for the Keys (Ault et al. 1998) is strikingly similar to the current situation observed in the Tortugas, despite the region's relatively remote location some 70 miles west of Key West.

Recent quantitative assessments of the multispecies reef fish community in the Florida Keys showed that fishing mortality levels are very high, that many stocks are overfished, and that exploitation has altered the structure and dynamics of the reef fish community (Ault et al. 1998). As reef fish stocks continue to decline, the picture of exploitation potential in the park is rapidly increasing. The Tortugas provides the last good fishing grounds for a rapidly growing fleet of anglers equipped with technological innovations such as GPS (global positioning system) and better and faster vessels that magnify the effectiveness of the fishermen. Pressures for increased fishery production will continue to escalate as human populations swell in the region. Many observations in the past 100 years suggest that many well-known individual species of the Tortugas region are now potentially rare, threatened, or endangered.

Currently, more than 60% of the reef fish in the Florida Keys are overfished by government standards and in need of further management intervention (Ault et al. 1998). Although the reef fish populations in the park appear to be in a better condition than the rest of the Keys, they are still overfished. The simulation results (see appendix I) showed that a majority of the snapper, grouper, and grunt stocks would decline during the next 20 years without management intervention. Current levels of exploitation would continue to result in long-term major adverse impacts on the exploited reef fish stocks in the park, reducing the value of the park to almost all users, including fisherman, scuba divers, and snorkelers. As reef fish stocks begin to collapse and become more rare, the diversity, abundance, size, distribution, and balance of the reef fish community would become further degraded. Because alternative A contains no research natural area zone, it offers no further protection to the diversity of the reef fish community or protection from increased impacts.

Other Species. Unexploited reef species — sharks and rays, pelagic species, and baitfish — are intricately linked to the health of the reef environment and to the dynamics and resiliency of the exploited reef fish community, which either preys upon or is the prey of these groups of fish. These unexploited reef fish species would be impacted indirectly, through habitat degradation and the dynamics of the exploited reef fishery, and directly through accidental catches by recreational fisherman. The delicate balance of the coral reef ecosystem is easily upset by the impacts of habitat degradation and selective fishing on key predator species. The combination of these factors, under current levels of park access and fishing mortality, would continue to present a major

short- and long-term adverse impact on these exploited and unexploited fish populations.

The remoteness of the Tortugas has historically kept pressures from human population growth, widespread overfishing, and pollution at low levels. For several decades the Tortugas region has supported the Keys with larvae and the export of adult fish, which has provided critical support to the multibillion-dollar fishing and tourist economies. Proposed changes in park natural resources management would likely enhance the conservation of its unique qualities as well as the function, dynamics, and productivity of the wider Florida Keys ecosystem. Maintenance of the park's natural resource ecosystem has considerable implications for ecosystem resiliency and the sustainability of fisheries (Lott 1996, Lee et al. 1999, Schmidt et al. 1999). These facts make the observed declines in the reef fish community and the great risks of further adverse impacts extremely important concerns for park managers and those involved with the entire Florida Keys ecosystem.

Impacts on Wildlife Resources

Birds. The sanctity of the park as a haven for seabirds and their nesting sites is becoming increasingly jeopardized by the growth of human activities and resource uses in the Tortugas region. Although most of the birds and their nesting sites are currently protected, the levels of human use and access within the park would continue to present major long-term adverse impacts on the adult birds, because these uses often result in death. Impacts on adult birds are due to overharvesting of baitfish food sources, changes in prey base or community composition through overfishing and noise disturbances from boats and aircraft overflights.

The seemingly minor noise distractions from boats and planes can potentially be fatal for eggs and nesting young, thus resulting in major short- and long-term impacts for these life stages. With increases in park use, noise levels would inevitably continue to increase, threatening successful nesting. Visitor education and compliance with rules protecting the natural soundscape would mitigate these impacts somewhat. Several additional threats to nesting sites and the young of seabirds in the park have been identified. The major sources of degradation and/or loss of nesting sites include disturbance by visitors, noise from planes and boats, exotic plant invasions, erosion, and exotic rats that eat eggs and young, resulting in major short- and long-term damages.

Turtles. The sanctity of the park as a haven for marine turtles and their nesting sites is becoming increasingly jeopardized by the growth of human activities and uses in the Tortugas region. The current levels and access throughout the park of recreational boaters with little knowledge of the area would continue to result in major short- and long-term adverse impacts on turtles swimming in the park due to mortality from collisions with boats and/or propellers. The most important human-associated source of mortality is incidental capture of turtles in shrimp trawls, which accounts for more deaths than all other human activities combined (NPS 1998). This occurs near the park boundaries. Other threats are the ingestion of marine debris and entanglement in active and passive fishing gear (Glenn 1996).

Several threats to nesting sites of sea turtles in the park have been identified. The major sources of degradation and/or loss of nesting sites include disturbance by visitors, artificial lighting, exotic plant invasions, erosion, exotic rats that eat eggs and young, aircraft overflights, and predation by ghost crabs, which eat turtle eggs. With increases in park use, noise levels would inevitably continue to increase, threatening successful nesting. Visitor education and compliance with rules protecting the natural soundscape would mitigate these impacts somewhat.

Although much time and effort is put into protecting nesting turtles and their nests, the current levels of visitor use and unmonitored access to many beach areas would continue to be a moderate short- and long-term threat to the nesting behaviors and nests of the turtles.

Marine Mammals. Marine mammals that reside in or travel through the park would continue to be predominantly impacted by boat propeller damage, inadvertent entanglement in fishing lines, and habitat degradation. Current levels of boat use and unrestricted access to all portions of the park, particularly areas frequented by manatees and coastal dolphins, would continue to present major short- and long-term adverse impacts on marine mammals from collisions and propeller contact — particularly for very young and old individuals that are less mobile and less able to avoid collisions.

Impacts on the Environmental Setting

Demographic trends suggest a quadrupling of human population in the South Florida region during the next 50 years. Human population growth and resource use issues indicate compounding problems due to expected increases in water pollution, noise pollution, and additional lighting associated with increased presence and use. If these issues are not addressed, the resources and qualities that make Dry Tortugas unique could be lost.

Soundscape and Night Lighting. The current levels of visitation focused during certain periods of the year provide a moderate short-term adverse impact on the soundscape and the opportunities to see the night sky in the park. Noise also threatens successful nesting of birds and turtles. As levels of visitation increase, the current management plan would be insufficient to control the escalation in light and noise pollution and would present a major short-term risk.

Low tolerance for activities that degrade the natural lighting and the natural soundscape of the park would decrease these impacts and improve the opportunities to hear the natural sounds and see the night sky, as would education and compliance with night sky and soundscape protection regulations.

Wetlands. There would be no impacts on wetlands under this alternative.

Water Quality. The remoteness of the Tortugas has kept pollution at low levels in the face of population growth, the expansion of development pressures, and harmful changes in water quality.

Nutrient loading is a widespread factor that alters the structure and function of aquatic ecosystems (Valiela et al. 1992). Irreparable damages to the park's sensitive natural resources could result from overuse unless visitation levels and types of activities and their locations were balanced with resource preservation. Potential pollution sources include private and commercial motor boats (fuel leaks, oil spills, sewage, etc.), sail boats, picnicking, camping, photography, and general use. The natural communities that comprise the Florida Keys and Dry Tortugas ecosystem exist in a dynamic equilibrium, and changes that may result in a direct impact on one community type can have profound effects on adjacent or interacting communities. The continued sustainability of this marine ecosystem depends upon the maintenance of clear waters with relatively low nutrients (EPA 1999).

The water quality within the park constantly faces the potential of a minor or major oil or fuel spill caused by grounding of recreational boats, and this threat constitutes a potential major short-term and moderate long-term adverse impact on the park. Under alternative A, this threat would continue. The restriction of any further construction of facilities would provide increased protection of water quality.

Cumulative Impacts

The lack of resource protection proposed in alternative A would place park resources in significant peril of degradation due to these upstream changes and would provide no buffer against external sources of impacts.

The remoteness of the Tortugas has historically kept pressures from fishing and pollution at low levels in the face of rapid regional human population growth, expansion of development pressures, harmful changes in water quality, and widespread overfishing. For several decades the Tortugas region has supported the Keys with larvae and the export of adult fish, which has provided critical support of the important multibillion-dollar fishing and tourist economies in the Keys. Conservation of the unique and significant qualities of the park provides long-term enhancement to the function, dynamics, and productivity of the broader Florida Keys ecosystem. The maintenance of such a system has considerable implications on ecosystem resiliency and the sustainability of fisheries throughout the Florida Keys (Lott 1996, Lee et al. 1999, Schmidt et al. 1999).

The current high levels of unrestricted boat use and access within all areas of the park under this alternative would continue to cause short- and long-term adverse localized impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats. These adverse impacts on the essential and unique habitats in the park would continue to accumulate over time, resulting in greater and greater degradation of resource quality and functioning, and at some point in the future these critical habitats would lose functionality and become unrecoverable.

The park, under alternative A, would not contribute any significant benefits to the system of other proposed research natural areas within the Florida Keys National Marine Sanctuary, the Gulf of Mexico, the Caribbean, or the coast of the United States, but the park could benefit from the implementation of nearby research natural areas such as those proposed by the sanctuary's ecological reserves.

The resource degradation that would occur under alternative A would not only endanger the park resources, but would also diminish the capacity of the rest of the Florida Keys to sustain itself into the future.

Conclusion

Under alternative A, the aquatic essential and unique habitats in the park would continue to face long-term impacts through direct habitat degradation from unrestricted, amateur boat users and through contact from scuba divers, snorkelers, and swimmers. These impacts would be compounded by any oil spills, fuel leaks, waste disposals, etc. and by the expected increase in trash due to increasing visitor use. Fish, shark, and invertebrate populations all use the underwater community in different ways (protection, food, spawning, etc.), and changes in the delicate balances of these multispecies communities due to fishing and other effects would continue to cause compounding adverse impacts on the species and habitats due to shifts in use.

Likewise, the risks of adverse impacts on the essential habitats outside the park under alternative A would continue to compound the direct impacts on the fisheries and wildlife living in the park. The fish, marine mammals, birds, and turtles, habitats, and unique environment of the park all exist in a delicate balance. Changes to any component represent risks to all other components. Implementing alternative A poses a major long-term threat to the overall environmental health of the park's resources.

ALTERNATIVE B

Impacts on Essential and Unique Habitats

Coral Reefs, Sea Grass, Hardbottoms, and Sandbottoms. Management tools available under alternative B would control the maximum number of visitors in certain areas of the park. If in the unrestricted areas of the park established standards for resource quality were exceeded, additional use restrictions would be established to prevent further impairment of these resources. Also, visitor education might limit some damage from anchors and chains. Alternative B would provide slightly higher protection to the habitats of the park compared to alternative A.

Because alternative B provides no research natural area zone protection to the park's essential and unique habitats, it would provide little improvement over current conditions but would enhance protection from the impact of future increased use.

Special protection zoning for the elkhorn and fused staghorn coral formations in the Long Key/Bush Key tidal channel would increase protection for these at-risk species.

Terrestrial Habitats. Although access to some terrestrial areas of the park would continue to be restricted or prohibited, other island areas would allow complete access to recreational visitors. Improved monitoring of the use of terrestrial resources for picnicking, camping, wildlife viewing, walking, etc. would reduce some of the major short-term and moderate long-term deterioration of island flora due to these uses. If established standards for the management zone for resource quality were exceeded, additional use restrictions would be established to prevent further impairment of these resources. The prevention of any further facility construction would provide some level of protection to the terrestrial resources by preventing the major damage caused by such an undertaking.

Impacts on Fishery Resources

Exploited Reef Fish. The simulation results showed that a majority of the snapper, grouper, and grunt populations would continue to decline during the next 20 years without management intervention (see appendix I). Current levels of exploitation would continue to result in short- and long-term major adverse impacts on the exploited reef fish populations in the park, reducing the value of the park to almost all user groups, including fishermen, scuba divers, and snorkelers.

Other Species. As reef fish populations continue to decline, collapse, and become more rare, the diversity and balance of the reef fish community would become degraded. Because alternative B contains no research natural area zone, it offers no further protection to the diversity, abundance, size, and distribution of the reef fish community or protection from increased impacts. The combination of these factors, under current levels of park access and fishing mortality, would result in major short- and long-term adverse impacts on these populations.

Impacts on Wildlife Resources

Birds and Turtles. Alternative B would slightly increase protection to birds, turtles, and their nesting sites in the park due to limiting overcrowding in areas, spreading out resource use, and applying management tools to limit visitor impacts after certain management zone standards have been reached. Application of the special protection zone to highly sensitive sites during critical nesting periods would significantly limit adverse impacts. Unlimited boater access to the park would still present major short- and long-term adverse impacts on turtles.

Marine Mammals. Alternative B would slightly increase protection to the marine mammals in the park due to spreading out

resource use and applying management tools to limit visitor impacts after certain management zone standards have been reached. However, the management zone standards allow some adverse impacts. Unlimited boater access to the park would still present major short- and long-term adverse impacts on marine mammals.

Impacts on the Environmental Setting

Soundscape and Night Lighting. The current levels of visitation during periods of the year result in a moderate short-term adverse impact on the natural soundscape and night lighting within the park. However, as levels of visitation increase, the application of management tools and standards (visitor capacity limitations within areas, the reduction of boat use, and controls on noise levels) would ensure the protection of the night view of the sky and the natural soundscapes.

Wetlands. There would be no impacts on wetlands.

Water Quality. The water quality in the park constantly faces the potential of a minor or major oil or fuel spill caused by grounding of recreational boats, and this risk would continue under alternative B. However, as levels of visitation increase, the application of management tools and standards (visitor capacity limitations within areas and the reduction of boat use) would help decrease the risk to water quality. The restriction of any further construction of facilities would provide increased protection of water quality.

Cumulative Impacts

The risks of adverse impacts on the essential habitats outside the park under alternative B would continue to compound the direct impacts on the fisheries and wildlife living in the park. These cumulative impacts would be less adverse than those in alternative A but would be insufficient to halt the overall degradation of the park's resources.

Conclusion

Under alternative B, the essential and unique aquatic habitats in the park would continue to face long-term impacts through direct habitat degradation from unrestricted, amateur boat users and through contact from scuba divers, snorkelers, and swimmers. These impacts would be compounded by any oil spills, fuel leaks, waste disposals, etc. and by the expected increase in trash due to increasing visitor use.

Fish, shark, and invertebrate, bird, turtle and marine mammal populations all use the park in different ways (protection, food, spawning, etc.), and changes in the delicate balances of these multispecies communities due to fishing and other effects would continue to cause compounding adverse impacts on the species and habitats.

The AHP model results (see figure B13) indicate that alternative B would only be slightly more effective (1.1 times) in achieving the park's goals with respect to natural resources than alternative A. The implementation of alternative B would still pose a major long-term threat to the overall environmental health of the park.

ALTERNATIVE C

The text in the following discussions for alternative C has the same percentages that were in the *Draft General Management Plan Amendment / Environmental Impact Statement* even though the proposed boundary for the RNA zone changed. Because the percentage of the park that was added to the RNA zone with the change in the boundary was only 3%, the recalculation of the figures was not cost-effective.

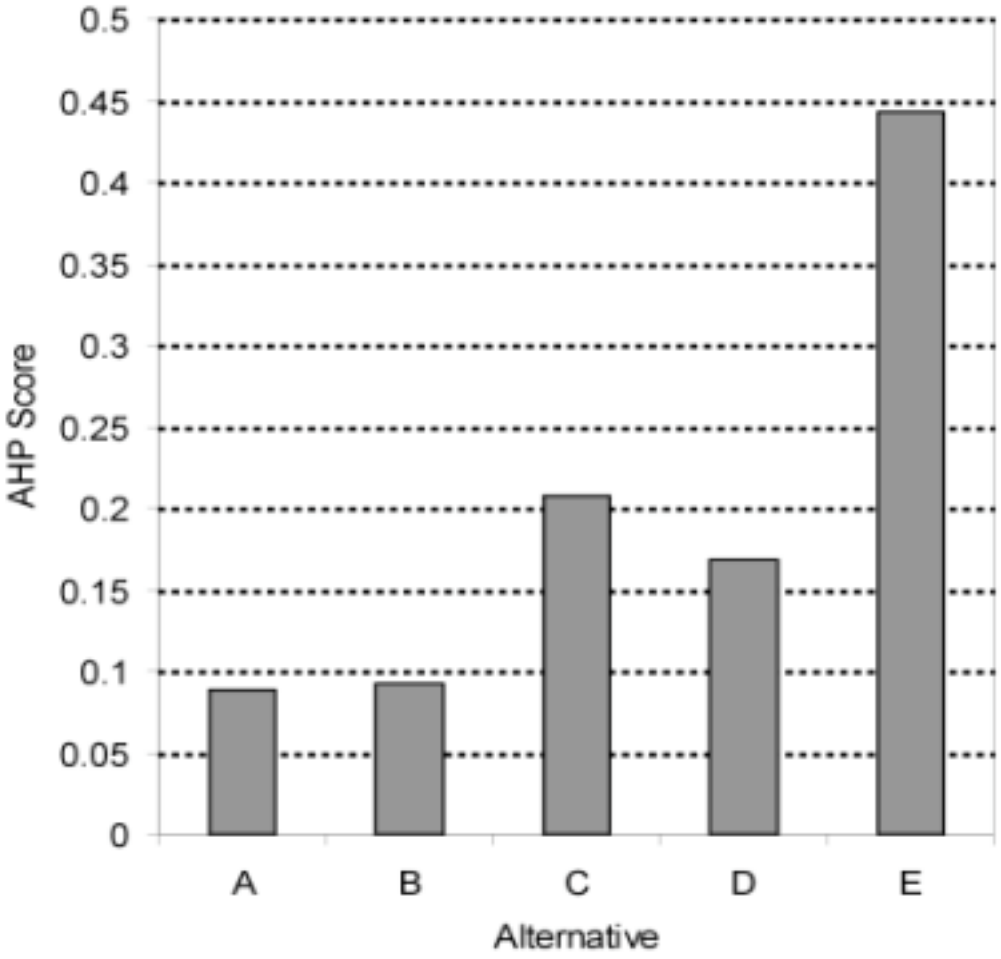


Figure B13: Overall AHP model scores for five management alternatives. Score values reflect the relative effectiveness of a given alternative in achieving the park's goals with respect to natural resources (see appendix I).

Impacts on Essential and Unique Habitats

Coral Reefs, Sea Grass, Hardbottoms, and Sand Bottoms. The introduction of a research natural area zone in the park would significantly reduce the short- and long-term adverse impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats within that zone. Restrictions on private boat use in the research natural area zone would reduce the threat of major damage to underwater habitats from groundings and propellers. The elimination of anchoring and fishing in the research natural area zone would remove the threat of damage to underwater habitats from these activities.

Limiting scuba diving, snorkeling, and swimming to deeper, localized areas near mooring buoys in the research natural area zone would significantly reduce the extent of damage to coral reefs from these activities. The research natural area zone would protect 41% of the coral reef habitats in the park, 100% of the hardbottom habitats, 26% of the sea grass beds, and 41% of the sand bottom areas (appendix F, table A2c).

This level of research natural area zone protection would provide a significant increase in habitat quality compared to the no-action alternative (alternative A), and would protect several extraordinary coral reef formations (e.g., Loggerhead Forest). This increased protection would have a beneficial impact on reef formations and associated aquatic life within the research natural area. The aquatic habitats outside the boundaries of the research natural area would still face moderate to major long-term adverse impacts due to use by boaters, fishermen, scuba divers, snorkelers, and swimmers.

Special protection zoning for the elkhorn and fused staghorn coral formations in the Long Key/Bush Key tidal channel would increase protection for these at-risk species.

Terrestrial Habitats. Monitored and/or restricted access to much of the terrestrial habitat and the use of guided tours would provide increased protection to land-based resources compared to alternative A.

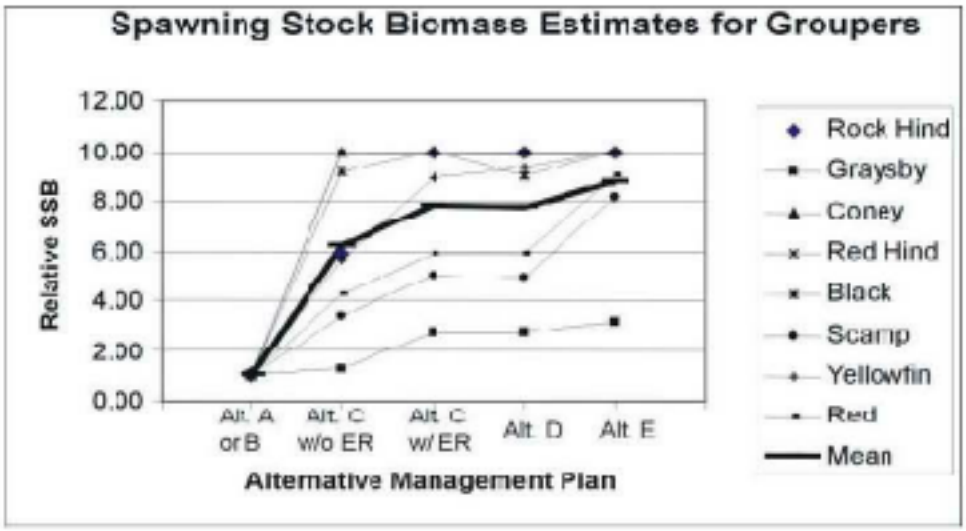
The restriction of any further construction of facilities, except dock expansion, and the shifting of visitor loads to commercial services would provide increased protection to the essential habitats of the park, further decreasing long-term adverse impacts.

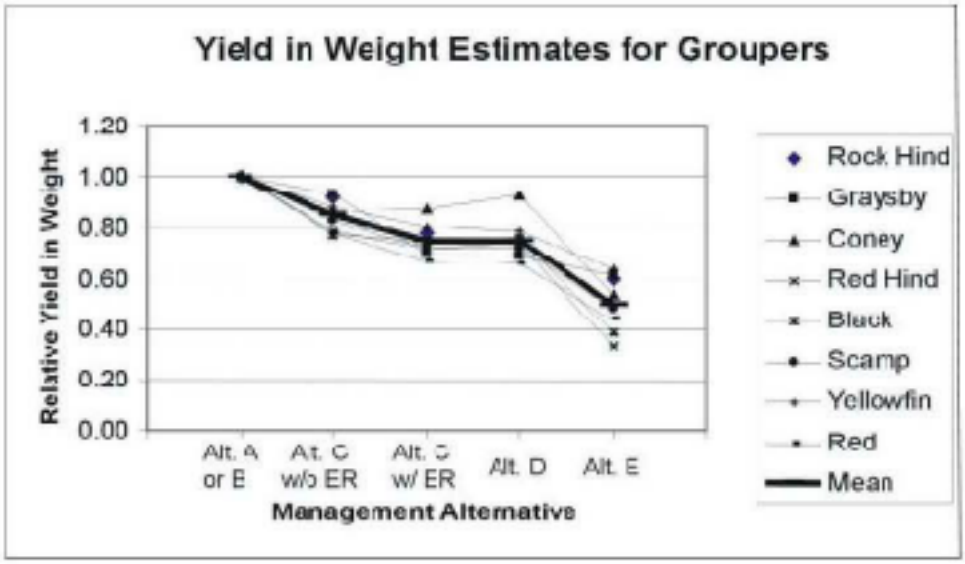
Impacts on Fishery Resources

Exploited Reef Fish. Recreational fishing would not be allowed in the research natural area zone under this alternative. The placement of this zone (see figure B5b in appendix F) would provide greatly increased levels of protection for 88% of the reef fish species found in the park, including 97% of the species in the snapper-grouper-grunt complex (appendix F, table A2c). This level of protection for such a high proportion of the total species in the park would benefit the reef fish community composition and provide stability to the reef fish community and the park's natural resources.

The simulation results (see appendix I) show that in 20 years, the research natural area zone would produce an 800% increase in spawning populations, more than a 1,000% increase in egg production, and only a 20% drop in yield in weight for all species of the grouper complex residing in the park (figure B7). Note that on figures B7, B9, and B11, alternative C without the Florida Keys Marine Sanctuary's ecological reserve is represented but it not one of the alternatives presented in this document. The results for the snappers show a 300% increase in spawning population, a 1,500% increase in egg production, and a 40% decrease in yield in weight (figure B9). Likewise, grunts show a 400% increase in spawning population, a 500% increase in egg production, and only a 20% decrease in yield in weight (figure B11). In addition, individual fish in the stocks would be allowed to grow to larger, naturally attainable sizes within the research natural area zone, attracting scuba divers

Figure B7: Results of the 20-year spatial simulations of the efficacy of the various management alternatives for all grouper species. (Note that alternative C without the Florida Keys National Marine Sanctuary's ecological reserves is not one of the alternatives proposed in this document.)





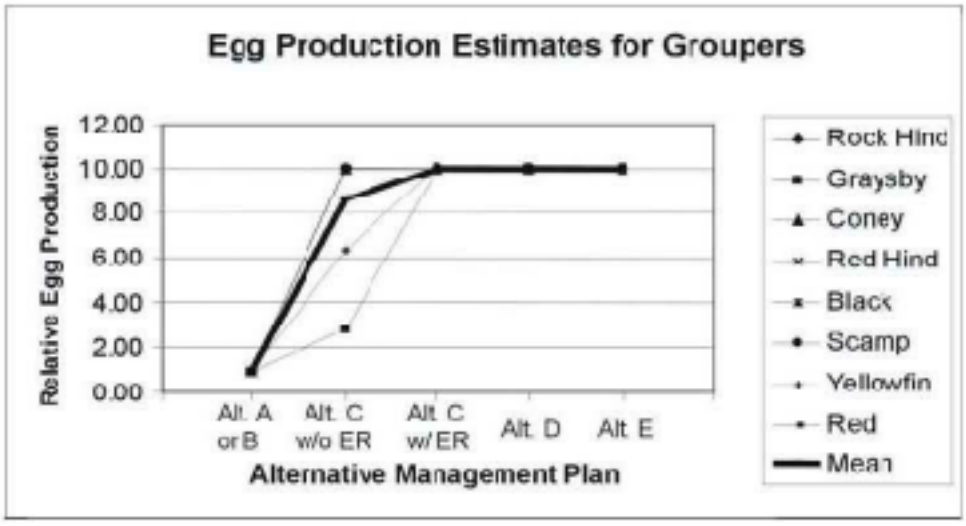
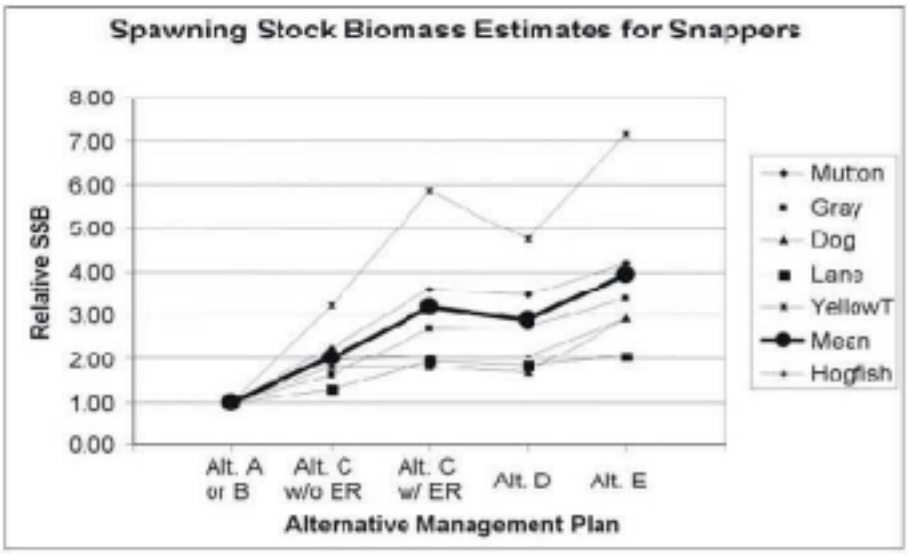
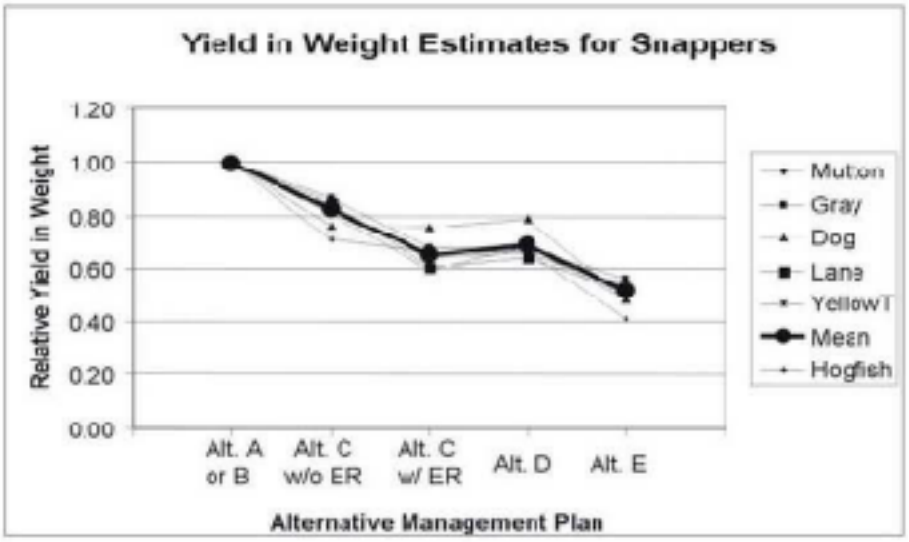


Figure B7: Results of the 20-year spatial simulations of the efficacy of the various management alternatives for all grouper species.

Figure B9: Results of the 20-year spatial simulations of the efficacy of the various management alternatives for all snapper species. (Note that alternative C without the Florida Keys National Marine Sanctuary's ecological reserves is not one of the alternatives proposed in this document.)





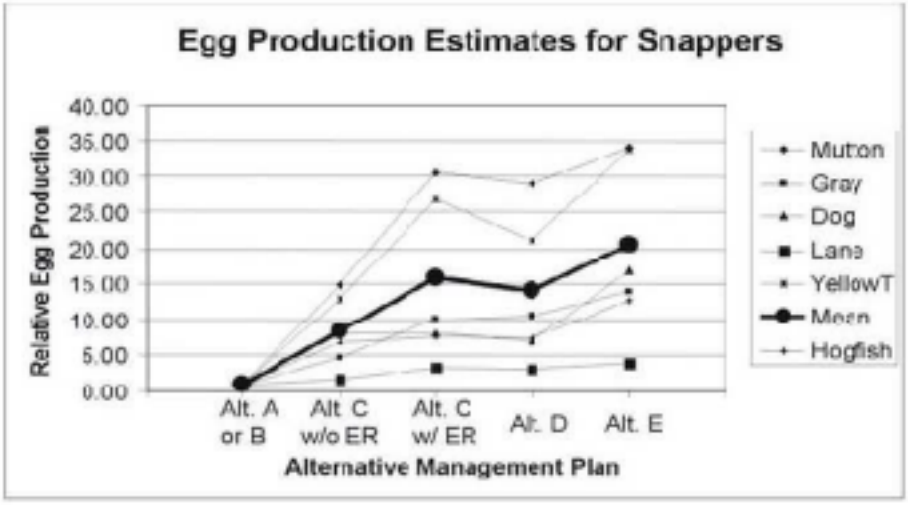


Figure B9: Results of the 20-year spatial simulations of the efficacy of the various management alternatives for all snapper.

Figure B11: Results of the 20-year spatial simulations of the efficacy of the various management alternatives for all grunt species. (Note that alternative C without the Florida Keys National Marine Sanctuary's ecological reserves is not one of the alternatives proposed in this document.)

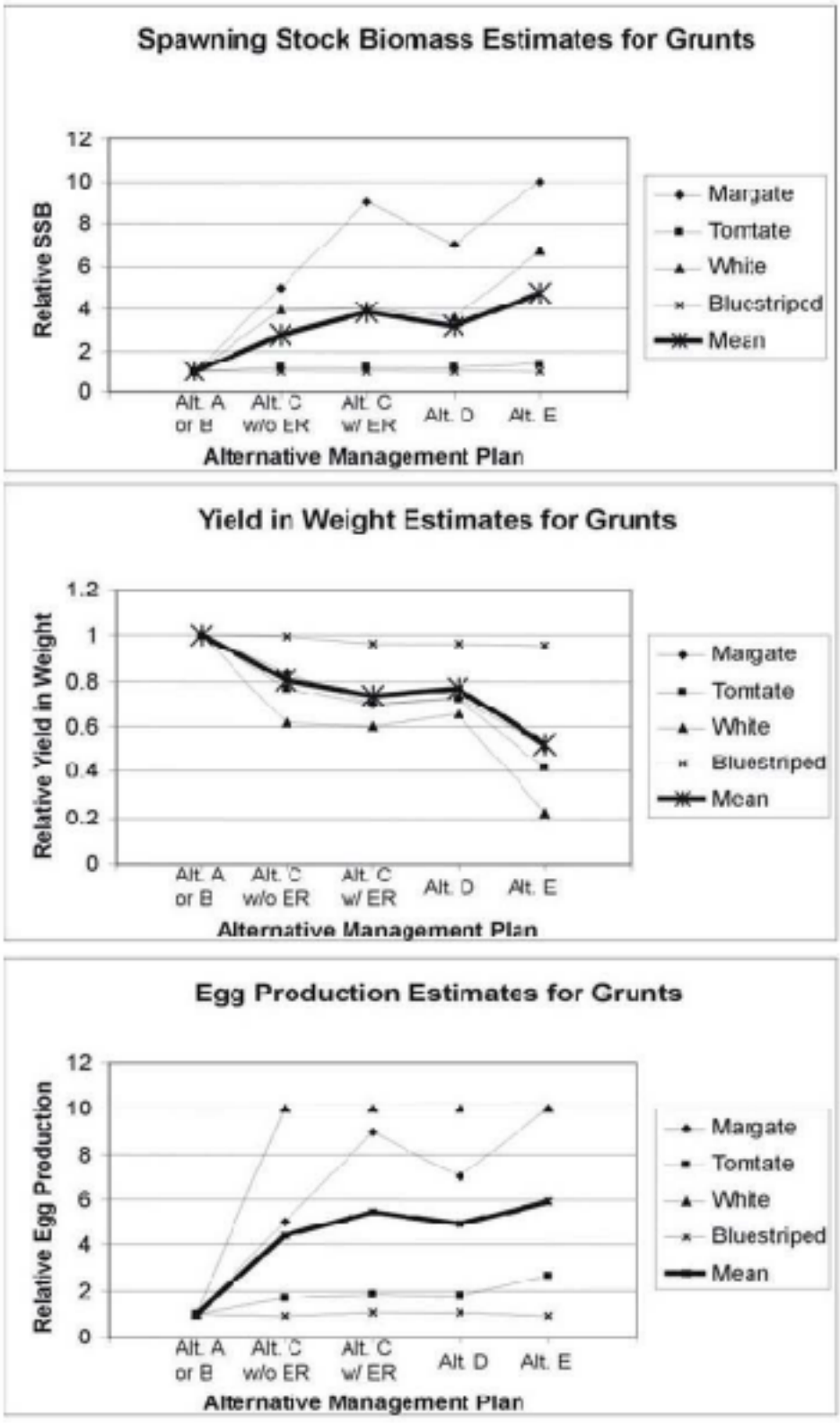


Figure 311: Results of the 20-year spatial simulations of the efficacy of the various management alternatives for all grunt species.

and snorkelers. Alternative C without the Florida Keys National Marine Sanctuary's ecological reserve, on figures B7, B9, and B11, is not one of the alternatives proposed in this document.

There would be a major short-term and minor long-term adverse impact on fishing yields in the park; however, fish stock biomass and yields would be higher and more sustainable over the long term, and the presence of substantially larger individuals would benefit recreational trophy fishing and commercial yields in water adjacent to the research natural area. Additionally, these larger individuals could leave the boundaries of the research natural area zone at times and could be caught by commercial fishermen or recreational fishermen outside the park seeking these large trophy fish. This would result in only moderate long-term risks of adverse impacts on the population due to expected fishing around the research natural area.

Other Species. The creation of the research natural area would also provide major short-term and long-term benefits to the diversity, abundance, size, and distribution of unexploited and protected/threatened fish and invertebrate populations through the protection of coral reef habitats and the elimination of accidental-catch mortality in the research natural area.

Impacts on Wildlife Resources

Birds, Turtles, and Marine Mammals. Measures to control access to land-based environments in the research natural area through guided tours under alternative C should significantly reduce short- and long-term adverse impacts on bird and turtle nests and eggs.

Eliminating fishing and restricting boat use within the research natural area zone would greatly reduce the risks to the birds, swimming turtles, and marine mammals that are caused by boating and fishing.

Impacts on the Environmental Setting

Soundscape and Night Lighting. Visitor capacity limitations within areas, the reduction of boat use, and controls on noise levels would provide a more pristine natural soundscape. Low tolerance for human activities that degrade the natural soundscape and the natural lighting of the park would decrease these impacts as would education and compliance with night sky and soundscape protection regulations.

Wetlands. Potential impacts would occur on the marine intertidal unconsolidated shore wetlands around Garden Key as a result of dock construction. The exact site of the dock is currently unknown and would be determined during the design phase. Consequently, the extent of impacts on wetlands is uncertain at this time. Appropriate environmental compliance would be conducted during site specific design of the dock facility, including analysis of impacts on wetlands.

Water Quality. In the research natural area, restricted private boat use would decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.). The restriction of any further construction of facilities, except the dock expansion, would provide increased protection of water quality.

The construction of dock facilities under this alternative might have localized impacts on the environmental resources near the fort. If a floating structure were used, the impacts should be minimized because no permanent structure would be built and pilings would not have to be driven into the ground. The construction of a permanent, shore-based structure might have short-term and long-term impacts. The potential short-term impacts would be increased sedimentation and turbidity, loss of habitat, animal mortality, air pollution, and dust dispersal. Potential long-term impacts would include loss of habitat, shading of habitat, unnatural current patterns, artificial habitat creation,

sediment buildup, and interference with turtle nesting. Most of these impacts could be minimized or eliminated by careful and thoughtful construction and low-impact procedures.

Cumulative Impacts

The proposed research natural area zone in this alternative would allow the park to function as one of several reserves within a larger system of reserves proposed and operating throughout the Florida Keys National Marine Sanctuary, the Gulf of Mexico, the eastern coast of the United States, and the Caribbean, providing and receiving benefits from this system through larval, juvenile, and adult transport of species.

Conclusion

The AHP model overall results (see figure B13) indicate that alternative C would be 2.5 times more effective in achieving the park's goals with respect to natural resources than alternative A. Implementing alternative C would greatly reduce the major long-term threats posed by alternative A to the overall environmental health of the park's resources.

ALTERNATIVE D

Impacts on Essential and Unique Habitats

Coral Reefs, Sea Grass, Hardbottoms, and Sand Bottoms. The introduction of a research natural area zone in the park would significantly reduce the short- and long-term adverse impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats in that zone. Restrictions on private boat use in this zone would reduce the threat of major damage to underwater habitats from groundings and propellers. The elimination of anchoring and fishing in the research natural area would remove the threat of damage to underwater habitats from these activities. Limiting scuba diving, snorkeling, and swimming to deeper, localized areas near mooring buoys in the research natural area zone would significantly reduce the extent of damage to coral reefs from these activities. The research natural area zone would protect 35% of the coral reef habitats in the park, 38% of the sea grass beds, 20% of the sand bottom areas, but none of the hardbottom habitats (appendix F, table A2c). This level of research natural area protection would provide a significant increase in habitat quality compared to the no-action alternative (alternative A). The aquatic habitats outside the boundaries of the research natural area zone would still face moderate to major long-term adverse impacts due to use by boaters, fishermen, scuba divers, snorkelers, and swimmers.

Special protection zoning for the elkhorn and fused staghorn coral formations in the Long Key/Bush Key tidal channel would increase protection for these at-risk species.

Terrestrial Habitats. Monitoring and/or restricting access to much of the terrestrial habitat and using guided tours would provide increased protection for land resources compared to alternative A.

The restriction of any further construction of facilities, except dock expansion, and the shifting of visitor loads to commercial services would provide increased protection to the essential habitats of the park, further decreasing long-term adverse impacts.

Impacts on Fishery Resources

Exploited Reef Fish. Recreational fishing would not be allowed in the research natural area zone under this alternative. The placement of this zone (see map in appendix F, figure B5c) would provide greatly increased levels of protection for 80% of the reef fish species found in the park and 83% of the species in the snapper-grouper-grunt complex (appendix F, table A2c). This level

of protection for a high proportion of the total species in the park would reduce the adverse impact on the reef fish community composition and provide stability to the reef fish community.

The simulation results (see appendix I) show that in 20 years, the research natural area zone would produce an 800% increase in spawning population, more than a 1,000% increase in egg production, and only a 20% drop in yield in weight for all species in the grouper complex residing in the park (see figure B7). The results for the snappers show a 280% increase in spawning population, a 1,400% increase in egg production, and a 30% decrease in yield in weight (see figure B9). Likewise, the grunts show a 350% increase in spawning population, a 500% increase in egg production, and only a 20% decrease in yield in weight (see figure B11).

In addition, individual fishes would be allowed to grow to larger, naturally attainable sizes within this zone, attracting scuba divers and snorkelers. There would be major short-term and minor long-term adverse impacts on fishing yields in the park; however, fish stock size and yields would be higher and sustainable over the long term, and the presence of these substantially larger individuals would benefit recreational trophy fishing and commercial yields in water adjacent to the research natural area. Additionally, these larger individuals could leave the boundaries of the zone at times and could be caught by commercial fishermen or recreational fishermen seeking these large trophy fish.

Alternative D would provide excellent protection to the exploited reef fish stocks (groupers, snappers, and grunts) and would result in only moderate long-term adverse impacts on the reef fish populations due to expected fishing around the research natural area zone.

Other Species. The creation of the research natural area zone would also provide major short-term and long-term benefits to the diversity, abundance, size, and distribution, of unexploited and protected/threatened fish and invertebrate populations through the protection of coral reef habitats and the elimination of accidental-catch mortality within the research natural area zone.

Impacts on Wildlife Resources

Birds, Turtles, and Marine Mammals. Measures to control access to land-based environments through guided tours in the research natural area should significantly reduce short- and long-term adverse impacts on bird and turtle nests and eggs. Eliminating fishing and restricting boat use within the research natural area would greatly reduce the risks to birds, swimming turtles, and marine mammals that are caused by boating and fishing.

Impacts on the Environmental Setting

Soundscape and Night Lighting. Visitor capacity limitations within areas, the reduction of boat use, and controls on noise levels would provide a more pristine natural soundscape. Low tolerance for human activities that degrade the natural lighting of the park would improve opportunities to see the night sky.

Wetlands. Potential impacts would occur on the marine intertidal unconsolidated shore wetlands around Garden Key as a result of dock construction. The exact site of the dock is currently unknown and would be determined during the design phase. Consequently, the extent of impacts on wetlands is uncertain at this time. Appropriate environmental compliance would be conducted during site specific design of the dock facility, including analysis of impacts on wetlands.

Water Quality. In the research natural area, restricted private boat use would decrease the short-term risks to water quality from

fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.). The restriction of any further construction of facilities, except for dock expansion, would provide increased protection of water quality.

The construction of dock facilities under this alternative might have localized impacts on the environmental resources near the fort. If a floating structure were used, the impacts should be minimized because no permanent structure would be built and pilings would not have to be driven into the ground. The construction of a permanent, shore-based structure might have short- and long-term impacts. The potential short-term impacts would be increased sedimentation and turbidity, loss of habitat, animal mortality, air pollution, and dust dispersal. Potential long-term impacts would include loss of habitat, shading of habitat, unnatural current patterns, artificial habitat creation, sediment buildup, and interference with turtle nesting. Most of these impacts could be minimized or eliminated by careful and thoughtful construction and low-impact procedures.

Cumulative Impacts

The proposed research natural area zone in this alternative would allow the park to function as one of several reserves in a larger system of reserves proposed and operating throughout the Florida Keys National Marine Sanctuary, the Gulf of Mexico, the eastern coast of the United States, and the Caribbean, providing and receiving benefits from this system through larval, juvenile, and adult transport of species.

Conclusion

The AHP model overall results (see figure B13) indicate that alternative D would be 2.1 times more effective in achieving the park's goals with respect to natural resources than alternative A. Implementing alternative D would greatly reduce the major long-term threats posed by alternative A to the overall environmental health of the park's natural resources.

ALTERNATIVE E

Because the percentage of the park that was deleted from the research natural area zone due to expansion of the historic preservation/adaptive use zone in the final plan is small (approximately 3%) under this alternative, the recalculation of the figures in the following text was not cost-effective.

Impacts on Essential and Unique Habitats

Coral Reefs, Sea Grass, Hardbottoms, and Sand Bottoms. The creation of a research natural area zone for essentially the entire park would almost eliminate the short- and long-term adverse impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats. Restrictions on private boat use in the park would reduce the threat of major damage to underwater habitats from groundings and propellers. The elimination of anchoring and fishing would remove the threat of damage to underwater habitats from these activities. Limiting scuba diving, snorkeling, and swimming to deeper, localized areas near mooring buoys in the research natural area zone would significantly reduce the extent of damage to coral reefs from these activities. The research natural area zone would protect nearly 100% of all underwater habitat area (appendix F, table A2b). This level of research natural area zone protection would provide a significant increase in habitat quality compared to the no-action alternative (alternative A).

Special protection zoning for the elkhorn and fused staghorn coral formations in the Long Key/Bush Key tidal channel would increase protection for these at-risk species.

Terrestrial Habitats. Monitored and/or restricted access to most of the terrestrial habitat and the use of guided tours would provide increased protection to land-based resources compared to alternative A. The restriction of any further construction of facilities, except dock expansion, and the shifting of visitor loads to commercial services, would provide increased protection to the essential habitats of the park, further decreasing long-term adverse impacts.

Impacts on Fishery Resources

Exploited Reef Fish. Recreational fishing would not be allowed in the park (see map in appendix F, figure B5d) under this alternative, except in the historic preservation/adaptive use zone. This would protect 100% of the reef fish species in the park and thus provide stability to the community.

The simulation results (see appendix I) show that for the park and Tortugas region, in 20 years the research natural area zone would produce a 900% increase in spawning population, more than a 1000% increase in egg production, and a 50% drop in fishery yield in weight for the groupers (see figure B7). The increases in stock biomass would be reflected in larger individuals and greater stock reproductive potential. The results for the snappers show a 400% increase in spawning population, a 2,000% increase in egg production, and also a 50% decrease in yield in weight (see figure B9). Likewise, the grunts show a 500% increase in spawning population, a 600% increase in egg production, and a 50% decrease in yield in weight (figure B11).

With fishing allowed only in a very limited portion of the park, fishery yields would be nearly eliminated. In addition, individuals would be allowed to grow to larger, naturally attainable sizes within the research natural area (most of the park), thereby attracting scuba divers and snorkelers. The presence of substantially larger individual fish in the park would benefit commercial fishermen and recreational trophy fishermen in waters adjacent to the park because these larger individuals could leave the boundaries of the park at times and could be caught by commercial fishermen and recreational fishermen seeking these large trophy fish.

Alternative E would provide excellent protection to the exploited reef fish populations (groupers, snappers, and grunts) and would result in only minor long-term risks of adverse impacts on those populations due to fishing around the park.

Other Species. The creation of the research natural area zone would also provide major short- and long-term benefits to the diversity, abundance, size, and distribution, of unexploited and protected/threatened fish and invertebrate populations through the protection of coral reef habitats and the elimination of accidental-catch mortality.

Impacts on Wildlife Resources

Birds, Turtles, and Marine Mammals. Measures to control access to land-based environments through guided tours under alternative E should significantly reduce short- and long-term adverse impacts on bird and turtle nests and eggs.

Eliminating fishing and restricting boat use within the research natural area (most of the park) would nearly eliminate the risks to swimming turtles, birds, and marine mammals that are caused by boating and fishing.

Impacts on the Environmental Setting

Soundscape and Night Lighting. Visitor capacity limitations within areas, the reduction of boat use, and controls on noise levels would provide a more pristine natural soundscape. Low tolerance for human activities that degrade the natural lighting of the park would improve the opportunities to see the night sky.

Wetlands. Potential impacts would occur on the marine intertidal unconsolidated shore wetlands around Garden Key as a result of dock construction. The exact site of the dock is currently unknown and would be determined during the design phase. Consequently, the extent of impacts on wetlands is uncertain at this time. Appropriate environmental compliance would be conducted during site specific design of the dock facility, including analysis of impacts on wetlands.

Water Quality. Restricted private boat use in most of the park would greatly decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.). The restriction of any further construction of facilities, except dock expansion, would provide increased protection of water quality.

The construction of dock facilities under this alternative might have localized impacts on the environmental resources near the fort. If a floating structure were used, the impacts should be minimized because no permanent structure would be built and pilings would not have to be driven into the ground. The construction of a permanent, shore-based structure might have short-term and long-term impacts. The potential short-term impacts would be increased sedimentation and turbidity, loss of habitat, animal mortality, air pollution, and dust dispersal. Potential long-term impacts would include loss of habitat, shading of habitat, unnatural current patterns, artificial habitat creation, sediment buildup, and interference with turtle nesting. Most of these impacts could be minimized or eliminated by careful and thoughtful construction and low-impact procedures.

Cumulative Impacts

The proposed research natural area zone in this alternative would allow the park to function as one of several reserves in a larger system of reserves proposed and operating throughout the Florida Keys National Marine Sanctuary, the Gulf of Mexico, the eastern coast of the United States, and the Caribbean, providing and receiving benefits from this system through larval, juvenile, and adult transport of species.

Conclusion

The AHP model overall results (see figure B13) indicate that alternative E would be 5 times more effective in achieving the park's goals with respect to natural resources than alternative A. The implementation of alternative E would almost eliminate the major long-term threats posed by alternative A to the overall environmental health of the park's natural resources.

SUMMARY AND CONCLUSION

To demonstrate the success of any management decisions within an ecosystem, it is necessary to understand both the initial state of the system and any changes that occur within the system over a given time period. It is a certainty that at some point in the future the National Park Service will be required to justify its use of a research natural area zone within the park. This will require both baseline estimates of the resources within the park and quantification of changes in those resources over time to successfully demonstrate the research natural area zone efficacy in meeting management goals. The comprehensive quantitative reef fish and habitat sampling survey conducted from late May to mid-July 1999 provides excellent baseline estimates of both the fishery resources and their critical habitats (reef, hardbottom, etc.).

Quantitative research conducted using mathematical programming, optimization, and spatial modeling techniques showed that reef fish species that were fished the most before the establishment of a research

natural area zone showed the greatest recovery response to the establishment of the zone (Meester 2000). Therefore, it is important to include these species in a monitoring plan to assess the impacts of the establishment of this zone. The results of the simulation work done for this management plan, as well as the results of a retrospective assessment for the entire Florida Keys (Ault et al. 1998), indicate that serial overfishing is occurring in the Florida Keys reef fish community where the grouper species is the most intensely fished, followed by the snappers and then the grunts.

Due to the frequency of sightings from visual surveys and estimated current fishing mortality rates, it is recommended that a monitoring program minimally include the red and black groupers, the gray and yellowtail snappers, and the white grunt within the appropriate monitoring and assessment survey design. A more robust strategy would be to sample the entire reef fish community to compare effects on exploited and nonexploited community members. Changes in population numbers and sizes of individuals in the reef fish populations after the establishment of the research natural area should be particularly marked for groupers.

IMPACTS ON CULTURAL RESOURCES

METHODOLOGY

The assessment of impacts on cultural resources and historic properties was made in accordance with regulations of the Advisory Council on Historic Preservation (36 CFR 800) implementing section 106 of the National Historic Preservation Act. Following a determination of the areas of potential effect, cultural resources were identified within these areas that are either listed on or are eligible for listing on the National Register of Historic Places. An assessment was made of the nature and extent of the effects on cultural resources anticipated from implementing proposed undertakings. Cultural resources can be affected by actions that alter in any way the attributes that qualify the resources for inclusion on the national register. Adverse effects can result when the integrity of a resource's significant characteristics is diminished. Consideration was given both to the effects anticipated at the same time and place of the undertaking, and to those potentially occurring indirectly and/or at a later time and distance.

To provide consistency with requirements of the National Environmental Policy Act, the effects on cultural resources are also described (in the conclusion sections for each alternative) in terminology intended to convey the duration, intensity and beneficial/negative nature of potential impacts. The intensity of impacts is defined as follows:

Negligible — The impact is barely perceptible and not measurable. Significant character-defining attributes of historic properties (including the informational potential of archeological resources) are not appreciably diminished or enhanced by the undertaking or resource protection measure.

Minor — The impact is perceptible and measurable. The effects remain localized and confined to a single element contributing to the significance of a larger national register property/district, or archeological site(s) with low to moderate data potential. Resource protection measures result in a limited degree of cultural resource preservation.

Moderate — The impact is sufficient to alter character-defining features of historic properties, generally involving a single or small group of contributing elements or archeological site(s) with moderate to high data potential. Resource protection measures result in an adequate degree of cultural resource preservation.

Major — The impact results in a substantial and highly noticeable change in character-defining features of historic properties, generally involving a large group of contributing elements and/or individually significant property or archeological site(s) with high to exceptional data potential. Resource protection measures result in a comprehensive or substantially enhanced degree of cultural resource preservation.

REGULATIONS AND POLICIES

The National Park Service is mandated to preserve and protect its cultural resources through the Organic Act of 1916 (USC title 16) and such specific legislation as the Antiquities Act of 1906 (16 USC 431); the National Historic Preservation Act of 1966, as amended (16 USC 470); the National Environmental Policy Act of 1969, as amended (42 USC 4321, 4331, 4332); the Archeological Resources Protection Act of 1979 (16 USC 470); and the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001). In addition, the management of cultural resources is guided by the Advisory Council on Historic Preservation's implementing regulations regarding "Protection of Historic Properties"

(36 CFR 800); the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995) and *Guidelines for the Treatment of Cultural Landscapes* (1996); Chapter V of the National Park Service's *Management Policies* (1988); and the National Park Service's *Cultural Resources Management Guideline* (DO-28 1998).

As part of its cultural resource management responsibilities, the National Park Service strives to inventory and evaluate all cultural resources under its jurisdictional management. Section 110 of the National Historic Preservation Act requires that historic properties be identified and evaluated under the criteria of National Register of Historic Places eligibility. Section 110 also stipulates that historic properties be managed to preserve and protect significant values. Section 106 of the National Historic Preservation Act requires that federal agencies having direct or indirect jurisdiction over undertakings consider the effect of those undertakings on resources either listed on or eligible for listing on the National Register of Historic Places. It also requires that the Advisory Council on Historic Preservation, the state historic preservation officer, tribal representatives, and other concerned parties be provided an opportunity to comment.

ALTERNATIVE A (NO ACTION)

Analysis

Cultural resources would not be adversely affected by ongoing park undertakings, and would be protected to the greatest extent permitted under NPS policies and the availability of park staff and other NPS support personnel to carry out protection measures. Preservation actions to stabilize historic structural features at Fort Jefferson and (as necessary) at Loggerhead Key would continue to be carried out in accordance with NPS standards and guidelines and the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

There is a potential, however, that increased visitation might impact significant resources without an increase in park staff and preservation/monitoring activities. At Fort Jefferson, for example, the massive masonry walls and brick walkways are generally capable of withstanding heavy visitor use. However, at less protected areas (e.g., on top of the fort's earthen parapets along the scarp walls) increased pedestrian traffic might potentially disturb historic fabric as a result of soil erosion, perhaps leading to masonry destabilization. Preservation maintenance and stabilization activities are critical for ensuring the fort's long-term survival and structural integrity, and also to enhance visitor safety as increasing numbers of tourists tour the fort.

Expansion and rehabilitation of the Fort Jefferson visitor center into adjacent casemates would be expected to have no adverse effect on the fort's historical integrity provided that construction activities were sensitively carried out so as not to irretrievably damage or disturb historic fabric (e.g., masonry walls). More effective interpretive activities and exhibits would be accommodated by the expanded visitor center, and problems currently resulting from spalling mortar/masonry would be abated. Planned upgrade of the casemates currently used for visitor and staff quarters would also have no adverse effect on the fort's historic fabric because efficiency living-space inserts would be placed in the casemates to avoid or minimize disturbance of the existing masonry.

The growing popularity of shipwreck exploration among recreational divers also presents concerns for cultural resource protection. The park's extensive assemblage of shipwreck sites could sustain loss or impairment of valuable archeological information as divers (either intentionally or inadvertently) disturb historic fabric or remove artifacts. The park would monitor resource conditions, attempt to keep divers away from sensitive sites, and undertake other measures to reduce diver-related

impacts. However, current park staffing levels are insufficient to adequately patrol shipwreck sites or to impart the importance of resource protection to visitors. Faced with increasing numbers of divers exploring wreck sites, the park would likely continue to react to incidents of resource damage rather than carry out more proactive and comprehensive resource protection measures.

Cumulative Impacts

Significant cultural resources within the park have sustained adverse effects from both natural causes (the harsh marine environment, wave and storm damage, etc.) and human impacts. Hurricanes during the last century, for example, seriously damaged lighthouses on Loggerhead and Garden Keys, and Fort Jefferson's exposed masonry continues to spall and deteriorate. Shipwreck sites face ongoing disturbance from natural processes and the impacts of recreational divers. In conjunction with increasing numbers of park visitors, a corresponding potential for further adverse effects on submerged and land-based cultural resources might be expected. However, the continuation of NPS policies and restoration undertakings would assist in protecting and preserving cultural resources to the extent permitted under current and projected funding/staffing levels. The immensity of Fort Jefferson and the unique challenges it presents for comprehensive preservation in its isolated maritime setting would continue to be a major cultural resource management issue into the future.

Conclusion

Ongoing stabilization and preservation maintenance would have moderate to major long-term benefits on Fort Jefferson, and (as necessary) the Loggerhead Key historic district. Expansion and rehabilitation of casemates for the visitor center and housing would be sensitively carried out, protecting the fort's historic fabric and structural integrity. All preservation undertakings would be carried out in accordance with NPS policies and standards and would have no adverse effect on the national register significance of historic properties.

Increased visitation, however, could result in long-term moderate to major adverse effects on cultural resources (both submerged and land-based) without a corresponding increase in the park's ability to effectively monitor and manage visitor use. The park would continue to carry out resource protection to the greatest extent permitted under existing policies, funding, and staffing levels.

ALTERNATIVE B

Analysis

This alternative would be expected to result in greater protection of cultural resources than would occur under alternative A. The park staff would be able to more effectively carry out resource protection and monitoring activities by limiting the number of visitors permitted in selected areas at a given time.

In addition to the continuation of NPS cultural resource policies and protective measures, the park would undertake more comprehensive protection for shipwreck sites under provisions of the *Submerged Cultural Resources Strategy* (see appendix H). Among its provisions, a systematic and multidisciplinary monitoring program would be implemented to assess impacts, analyze and compare changed site conditions, and provide the basis for appropriate treatment or remedial action. An effective monitoring program would have to be in place before any site was opened to recreational diving. Mooring buoys would direct divers to selected locations, and sensitive sites would remain off-limits except for approved research purposes.

Heavy visitor use would continue to be expected at Fort Jefferson, which would remain the primary destination for commercial transportation providers. The park would therefore strive to ensure that potential visitor use impacts would not compromise the fort's historic integrity or compound the deterioration occurring as a result of the harsh marine environment. The park would continue to apply stabilization measures to arrest deterioration and would, as necessary, restrict visitor access to sensitive areas that require remedial preservation treatment. No adverse effect on significant historic features would be expected from expansion and rehabilitation of the Fort Jefferson visitor center and upgrades of existing staff/visitor quarters within the fort casemates.

Additional staff would be required to adequately implement or enforce the necessary range of resource protection measures.

Cumulative Impacts

Significant cultural resources within the park have sustained adverse effects from both natural causes (the harsh marine environment, wave and storm damage, etc.) and human impacts. Hurricanes during the last century, for example, seriously damaged lighthouses on Loggerhead and Garden Keys, and Fort Jefferson's exposed masonry continues to spall and deteriorate. Shipwreck sites face ongoing disturbance from natural processes and the impacts of recreational divers. In conjunction with increasing numbers of park visitors, a corresponding potential for further adverse effects on submerged and land-based cultural resources may be expected. However, along with NPS policies for preserving and protecting cultural resources, additional measures to limit visitor numbers in certain areas of the park, and the implementation of systematic resource management approaches (e.g., the *Submerged Cultural Resources Strategy*, see appendix H) would provide positive beneficial effects that would serve to check or abate adverse effects in the future.

Although the park would be in a better position to proactively manage and protect cultural resources by implementing these measures, the immensity of Fort Jefferson and the unique challenges it presents for comprehensive preservation in its isolated maritime setting would continue to be a major cultural resource management issue.

Conclusion

Implementation of this alternative would be expected to have no adverse effect on historic properties and would provide long-term moderate benefits for preserving and protecting cultural resources. The park's ability to proactively manage cultural resources and monitor visitor use impacts would be enhanced with the adoption of the *Submerged Cultural Resources Strategy* and limitations on visitor numbers permitted in certain areas of the park.

In common with all alternatives, ongoing stabilization and preservation maintenance would have long-term moderate to major benefits on Fort Jefferson and (as necessary) the Loggerhead Key historic district. Expansion and rehabilitation of casemates for the visitor center and housing would be sensitively carried out, protecting the fort's historic fabric and structural integrity. All preservation undertakings would be carried out in accordance with NPS policies and standards and would have no adverse effect on the national register significance of historic properties.

ALTERNATIVE C

Analysis

Implementing this alternative would entail more comprehensive protection of cultural resources than would occur under alternatives A and B. In common with alternative

B, the park would be able to more effectively carry out resource protection and monitoring activities by limiting the number of visitors permitted in approved areas of the park at a given time. The establishment of a research natural area zone (intended primarily to protect critical marine habitat and ecosystems) would also have positive benefits on the cultural resources within this zone. Visitor activities would be managed to prevent or minimize resource impacts. The emphasis placed on scientific research and the retention of resources in as near-pristine condition as possible would coincide with the objectives of cultural resource preservation and archeological research.

The requirement that visitors receive a permit to enter the research natural area zone would provide an effective means of imparting the requirements for protecting cultural resources and the penalties for disturbance. This requirement would also allow the park to more closely monitor the distribution and types of visitor activities occurring in the zone, which would support cultural resource management objectives. In collaboration with the National Park Service, commercial tour operators would assume a substantial role in providing visitors with information regarding cultural resource protection. This would have positive benefits, particularly if NPS staffing levels remain inadequate to effectively impart this information to visitors.

In addition to the continuation of NPS cultural resource policies and protective measures, the park would undertake comprehensive protection of shipwreck sites under provisions of the *Submerged Cultural Resources Strategy* (see appendix H). Among its provisions, a systematic and multidisciplinary monitoring program would be implemented to assess impacts, analyze and compare changed site conditions, and provide the basis for appropriate treatment or remedial action. An effective monitoring program would have to be in place before any site was opened to recreational diving. Mooring buoys would be used to keep divers in approved locations, and sensitive sites would remain off-limits except for approved research purposes.

Heavy visitor use would continue to be expected at Fort Jefferson, which would remain the initial destination for commercial transportation providers and private boaters receiving permits. The park would therefore strive to ensure that potential visitor use impacts would not compromise the fort's historic integrity or compound the deterioration occurring as a result of the harsh marine environment. The park staff would continue to apply stabilization measures to arrest deterioration and, as necessary, restrict visitor access to sensitive areas requiring remedial preservation treatment. No adverse effect on significant historic features would be expected from expansion and rehabilitation of the Fort Jefferson visitor center and upgrades of the staff/visitor quarters within the fort casemates.

The proposed extension of the dock to accommodate concession vessel(s) would require an archeological assessment to identify potential submerged cultural resources in the area of the dock extension. If significant sites were found that could not be avoided by construction, data recovery excavations or other approved mitigation measures would be implemented before starting construction.

Cumulative Impacts

Significant cultural resources within the park have sustained adverse effects from both natural causes (the harsh marine environment, wave and storm damage, etc.) and previous human impacts. Hurricanes during the last century, for example, seriously damaged lighthouses on Loggerhead and Garden Keys, and Fort Jefferson's exposed masonry continues to spall and deteriorate. Shipwreck sites face ongoing disturbance from natural processes and the impacts of recreational divers. In conjunction with increasing numbers of park

visitors, a corresponding potential for further adverse effects on submerged and land-based cultural resources might be expected. However, along with NPS policies for preserving and protecting cultural resources, additional measures to limit visitor numbers in certain areas of the park, implementation of systematic resource management approaches (e.g., the *Submerged Cultural Resources Strategy*), the establishment of a research natural area zone, and visitor permitting requirements would all provide positive beneficial effects that would serve to check or abate adverse effects in the future.

Although the park would be in a better position to proactively manage and protect cultural resources by implementing these measures, the immensity of Fort Jefferson and the unique challenges it presents for comprehensive preservation in its isolated maritime setting would continue to be a major cultural resource management issue.

Conclusion

Implementing this alternative would be expected to have no adverse effect on historic properties and would provide major long-term benefits for the preservation and protection of cultural resources. The park staff's ability to proactively manage cultural resources and monitor visitor use impacts would be substantially enhanced with the adoption of the *Submerged Cultural Resources Strategy*, limitations on visitor numbers, permitting requirements, and the adoption of a research natural area zone.

In common with all alternatives, ongoing stabilization and preservation maintenance would have long-term moderate to major benefits on Fort Jefferson and (as necessary) the Loggerhead Key historic district. Expansion and rehabilitation of casemates for the visitor center and housing would be sensitively carried out in a fashion that protects the fort's historic fabric and structural integrity. All preservation undertakings would be carried out in accordance with NPS policies and standards and would have no adverse effect on the national register significance of historic properties.

To ensure that potential archeological resources are avoided or mitigated, archeological assessments would be required for areas of construction-related disturbance associated with extension of the dock.

ALTERNATIVE D

Analysis

For the most part, the effects on cultural resources under this alternative would be the same as those described under alternative C. The elimination of private boats from the research natural area zone would be expected to incrementally increase the protection afforded to submerged cultural resources from visitor impacts. Visitor access to this zone would be solely by means of commercially operated tour vessels, and recreational diving under the direction of these operations would be closely monitored to ensure that submerged resources were adequately protected.

Requiring private boaters to get a permit to enter the natural/cultural zone would provide an effective means of imparting the requirements for protecting cultural resources and the penalties for disturbance. This requirement would also allow the park to more closely monitor the distribution and types of visitor activities occurring over a wider area of the park than under alternative C, which would benefit cultural resource management objectives. In collaboration with the National Park Service, commercial tour operators would assume a substantial role in providing visitors with information regarding cultural resource protection. This would have positive benefits, particularly if NPS staffing levels remain inadequate to effectively impart this information to visitors.

In addition to the continuation of NPS cultural resource policies and protective measures, the park staff would undertake the comprehensive protection of shipwreck sites under provisions of the *Submerged Cultural Resources Strategy* (see appendix H). Among its provisions, a systematic and multidisciplinary monitoring program would be implemented to assess impacts, analyze and compare changed site conditions, and provide the basis for appropriate treatment or remedial action. An effective monitoring program would have to be in place before any site was opened to recreational diving. Mooring buoys would be used to keep divers in approved locations, and sensitive sites would remain off-limits except for approved research purposes.

Heavy visitor use would continue to be expected at Fort Jefferson, which would remain the initial destination for commercial transportation providers and private boaters receiving permits. The park would therefore strive to ensure that potential visitor use impacts would not compromise the fort's historic integrity or compound the deterioration occurring as a result of the harsh marine environment. The park staff would continue to apply stabilization measures to arrest deterioration and, as necessary, restrict visitor access to sensitive areas that require remedial preservation treatment. No adverse effect on significant historic features would be expected from expanding and rehabilitating the Fort Jefferson visitor center and upgrades of staff/visitor quarters within the fort casemates.

The proposed extension of the dock to accommodate concession vessel(s) would require an archeological assessment to identify potential submerged cultural resources in the area of the dock extension. If significant sites were found that could not be avoided by construction, data recovery excavations, or other approved mitigation measures would be implemented before starting construction.

Cumulative Impacts

Significant cultural resources in the park have sustained adverse effects from both natural causes (the harsh marine environment, wave and storm damage, etc.) and human impacts. Hurricanes during the last century, for example, seriously damaged lighthouses on Loggerhead and Garden Keys, and Fort Jefferson's exposed masonry continues to spall and deteriorate. Shipwreck sites face ongoing disturbance from natural processes and the impacts of recreational divers. In conjunction with increasing numbers of visitors to the park, a corresponding potential for further adverse effects on submerged and land-based cultural resources might be expected. However, along with NPS policies for preserving and protecting cultural resources, additional measures to limit visitor numbers in certain areas of the park, the implementation of systematic resource management approaches (e.g., the *Submerged Cultural Resources Strategy*), the establishment of a research natural area zone, and visitor permitting requirements would all provide positive beneficial effects that would check or abate adverse effects in the future.

Although the park staff would be in a better position to proactively manage and protect cultural resources by implementing these measures, the immensity of Fort Jefferson and the unique challenges it presents for comprehensive preservation in its isolated maritime setting would continue to be a major cultural resource management issue.

Conclusion

Implementing this alternative would be expected to have no adverse effect on historic properties and would provide major long-term benefits for the preservation and protection of cultural resources. In comparison with alternative C, incrementally greater cultural resource protection would result from the elimination of private boats from the research natural area zone and the

requirement that private boaters obtain permits for activities in the natural/cultural zone. The park staff's ability to proactively manage cultural resources and monitor visitor use impacts would be substantially enhanced with the adoption of the *Submerged Cultural Resources Strategy*, limitations on visitor numbers, permitting requirements, and the adoption of a research natural area zone.

In common with all alternatives, ongoing stabilization and preservation maintenance would have moderate to major long-term benefits on Fort Jefferson and (as necessary) the Loggerhead Key historic district. The expansion and rehabilitation of casemates for the visitor center and housing would be sensitively carried out, protecting the fort's historic fabric and structural integrity. All preservation undertakings would be carried out in accordance with NPS policies and standards and would have no adverse effect on the national register significance of historic properties.

To ensure that potential archeological resources are avoided or mitigated, archeological assessments would be required for areas of construction-related disturbance associated with extension of the dock.

ALTERNATIVE E

Analysis

The extension of the resource natural zone to the majority of the park would result in the greatest degree of cultural resource protection in comparison with the other alternatives. The emphasis on scientific research proposed under this alternative would support the archeological research objectives identified in the *Submerged Cultural Resources Strategy* (see appendix H). Archeologists could comprehensively analyze and investigate the park's submerged cultural resources with a substantially reduced risk that valuable site data might be lost due to visitor impacts.

The requirement that visitors receive a permit to enter the research natural area zone would provide an effective means of imparting the requirements for protecting cultural resources and the penalties for disturbance. It would also allow the park to more closely monitor the distribution and types of visitor activities occurring over a wide area of the park, which would benefit cultural resource management objectives. In collaboration with the National Park Service, commercial tour operators would assume a substantial role in providing visitors with information regarding cultural resource protection. This would have positive benefits, particularly if NPS staffing levels remain inadequate to effectively impart this information to visitors.

In addition to the continuation of NPS cultural resource policies and protective measures, the park would undertake the comprehensive protection of shipwreck sites under provisions of the *Submerged Cultural Resources Strategy*. Among its provisions, a systematic and multidisciplinary monitoring program would be implemented to assess impacts, analyze and compare changed site conditions, and provide the basis for appropriate treatment or remedial action. An effective monitoring program would have to be in place before any site was opened to recreational diving. Mooring buoys would be used to keep divers in approved locations, and sensitive sites would remain off-limits except for approved research purposes.

Heavy visitor use would continue to be expected at Fort Jefferson, which would remain the initial destination for commercial transportation providers and private boaters receiving permits. The park staff would therefore strive to ensure that potential visitor use impacts would not compromise the fort's historic integrity or compound the deterioration occurring as a result of the harsh marine environment. The park staff would continue to apply stabilization measures to arrest deterioration and, as necessary, restrict visitor access to sensitive areas requiring remedial preservation

treatment. No adverse effect on significant historic features would be expected from expansion and rehabilitation of the Fort Jefferson visitor center and upgrades of the staff/visitor quarters in the fort casemates.

Cumulative Impacts

Significant cultural resources in the park have sustained adverse effects from both natural causes (the harsh marine environment, wave and storm damage, etc.) and human impacts. Hurricanes during the last century, for example, seriously damaged lighthouses on Loggerhead and Garden Keys, and Fort Jefferson's exposed masonry continues to spall and deteriorate. Shipwreck sites face ongoing disturbance from natural processes and the impacts of recreational divers. In conjunction with increasing numbers of park visitors, a corresponding potential for further adverse effects on submerged and land-based cultural resources might be expected. However, along with NPS policies for preserving and protecting cultural resources, additional measures to limit visitor numbers in certain areas of the park, the implementation of systematic resource management approaches (e.g., the *Submerged Cultural Resources Strategy*), the establishment of a research natural area zone, and visitor permitting requirements would all provide positive beneficial effects that would check or abate adverse effects in the future.

Although the park staff would be in a better position to proactively manage and protect cultural resources by implementing these measures, the immensity of Fort Jefferson and the unique challenges it presents for comprehensive preservation in its isolated maritime setting would continue to be a major cultural resource management issue.

Conclusion

Implementing this alternative would be expected to have no adverse effect on historic properties and would provide major long-term benefits for the preservation and protection of cultural resources. In comparison with the other alternatives, the greatest degree of cultural resource protection would result from the extension of the research natural area zone and visitor permitting requirements to the majority of the park. The park staff's ability to proactively manage cultural resources and monitor visitor use impacts would be substantially enhanced with the adoption of the *Submerged Cultural Resources Strategy*, limitations on visitor numbers, permitting requirements, and the adoption of a widespread research natural area zone.

In common with all alternatives, ongoing stabilization and preservation maintenance would have moderate to major long-term benefits on Fort Jefferson and (as necessary) the Loggerhead Key historic district. Expansion and rehabilitation of casemates for the visitor center and housing would be sensitively carried, protecting the fort's historic fabric and structural integrity. All preservation undertakings would be carried out in accordance with NPS policies and standards and would have no adverse effect on the national register significance of historic properties.

IMPACTS ON VISITOR EXPERIENCE

METHODOLOGY

This impact analysis evaluates four aspects of visitor experience, including diversity of visitor activities, interpretation and orientation, visitor facilities and services, and visitor experience values. Analysis is conducted in terms of how the visitor experience might vary by applying different management zones in the alternatives. Analysis is 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 and duration of potential impacts.

Basis of Analysis

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 the management zones would affect group and individual opportunities.

Interpretation and Orientation. The analysis of interpretation and orientation is based on whether there would be a change in the availability of education programs resulting from management zone application or other actions.

Visitor Facilities and Services The analysis discusses impacts on access to visitor facilities and services provided by the Park Service and commercial services in relation to management zone application and other actions.

Visitor Experience Values. The impact analysis associated with visitor experience values is based on whether there would be a change in opportunities for solitude, tranquility, challenge, adventure, and freedom to travel throughout the park.

Intensity

The intensity of the impact considers whether the impact to visitor experience would be negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable to the visitor and would have no discernable 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 the visitor experience. Major impacts would have a substantial and noticeable effect on the visitor experience and could permanently alter various 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 permanent effect on the visitor experience, such as no recreational fishing in the research natural area.

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, other services, and types of experiences. Adverse impacts would reduce access or availability to these four facets of visitor experience.

ALTERNATIVE A

Analysis

Under alternative A, the current availability and diversity of recreational opportunities would continue as managed. Activities including touring the fort, snorkeling, scuba diving, fishing, boating, swimming, camping, kayaking, and viewing wildlife would continue to be available at their current levels and locations. Access to areas of the park beyond Garden Key would continue to be primarily by private boat or expensive charters rather than by commercial ferries.

With no defined limits on numbers of visitors under the no-action alternative, some activities could become crowded and change the character of these activities, which would affect the quality of the visitor experience. For example, boating, fishing, diving, snorkeling, and swimming in high use areas could become a more social rather than solitary experience. Crowded conditions would be magnified in the campground and around the fort, especially as competition grew for facilities. Increased visitation would eventually lead to a deterioration of resources in high use areas, which would result in a corresponding decline in the quality of visitor experience. Although there would be a diverse range of activities available, increasing visitation would result in a long-term, minor adverse impact on visitor activities.

Interpretive and educational services available at Fort Jefferson and by commercial services providers en route to and at Garden Key would continue. Education opportunities for private boaters would continue to be random and limited. With no additional interpretive personnel at the fort, guided tours and special programs by park rangers would remain limited.

However, the availability and diversity of interpretation and orientation programs and visitor services would be expanded under alternative A through three actions — establishing an interagency visitor facility in Key West, expanding the visitor center at the fort, and conducting additional planning to improve interpretation and orientation. These actions would provide a wide variety of interpretive media, a broad scope of topics, and in-depth educational programs that would enhance visitors' understanding of the park's cultural and natural resources and the need for preserving them.

The Key West visitor facility would introduce Dry Tortugas to people who might not be aware of the park. For visitors without the ability to visit the park, expanded interpretation at Key West would result in the park's being accessible (programmatically) through video shows, displays, and interpretive talks in lieu of actual travel to the park. Pre-visit information would tell visitors of park conditions and inform them of limited facilities in the park and the need to be self-sustained. This information also would give travelers the opportunity to choose ahead of time from a variety of visitor activities. Alternative A would have a major long-term beneficial impact on the interpretation and orientation aspect of visitor experience.

With the exception of adding the visitor facility in Key West and expanding the visitor center in the fort, the availability and diversity of visitor facilities and services would not change from their current trends. The campground, swim beach, dingy beach, restrooms, and dock would not be expanded. Commercial ferry service would continue to provide transportation to the park. Charter boats would provide intrapark travel. There would continue to be no services at the fort to provide visitors with food or convenience items.

Currently, the park is meeting visitor demand for camping and dock space, but not all visitors have an opportunity for guided tours of the fort. Overall, park visitation would increase over existing levels, although the increase over the life of this plan is not quantifiable. It is expected that

increases in visitation levels would occur primarily during the current peak periods and would largely be day users and private boaters. (Currently, limits are imposed only by the number of people commercial vessels are allowed to bring to the park and by the number of private boats the dock space and anchorage can accommodate at Garden Key.)

Without limitations on visitation numbers, the potential exists for a decrease in access to facilities and services for future visitors. Some visitors would be forced to change their plans if unable to secure a campground site, for example, and would likely need to return to the mainland. Competition for dock space and anchorage would increase for private boaters and commercial service providers. The lack of access to visitor facilities and services would have a long-term, moderate, adverse impact on the visitor experience as a result of implementing alternative A.

Under alternative A, access to the park would continue as currently managed. Private boaters and charter boats would continue to have freedom to travel throughout most of the park and participate in self-initiated experiences with few restrictions. Opportunities for solitude and tranquility, challenge, and adventure in remote, near-pristine areas of the park would remain unchanged. People coming to the park by commercial ferries would not have access to the same level of solitude and tranquility, challenge, and adventure as private boaters because they would remain limited primarily to activities on Garden Key. An increase in visitation would potentially result in increased crowding and noise, especially around Garden Key. If alternative A was implemented, continued increases in the number of visitors could result in long-term, moderate adverse impacts on visitor experience values for most of the park's visitors.

Cumulative Impacts

Coordination with the Florida Keys National Marine Sanctuary in their planning efforts and participation in the South Florida Ecosystem Restoration Task Force could provide an avenue to make visitors to the park aware of the interrelationship of lands under various jurisdictions. Visitors would have the opportunity to learn from various sources regarding the importance of the South Florida ecosystem restoration efforts in a rapidly growing and encroaching urban environment. Participation in the Coral Reef Task Force would potentially assist the Park Service in presenting information on international efforts to protect and restore coral reefs around the world. Visitors would gain a comprehensive understanding of the South Florida region and an enhanced scope of knowledge extending beyond local boundaries.

In addition, knowledge from research projects in the region and beyond would provide visitors with a broad scope of new and up-to-date information regarding natural and cultural resources. Visitors to the park also could have enhanced opportunities to learn of the variety of experiences available regionally and internationally. Information, orientation, and interpretive programs and activities, combined with similar activities in other federal, state, and local areas, would result in beneficial cumulative impacts on the overall visitor experience. The intensity and duration of the cumulative impact would depend on the number and type of actions taken to implement the above planning efforts.

Conclusion

The diversity of visitor opportunities available in the park would continue, but increases in visitation could result in changes to accessibility and affect visitor experience values. Implementing alternative A would result in minor to moderate long-term

adverse impacts on these aspects of the visitor experience.

Visitors would continue to benefit from interpretive programs at Fort Jefferson and en route to the park, but NPS programs would be still be conducted on a limited basis especially in contacting private boaters. However, establishing a visitor contact facility in Key West would have major long-term beneficial impacts on the visitor experience by providing enhanced interpretation and orientation.

Completion of and implementation of an interpretive plan and a wayside exhibit plan would have major long-term benefits on the visitor experience by providing tools to foster public awareness and appreciation of the park's natural and historical features, promoting an understanding of ecological concepts and relevance of historical knowledge, and instilling a sense of stewardship towards the resources.

Visitors could benefit from enhanced interpretation and orientation resulting from NPS coordination with other planning efforts, including the Florida Keys National Marine Sanctuary and the South Florida Ecosystem Restoration Task Force.

ALTERNATIVE B

Analysis

Under alternative B, visitor activities that are currently available would remain, including boating, fishing, diving, snorkeling, camping, swimming, kayaking, picnicking, and touring the fort. The management of these activities would change somewhat in that the park would establish maximum numbers of visitors appropriate in specific areas along with desired visitor behaviors and standards for resource conditions. Mooring buoys and park staff would guide visitors to specific areas to engage in activities such as snorkeling and diving.

Establishing maximum numbers of visitors for sites would allow for an increase in visitor numbers over current levels but would distribute visitors among a number of resources. Dispersal over a broad area would reduce crowding and enhance visitor experience values by giving visitors improved opportunities for solitude, tranquility, challenge, and adventure than would occur under conditions with no restrictions. As described in alternative A, private boaters would have greater opportunities to experience these values than would commercial ferry passengers whose activities would be centered primarily at Garden Key.

Visitor facilities and services currently available would continue, and establishing limits at selected areas (see table 1) would maximize opportunities to access facilities such as the campground and dock. Implementing alternative B would have long-term minor beneficial impacts on visitor activities, visitor experience values, and access to facilities and services.

Some visitors might experience a feeling of intrusion and loss of privacy when park staff conduct monitoring activities. These activities would include investigating the location of a boat's anchor or observing visitors' contact with reef organisms when snorkeling or diving. Monitoring activities would have short-term minor adverse impacts on visitor experience values.

Establishing the visitor contact facility at Key West would have the same long-term major beneficial impacts as described in alternative A on the interpretation and orientation aspect of visitor experience. Visitors would be able to learn about park conditions and availability of facilities and services in advance and preplan their visit.

Cumulative Impacts

Coordination with the Florida Keys National Marine Sanctuary in their planning efforts and participation in the South Florida

Ecosystem Restoration Task Force could provide an avenue to make visitors to the park aware of the interrelationship of lands under various jurisdictions. Visitors would have the opportunity to learn from various sources regarding the importance of the South Florida ecosystem restoration efforts in a rapidly growing and encroaching urban environment. Participation in the Coral Reef Task Force would potentially assist the Park Service in presenting information on international efforts to protect and restore coral reefs around the world. Visitors would gain a comprehensive understanding of the South Florida region and an enhanced scope of knowledge extending beyond local boundaries.

In addition, knowledge from research projects in the region and beyond would provide visitors with a broad scope of new and up-to-date information regarding natural and cultural resources. Visitors to the park also could have enhanced opportunities to learn of the variety of experiences available regionally and internationally. Information, orientation, and interpretive programs and activities, combined with similar activities in other federal, state, and local areas, would result in beneficial cumulative impacts on the overall visitor experience. The intensity and duration of the cumulative impact would depend on the number and type of actions taken to implement the above planning efforts.

Conclusion

The diversity of visitor activities in the park would continue. Establishing maximum numbers of visitors at specific sites and dispersing them over a number of resources would improve opportunities for solitude, tranquility, challenge, and adventure and would reduce crowding at park facilities. These improvements would have long-term minor beneficial impacts on visitor activities, visitor experience values, and access to facilities and services. During monitoring activities, some visitors might experience a sense of intrusion resulting in a short-term minor adverse impact.

Establishing a visitor contact facility in Key West would have major long-term beneficial impacts on the visitor experience by providing enhanced interpretation and orientation.

Completion of and implementation of an interpretive plan and a wayside exhibit plan would have major long-term benefits on the visitor experience by providing tools to foster public awareness and appreciation of the park's natural and historical features, promoting an understanding of ecological concepts and relevance of historical knowledge, and instilling a sense of stewardship towards the resources.

Visitors could benefit from enhanced interpretation and orientation resulting from NPS coordination with other planning efforts, including the Florida Keys National Marine Sanctuary and the South Florida Ecosystem Restoration Task Force.

ALTERNATIVE C

Analysis

Implementing alternative C would improve the visitor experience by providing opportunities for visitors to travel in tours to areas of the park beyond Garden Key that are currently available to private boaters and charter boats only. The use of commercial services to provide travel within the park would give more visitors the opportunity to enjoy near-pristine resources, especially in the research natural area, and engage in activities such as snorkeling at coral reefs and diving to shipwrecks. Self-contained ferry operations would provide a level of comfort and services the park is unable to provide within the limitations of its facilities and the opportunity to stay overnight in the park.

Recreational fishing would not be permitted in the research natural area, which would decrease the diversity of visitor activities for some park visitors. However, recreational fishing would still be allowed in the historic preservation/adaptive use and natural/cultural zones. Visitors in these zones would be expected to encounter more recreational fishermen than if they were dispersed over the entire park. Implementing alternative C would have a long-term, minor adverse affect on recreational fishermen, but overall, opportunities to experience diverse activities would be enhanced resulting in long-term major beneficial impacts on the visitor experience.

In the management of visitor activities, the park would establish the maximum numbers of visitors appropriate in specific areas along with desired visitor behaviors and standards for resource conditions. Mooring buoys and park staff would guide visitors to specific areas to engage in activities such as snorkeling and diving. Establishing maximum numbers of visitors for sites would distribute visitors among a number of resources. Dispersal over a broad area would reduce crowding and enhance visitor experience values by giving visitors improved opportunities for solitude, tranquility, challenge, and adventure as opposed to conditions with no limitations.

Requiring a permit for private boaters to use the park would cause some boaters to experience a loss of freedom and feel inconvenienced, especially those who have previously traveled in the park without a permit.

Visitors on tours to areas beyond Garden Key would have a more structured experience and less freedom than private boaters. However, they would experience a level of challenge and adventure not currently available to most of the park's visitors. As a member of a small tour group, visitors would experience tranquility and solitude in the vast expanse of ocean and sky. Implementing alternative C would result in long-term moderate beneficial impacts on visitor experience values. Some visitors might experience a feeling of intrusion and loss of privacy when park staff conduct monitoring activities. These activities would include investigating the location of a boat's anchor in the natural/cultural zone or observing visitor contact with reef organisms when snorkeling or diving. Monitoring activities would have short-term minor adverse impacts on some visitors seeking solitude.

Current visitor facilities and services would continue. Establishing limits on facilities and services and at selected areas (see table 1) could be an inconvenience to some visitors but would have a long-term beneficial impact on overall visitor experience. Most visitors would be able to experience the values for which the park was established better, including pristine resources, solitude, quiet, and tranquility. Instituting a reservation system for the campground would ensure that space without crowding was available for visitors when they arrive. Limiting the numbers of visitors that arrive on the ferry and seaplanes would also ensure that facilities and popular activity sites were not crowded and that park values were maintained. By limiting the trips and capacity for the seaplanes there would be less noise intrusion near the fort from takeoffs and landings. The seaplane limits would be intended to encourage fewer trips with larger capacity planes, which could result in more time in the park for air taxi visitors to participate in activities and thus enhance their experience.

Establishing the visitor contact facility at Key West would have the same long-term major beneficial impacts as described in alternative A on the interpretation and orientation aspect of visitor experience. Visitors would be able to learn about park conditions and the availability of facilities and services in advance and preplan their visit.

The impact on visitors of establishing an entrance fee would depend on the amount of the fee. However, it would not be expected to deter visitors from coming to the park. The impact of charging visitors an entrance fee would have long-term negligible to minor adverse impacts on visitor use.

Implementing alternative C would provide additional educational opportunities. Visitors in tour groups would gain knowledge incorporated into recreational activities and presented by trained commercial tour staff en route to the park, at Fort Jefferson, and on tours beyond Garden Key. Private boaters would receive information about preserving the park's resources when they obtain a permit at the fort. Information would be expected to be up-to-date as a result of research efforts by park scientists and investigators. The beneficial impacts of these interpretation and orientation aspects on the visitor experience would be long-term and major.

Cumulative Impacts

Coordination with the Florida Keys National Marine Sanctuary in their planning efforts and participation in the South Florida Ecosystem Restoration Task Force could provide an avenue to make visitors to the park aware of the interrelationship of lands under various jurisdictions. Visitors would have the opportunity to learn from various sources regarding the importance of the South Florida ecosystem restoration efforts in a rapidly growing and encroaching urban environment. Participation in the Coral Reef Task Force would potentially assist the Park Service in presenting information on international efforts to protect and restore coral reefs around the world. Visitors would gain a comprehensive understanding of the South Florida region and an enhanced scope of knowledge extending beyond local boundaries.

In addition, knowledge from research projects in the region and beyond would provide visitors with a broad scope of new and up-to-date information regarding natural and cultural resources. Visitors to the park also could have enhanced opportunities to learn of the variety of experiences available regionally and internationally. Information, orientation, and interpretive programs and activities, combined with similar activities in other federal, state, and local areas, would result in beneficial cumulative impacts on the visitor experience. The intensity and duration of the cumulative impact would depend on the number and type of actions taken to implement the above planning efforts.

Prohibiting recreational fishing in a portion of the park, in the Florida Keys National Marine Sanctuary ecological reserve, and in Tortugas South and those portions of Tortugas North that are in state waters or under the jurisdiction of the Gulf of Mexico Fishery Management Council would have short-term adverse cumulative impacts on visitor experience values. Reducing the number of areas that allow recreational fishing would result in an increase in visitors to areas permitting the activity. There would likely be fewer opportunities to experience solitude and tranquility, resulting in a lower quality experience than currently anticipated. Fishermen would potentially catch fewer fish. However, the experience would be enhanced in the future for fishermen as marine populations increase in size and number as a result of establishing zones dedicated to improving the spawning population.

Conclusion

Visitors would be able to travel to areas beyond Garden Key on commercial service vessels and experience near-pristine resources, solitude, tranquility, challenge, and adventure previously available only to private boaters and charter boats. Implementing alternative C would result in long-term moderate beneficial impacts on visitor experience values.

The diversity of activities would be reduced for some visitors by prohibiting recreational fishing in the research natural area zone. Some boaters would experience a loss of freedom with the need to obtain a permit to travel in this zone. Implementing alternative C would have a long-term, minor adverse effect on recreational fishermen and a short-term minor adverse effect on some private boaters. Overall, opportunities to experience diverse activities would be enhanced for more visitors than currently and result in long-term major beneficial impacts on this aspect of the visitor experience. Establishing limits on numbers of visitors at selected areas (see table 1) would have long-term minor beneficial effects on facilities and services.

Establishing a visitor contact facility in Key West, educating visitors on tours, and requiring private boaters to obtain a permit and learn about preserving the park's resources would have major long-term beneficial impacts on the visitor experience by providing enhanced interpretation and orientation.

Completion of and implementation of an interpretive plan and a wayside exhibit plan would have major long-term benefits on the visitor experience by providing tools to foster public awareness and appreciation of the park's natural and historical features, promoting an understanding of ecological concepts and relevance of historical knowledge, and instilling a sense of stewardship towards the resources.

Visitors could benefit from enhanced interpretation and orientation resulting from NPS coordination with other planning efforts, including the Florida Keys National Marine Sanctuary, the U.S. Fish and Wildlife Service, the state, the South Florida Ecosystem Restoration Task Force, and Monroe County.

There would be a decrease in areas available for recreational fishing. However, in the future fishermen would benefit from increased fish populations as a result of various planning efforts that would establish zones dedicated to improving spawning population.

ALTERNATIVE D

Implementing alternative D would improve the visitor experience by providing opportunities for visitors to travel in tours to areas of the park beyond Garden Key that currently are available to private boaters and charter boats only. The use of commercial services to provide travel within the park would give more visitors the opportunity to enjoy near-pristine resources and engage in activities such as snorkeling and diving over coral reefs and shipwrecks. Self-contained ferry operations would provide a level of comfort and services that the park is unable to provide within the limitations of its facilities and the opportunity to stay overnight in the park.

In alternative D, boating and recreational fishing would not be permitted in the research natural area, which would decrease the diversity of visitor activities for some park visitors. However, boating and recreational fishing would still be allowed in the historic preservation/ adaptive use and natural/cultural zones. Visitors in these zones would be expected to encounter more boaters and recreational fishermen than if they were dispersed over the entire park. Implementing alternative D would have a long-term, minor adverse affect on boaters and recreational fishermen. However, most present-day activities would still be available to a wider spectrum of visitors in a broader area of the park. In addition, these visitors would encounter resources of high integrity, especially in the research natural area. Overall, opportunities to experience diverse activities would be enhanced, resulting in long-term major beneficial impacts on the visitor experience.

In the management of visitor activities, the park would establish maximum numbers of

visitors appropriate in specific areas, along with desired visitor behaviors and standards for resource conditions. Mooring buoys and park staff would guide visitors to specific areas to engage in activities such as snorkeling and diving. Establishing maximum numbers of visitors for sites would distribute visitors among a number of resources. Dispersal over a broad area would reduce crowding and enhance visitor experience values by giving visitors improved opportunities for solitude, tranquility, challenge, and adventure as opposed to conditions with no limitations.

Visitors on tours to areas beyond Garden Key would have a more structured experience and less freedom than private boaters. However, they would experience a level of challenge and adventure not currently available to most of the park's visitors. As a member of a small tour group, visitors would experience tranquility and solitude in the vast expanse of ocean and sky. Implementing alternative D would result in long-term moderate beneficial impacts on visitor experience values.

Requiring a permit for private boaters to use the park (historic preservation/adaptive use zone) and prohibiting them in the research natural area would cause some boaters to experience a loss of freedom and feel inconvenienced, especially those who have previously traveled in the park without a permit. Some visitors would experience a feeling of intrusion and loss of privacy when park staff conduct monitoring activities. These activities would include investigating the location of a boat's anchor or observing visitor contact with reef organisms when snorkeling or diving. The permit process and monitoring activities would have short-term minor adverse impacts on some visitor experience values such as freedom to travel and solitude.

Current visitor facilities and services would continue. Establishing limits on facilities and services and at selected areas (see table 1) could be an inconvenience to some visitors but would have a long-term beneficial impact on overall visitor experience. Most visitors would be able to experience the values for which the park was established better, including pristine resources, solitude, quiet, and tranquility. Instituting a reservation system for the campground would ensure that space without crowding was available for visitors when they arrive. Limiting the numbers of visitors that arrive on the ferry and seaplanes would also ensure that facilities and popular activity sites were not crowded and that park values were maintained. By limiting the trips and capacity for the seaplanes there would be less noise intrusion near the fort from takeoffs and landings. The seaplane limits would be intended to encourage fewer trips with larger capacity planes, which could result in more time in the park for air taxi visitors to participate in activities and thus enhance their experience.

Establishing the visitor contact facility at Key West would have the same long-term major beneficial impacts as described in alternative A on the interpretation and orientation aspect of the visitor experience. Visitors would be able to learn about park conditions and availability of facilities and services in advance and preplan their visit.

Implementing alternative D would provide additional educational opportunities. Visitors in tour groups would gain knowledge incorporated into recreational activities and presented by trained commercial tour staff en route to the park, at Fort Jefferson, and on tours beyond Garden Key. Private boaters going into the natural/cultural zone would receive information about preserving the park's resources when they obtain a permit at the fort. Interpretive information would be expected to be up-to-date as a result of research efforts by park scientists and investigators. Beneficial impacts of these interpretation and orientation aspects on the visitor experience would be long term and major.

Cumulative Impacts

Coordination with the Florida Keys National Marine Sanctuary in their planning efforts and participation in the South Florida Ecosystem Restoration Task Force could provide an avenue to make visitors to the park aware of the interrelationship of lands under various jurisdictions. Visitors would have the opportunity to learn from various sources regarding the importance of the South Florida ecosystem restoration efforts in a rapidly growing and encroaching urban environment. Participation in the Coral Reef Task Force would potentially assist the Park Service in presenting information on international efforts to protect and restore coral reefs around the world. Visitors would gain a comprehensive understanding of the South Florida region and an enhanced scope of knowledge extending beyond local boundaries.

In addition, knowledge from research projects in the region and beyond would provide visitors with a broad scope of new and up-to-date information regarding natural and cultural resources. Visitors to the park also could have enhanced opportunities to learn of the variety of experiences available regionally and internationally. Information, orientation, and interpretive programs and activities, combined with similar activities in other federal, state, and local areas, would result in beneficial cumulative impacts on the overall visitor experience. The intensity and duration of the cumulative impact would depend on the number and type of actions taken to implement the above planning efforts.

Prohibiting recreational fishing in a portion of the park, in the Florida Keys National Marine Sanctuary ecological reserve and in Tortugas South and those portions of Tortugas North that are in state waters or under the jurisdiction of the Gulf of Mexico Fishery Management Council would have short-term adverse cumulative impacts on visitor experience values. Reducing the number of areas that allow recreational fishing would result in an increase in visitors to areas permitting the activity. There likely would be fewer opportunities to experience solitude and tranquility, resulting in a lower-quality experience than currently anticipated. Fishermen would potentially catch fewer fish. However, the experience would be enhanced in the future for fishermen as marine populations increase in size and number as a result of establishing zones dedicated to improving the spawning population habitat.

Conclusion

Visitors would be able to travel to areas beyond Garden Key on commercial service vessels and experience near-pristine resources, solitude, tranquility, challenge, and adventure previously available only to private boaters and charter boats, resulting in long-term moderate beneficial impacts on visitor experience values. The diversity of activities would be reduced for some visitors by prohibiting recreational fishing and boating in the research natural area zone. Some boaters would experience a loss of freedom with the need to obtain a permit to travel in the park. Implementing alternative D would have a long-term, minor adverse effect on recreational fishermen and private boaters. Overall, opportunities to experience diverse activities would be enhanced for more visitors than currently and result in long-term major beneficial impacts on this aspect of the visitor experience. Establishing limits on numbers of visitors would have long-term minor beneficial effects on facilities and services.

Establishing a visitor contact facility in Key West, educating visitors on tours and requiring private boaters to obtain a permit and learn about preserving the park's resources would have major long-term beneficial impacts on the visitor experience by providing enhanced interpretation and orientation.

Completion of and implementation of an interpretive plan and a wayside exhibit plan would have major long-term benefits on the visitor experience by providing tools to foster public awareness and appreciation of the park's natural and historical features, promoting an understanding of ecological concepts and relevance of historical knowledge, and instilling a sense of stewardship towards the resources.

Visitors could benefit from enhanced interpretation and orientation resulting from NPS coordination with other planning efforts, including the Florida Keys National Marine Sanctuary and the South Florida Ecosystem Restoration Task Force.

There would be a decrease in areas available for recreational fishing. However, in the future fishermen would benefit from increased fish populations as a result of various planning efforts that would establish zones dedicated to improving spawning population habitat.

ALTERNATIVE E

Implementing alternative E would improve the visitor experience by providing opportunities for visitors to travel in tours to areas of the park beyond Garden Key that currently are available to private boaters and charter boats only. The use of commercial services to provide travel within the park would give more visitors than currently are able the opportunity to enjoy near-pristine resources and engage in activities such as snorkeling and diving over coral reefs and shipwrecks. Self-contained ferry operations would provide a level of comfort and services the park is unable to provide within the limitations of its facilities and the opportunity to stay overnight in the park.

Private boating would be restricted and recreational fishing would not be permitted in the park, which would decrease the diversity of visitor activities for park visitors. With the exception of the historic preservation/ adaptive use zone, visitors wanting to engage in boating and recreational fishing activities would need to go outside of the park. Restricting private boating and eliminating recreational fishing from the park would result in some private boaters, recreational fishermen, and charter boats seeking other areas beyond the park. It is anticipated that there would be a corresponding increase of visitors beyond the park in areas that allow these activities. There might be some minor crowding in these areas, which would result in long-term minor adverse impacts on recreational fishermen and boaters.

Implementing alternative E would have a long-term, moderate adverse affect on boaters and recreational fishermen. However, most present-day activities would still be available to a broader spectrum of visitors in a wider area of the park. In addition, these visitors would encounter resources of high integrity. There would be a significant reduction in opportunity for people to be out in the marine environment and their freedom of movement in this alternative. Because visitor experience under this alternative would be highly structured and opportunities for individual discovery or choice of activities would be limited and would fall to the prerogative of the tour operator, long-term moderate negative impact on the visitor experience would be expected.

In the management of visitor activities, the park would establish maximum numbers of visitors appropriate in specific areas, along with desired visitor behaviors and standards for resource conditions. Visitors on commercial tours would travel to specific areas to engage in activities such as snorkeling and diving. Establishing maximum numbers of visitors for sites would distribute visitors among a number of resources. Dispersal over a broad area would reduce crowding and enhance visitor experience values by giving visitors of small tour groups improved opportunities for solitude and

tranquility as opposed to conditions with no limitations.

Visitors on tours to areas beyond Garden Key would have a structured experience and less freedom to travel than is currently possible. However, they would experience a level of challenge and adventure not currently available to most of the park's visitors. Implementing alternative E would result in long-term moderate beneficial impacts on visitor experience for those visitors who have very limited experience in marine areas and who rely on commercial tours (not private boats) for access.

Current visitor facilities and services would continue. Establishing limits on facilities and services and at selected areas (see table 1) could be an inconvenience to some visitors but would have a long-term beneficial impact on overall visitor experience. Most visitors would be able to experience the values for which the park was established better, including pristine resources, solitude, quiet, and tranquility. Instituting a reservation system for the campground would ensure that space without crowding was available for visitors when they arrive. Limiting the numbers of visitors that arrive on the ferry and seaplanes would also ensure that facilities and popular activity sites were not crowded and that park values were maintained. By limiting the trips and capacity for the seaplanes there would be less noise intrusion near the fort from takeoffs and landings. The seaplane limits would be intended to encourage fewer trips with larger capacity planes, which could result in more time in the park for air taxi visitors to participate in activities and thus enhance their experience.

Establishing the visitor contact facility at Key West would have the same long-term major beneficial impacts as described in alternative A on the interpretation and orientation aspect of visitor experience. Visitors would be able to learn about park conditions and the availability of facilities and services in advance and preplan their visit.

Implementing alternative E would provide additional educational opportunities. All visitors would be educated about sensitive resources. Visitors in tour groups would gain knowledge incorporated into recreational activities and presented by trained commercial tour staff en route to the park, at Fort Jefferson, and on tours beyond Garden Key. Interpretive information would be expected to be up-to-date as a result of research efforts by park scientists and investigators. The beneficial impacts of these interpretation and orientation aspects on the visitor experience would be long term and major.

Cumulative Impacts

Coordination with the Florida Keys National Marine Sanctuary in their planning efforts and participation in the South Florida Ecosystem Restoration Task Force could provide an avenue to make visitors to the park aware of the interrelationship of lands under various jurisdictions. Visitors would have the opportunity to learn from various sources regarding the importance of the South Florida ecosystem restoration efforts in a rapidly growing and encroaching urban environment. Participation in the Coral Reef Task Force would potentially assist the Park Service in presenting information on international efforts to protect and restore coral reefs around the world. Visitors would gain a comprehensive understanding of the South Florida region and an enhanced scope of knowledge extending beyond local boundaries.

In addition, knowledge from research projects in the region and beyond would provide visitors with a broad scope of new and up-to-date information regarding natural and cultural resources. Visitors to the park also could have enhanced opportunities to learn of the variety of experiences available regionally and internationally. Information,

orientation, and interpretive programs and activities, combined with similar activities in other federal, state, and local areas, would result in beneficial cumulative impacts on the overall visitor experience. The intensity and duration of the cumulative impact would depend on the number and type of actions taken to implement the above planning efforts.

Prohibiting recreational fishing in most of the park, in the Florida Keys National Marine Sanctuary ecological reserve, and in Tortugas South and those portions of Tortugas North that are in state waters or under the jurisdiction of the Gulf of Mexico Fishery Management Council would have short-term adverse cumulative impacts on visitor experience values. Reducing the number of areas that allow recreational fishing would result in an increase in visitors to areas permitting the activity. There likely would be fewer opportunities to experience solitude and tranquility, resulting in a lower-quality experience than currently anticipated. Fishermen would potentially catch fewer fish. However, the experience would be enhanced in the future for fishermen as marine populations increase in size and number as a result of establishing zones dedicated to improving the spawning population habitat.

Conclusion

Visitors would be able to travel to areas beyond Garden Key on commercial service vessels and experience near-pristine resources, solitude, tranquility, challenge, and adventure currently available only to private boaters and charter boats, resulting in long-term moderate beneficial impacts on visitor experience values. The diversity of activities would be reduced for some visitors by prohibiting recreational fishing and restricting private boating in the park, resulting in a long-term, moderate adverse effect on recreational fishermen and private boaters. Overall, opportunities to experience diverse activities would be enhanced for more visitors than currently and result in long-term major beneficial impacts on this aspect of the visitor experience. Establishing limits on numbers of visitors at selected areas (see table 1) would have long-term minor beneficial effects on facilities and services.

Establishing a visitor contact facility in Key West, educating visitors on tours, and requiring private boaters obtain a permit and learn about preserving the park's resources would have major long-term beneficial impacts on the visitor experience by providing enhanced interpretation and orientation.

Completion of and implementation of an interpretive plan and a wayside exhibit plan would have major long-term benefits on the visitor experience by providing tools to foster public awareness and appreciation of the park's natural and historical features, promoting an understanding of ecological concepts and relevance of historical knowledge, and instilling a sense of stewardship towards the resources.

Visitors could benefit from enhanced interpretation and orientation resulting from NPS coordination with other planning efforts, including the Florida Keys National Marine Sanctuary and the South Florida Ecosystem Restoration Task Force.

There would be a decrease in areas available for recreational fishing. However, in the future fishermen would benefit from increased fish populations as a result of various planning efforts that would establish zones dedicated to improving spawning population.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

METHODOLOGY

The impact analysis evaluated three separate socioeconomic areas including tourism and recreation, the local and regional economy, and commercial services.

A quantitative analysis was not conducted because the additional cost of that analysis was not considered to be reasonably related to the expected increase in the quantity and/or quality of relevant information. The National Park Service believes that a qualitative analysis provides a sufficient assessment of all relevant socioeconomic impacts associated with this rulemaking.

Basis of Analysis

Tourism and Recreation. The impact analysis is discussed on the basis of changes in tourism and recreational opportunities at the county and regional level associated with the implementation of each of the alternatives.

Local and Regional Economy. The analysis qualitatively analyzes impacts of potential changes in visitor spending and resultant contributions to the economy.

Commercial Services. The impact analysis qualitatively discusses the impacts of management zone application on current and potential concessioners.

Intensity

The intensity of the impact considers whether the impact would be negligible, minor, moderate, or major. Negligible impacts were considered undetectable and would have no discernible effect on the socioeconomic environment. Minor impacts were effects on the socioeconomic environment that would be slightly detectable but not expected to have an overall effect. Moderate impacts would be clearly detectable and could have an appreciable effect. Major impacts would have a substantial influence on and could permanently alter the socioeconomic environment.

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 the socioeconomic environment.

Type of Impact

The impacts are evaluated in terms of whether the impact would be beneficial or adverse to the socioeconomic environment. Beneficial socioeconomic impacts would improve the social or economic conditions in the county or region. Adverse socioeconomic impacts would negatively alter social or economic conditions in the county or region.

ALTERNATIVE A

Analysis

The implementation of alternative A would not be expected to result in changes to overall tourism and recreational opportunities in Monroe County or the South Florida region. The region's resources, including local, state, and federal parks, would be expected to continue attracting visitors as currently experienced. Water-related activities, such as boating and fishing, and land-based opportunities, including biking and golfing, would continue to be available.

Implementing alternative A would have negligible effects on tourism overall and on the availability of recreation opportunities in Monroe County and the South Florida Region.

A continuation of trends in current economic conditions would be anticipated. Tourists and retired residents would continue to account for much of the county and region's income. The service and retail trade industries would be expected to remain in the top employment sectors of the county and regional economy.

The multiagency visitor contact facility would be expected to attract more visitors to Key West with an enhanced interpretive program of the areas' resources. Visitor spending and contributions to the economy would increase proportionally to the number of added visitors. Relative to the county and regional economic base, this increase would be anticipated to have long-term minor beneficial impacts on the economy.

Rehabilitating buildings in Key West for the visitor facility and staff housing and expanding the visitor center in the fort would have a minor short-term beneficial effect on the county's economy. The rehabilitation and expansion projects would result in additional employment opportunities in the building trades during the period of construction. Some retail businesses would have an increase in sales for purchases of supplies and equipment for construction activities. Relative to the county's employment and economic base, the economic benefit from implementing alternative A would be short-term and minor.

Transportation to and within the park would continue to be authorized by commercial use authorizations (CUAs). Basically, all commercial operators now doing business in the park, and perhaps additional operators, would continue their operations with no significant changes. Current conditions in CUA permits that limit use for carrying capacity and resource protection purposes would remain in effect or be slightly tightened, which could reduce the amount of business operators conduct in the park. Operators of large ferry-type vessels would be limited to a combined total of 150 passengers per day, which would reduce current incomes and have a minor economic impact on existing operators. Interpretive materials would continue to be provided to commercial operators for voluntary use within the park. Commercial operators would not have dedicated dock space, assigned staff housing, or other assigned facilities, and they would continue to be subject to time limits at the NPS dock and other park regulations, which would have no new impacts. There would be no new impacts on commercial charter fishing operators.

Cumulative Impacts

No known cumulative impacts on tourism, recreational opportunities, or the local and regional economy would be expected.

Conclusion

Implementing alternative A would have negligible effects on tourism and the availability of recreational opportunities in Monroe County and the South Florida region. Diverse recreational activities would continue to be available. Tourism would continue to account for much of the county's income, and service and retail would remain top employment sectors.

Establishing the multiagency contact facility could attract more visitors to Key West, resulting in minor long-term benefits for the county's economy. Minor short-term economic benefits would occur as a result of rehabilitation activities for the visitor contact facility, park staff housing in Key West, and the expansion of the fort's visitor center.

Impacts on commercial operators providing ferry services to the park and charter fishing operators would be anticipated to be minor.

ALTERNATIVE B

Analysis

As described in alternative A, implementing alternative B would not be expected to affect tourism or recreation activities in Monroe County or the South Florida region.

Current trends in contributions to the county and regional economy by tourists and retirees would likely continue. The service and retail trade industries would be expected to remain in the top employment sectors of the county and regional economy. The economic benefits of the Key West facility attracting visitors to the area would have the same long-term minor impacts on the economy as described in alternative A.

The short-term minor beneficial impacts of rehabilitating buildings for the Key West visitor contact facility and staff housing and expanding the fort's visitor center would be the same as described in alternative A.

Transportation to and within the park would continue to be authorized by commercial use authorizations. Basically, all commercial operators now doing business in the park could continue their operations with no significant changes. Current conditions in CUA permits that limit use for carrying capacity and resource protection purposes would remain in effect and be tightened to reflect natural/cultural zone limits, which could slightly reduce the level of commercial use in the park and consequently the income of some operators. Operators of large ferry-type vessels would be limited to a combined total of 150 passengers per day, which would reduce current incomes and have a minor economic impact on existing operators. Interpretive materials as well as training by NPS staff would continue to be available to commercial operators for voluntary use within the park, although operators would be strongly encouraged to take advantage of the opportunity. Commercial operators would not have dedicated dock space, assigned staff housing, or other assigned facilities and they would continue to be subject to time limits at the NPS dock and other park regulations, which would have no new impacts. There would be no new impacts on commercial charter fishing operators.

Cumulative Impacts

No known cumulative impacts on tourism, recreational opportunities, or the local and regional economy would be expected.

Conclusion

Implementing alternative B would have negligible effects on tourism and the availability of recreational opportunities in Monroe County and the South Florida region. Diverse recreation activities would continue to be available. Tourism would continue to account for much of the county's income, and service and retail would remain top employment sectors.

Establishing the multiagency contact facility could attract more visitors to Key West, resulting in minor long-term benefits for the county's economy. Minor short-term economic benefits would occur as a result of rehabilitation activities for the visitor contact facility, park staff housing in Key West, and the expansion of the fort's visitor center.

Limiting use for carrying capacity and resource protection purposes could decrease the level of commercial use in the park, with a proportional reduction in some operators' income. Impacts on commercial charter fishing operators would be expected to be minor.

ALTERNATIVE C

Analysis

Implementing alternative C would not be expected to affect tourism or recreation activities in Monroe County or the South Florida region. Eliminating recreational fishing from the research natural area zone in Dry Tortugas would likely result in some private recreational fishermen and charter boats seeking other areas within or beyond the park. However, fishermen would not be expected to discontinue this activity in the Florida Keys. It would be anticipated that implementing alternative C would have long-term negligible impacts on the county and regional tourism and recreational activities.

As in alternative A, current trends in contributions to the county and regional economy by tourists and retirees would likely continue. The service and retail trade industries would be expected to remain in the top employment sectors of the county and regional economy. The economic benefits of the Key West facility attracting visitors to the area would have the same long-term minor impacts on the economy as described in alternative A.

The short-term minor beneficial impacts of rehabilitating buildings for the Key West visitor contact facility and staff housing and expanding the fort's visitor center would be the same as described in alternative A.

Visitor use management would significantly change in this alternative, and commercial services would play an integral part in that change. Transportation to the park would be authorized by two concession contracts — one for seaplane service and another for ferry service. There would be a major beneficial economic impact for the two businesses that were awarded the contracts. Except for private boaters and multiday charters, the two concessioners would have exclusive rights to bring day use visitors to the park. Operators who currently provide those services but are not awarded one of the two concessions contracts would experience a major adverse impact. Several new job opportunities with the concessioners would be anticipated, which would add income to the local economy that would offset the lost income from current operators that do not get the contract. However, overall impacts on the regional economy would be negligible.

Instituting carrying capacity limits on the concessioners could limit potential growth in a concessioner's revenues. However, the National Park Service feels that these impacts are by far offset by the beneficial impacts on resources and visitor experience. The proposed limit for the ferry (150) would be half again as much as one operator is currently allowed. By limiting the number of seaplane trips per day, for visitor experience reasons, the National Park Service is trying to encourage the use of larger capacity planes, which would be a more efficient operation for the concessioner.

The ferry contract would also include a requirement to provide intrapark transportation and guided tours within the limits of established carrying capacities in the park. This would be a new source of additional revenue for the concessioner, and it is anticipated that this income could be substantial. This would also increase the number of anticipated new job opportunities. To comply with this element of the contract, there would be the need for some capital investment. Some elements of the contract would be provided to the concessioner by the Park Service, such as required interpretive and resource protection training. Other elements, such as operating a suitable reservation system, would be an expense for the concessioner. The Park Service has analyzed this potential contract and believes it to be economically feasible and in compliance with the law requiring that the concessioner be afforded a reasonable opportunity to make a profit.

Commercial use authorizations would authorize other appropriate commercial activities that begin and end outside the park. These activities, including sailing excursions, fishing charters, wildlife viewing, and snorkel and dive trips, would have to be overnight trips because of the contractual obligations for day use activities with the concessioner. This could limit some operators. Commercial use authorizations would be limited, which might impact current permit holders and potential new operators. Limits on the numbers of passengers per trip and trips per year might impact some operators.

This alternative would necessitate guide fishermen who operate within the research natural area zone to relocate to another area, either within or outside of the park. The relocation would result in an inconvenience for these operators, but the sense of inconvenience would decrease over time as guides adjust to new restrictions and guidelines. In addition, establishing the research natural area zone would be anticipated to produce economic benefits in the future resulting from a higher and sustained yield of healthier fish populations throughout the region. Adverse impacts on guide fishermen currently operating in the research natural area zone would be short term and minor.

Cumulative Impacts

Prohibiting recreational fishing in a portion of the park, in the Florida Keys National Marine Sanctuary ecological reserve, and in Tortugas South and those portions of Tortugas North that are in state waters or under the jurisdiction of the Gulf of Mexico Fishery Management Council could have adverse cumulative impacts on some businesses in the local and regional economy. Charter boat companies catering to recreational fishermen and support businesses such as fishing equipment suppliers could experience a loss of revenue.

However, loss in revenue would be expected to be short term. Protecting marine life by establishing no-fishing areas would increase the number and size of species, and these species would eventually migrate to areas outside the no-fishing zones. Dispersal of these larger and more abundant populations would likely enhance fishing throughout the region for both recreational and commercial fishermen in the future. In addition, permitting public access to minimally disturbed areas would enhance the quality and value of nonconsumptive activities such as ecotourism, photography, recreational diving, fish watching, cultural activities, and wilderness experience. The economic benefits for nonconsumptive activities would potentially offset and could exceed the current extractive value (Dixon and Sherman 1990).

Conclusion

Implementing alternative C would not be expected to affect tourism or the availability of recreational activities in the South Florida region. Current trends in contributions to the economy by retirees and tourists would continue. Although fishing would be eliminated from a portion of the park, the Florida Keys would continue to attract recreational fishermen to the area. Implementing alternative C would have negligible effects on the county and regional economies.

Establishing the multiagency contact facility could attract more visitors to Key West, resulting in minor long-term benefits to the county's economy. Minor short-term economic benefits would occur as a result of rehabilitation activities for the visitor contact facility, park staff housing in Key West, and expansion of the Fort's visitor center.

Awarding a concessions contract to one ferryboat business and one seaplane business would result in a long-term major economic benefit to the businesses receiving

the contracts and a long-term major adverse impact on current operators who were not awarded a contract. Establishing intrapark transportation would provide additional revenue opportunities for the concessioner and more employment opportunities in the county. The added jobs would have a minor long-term beneficial impact on the economy. Charter fishing operators could experience a minor reduction in revenues from eliminating recreational fishing from the research natural area of the park. However, other opportunities would be available for CUA operators — such as overnight sailing excursions, fishing charters, wildlife viewing, and snorkel and dive trips.

The cumulative impacts of establishing no-fishing zones would have moderate long-term beneficial impacts on marine populations, recreational and commercial fishing, and the regional economy.

ALTERNATIVE D

Analysis

Implementing alternative D would not be expected to affect tourism or recreational activities in Monroe County or the South Florida Region. Eliminating private boating and recreational fishing from the research natural area in Dry Tortugas would likely result in some private boaters, recreational fishermen, and charter boats seeking other areas within or beyond the park. However, recreational fishermen and boaters would not be expected to discontinue these activities in the Florida Keys. It would be anticipated that implementing alternative D would have negligible impacts on the county and regional tourism and recreational activities.

As described in alternative A, current trends in contributions to the county and regional economy by tourists and retirees would likely continue. The service and retail trade industries would be expected to remain in the top employment sectors of the county and regional economy. The economic benefits of the Key West facility attracting visitors to the area would have the same long-term minor impacts on the economy as described in alternative A.

The short-term minor beneficial economic impacts of rehabilitating buildings for the Key West visitor contact facility and staff housing and expanding the fort's visitor center would be the same as described in alternative A.

The impacts of this alternative on the commercial operators and the National Park Service would be essentially the same as described in alternative C. There could be slightly more opportunities for the concessioner to increase revenues in this alternative because private boaters would not be allowed to dive, snorkel, anchor, or fish in the research natural area zone except through concessioner-guided tours.

Cumulative Impacts

Prohibiting recreational fishing in a portion of the park, in the Florida Keys National Marine Sanctuary ecological reserve, and in Tortugas South and those portions of Tortugas North that are in state waters or under the jurisdiction of the Gulf of Mexico Fishery Management Council would have adverse cumulative impacts on the local and regional economy. Charter boat companies catering to recreation fishermen and support businesses such as fishing equipment suppliers would experience a loss of revenue.

However, loss in revenue would be expected to be short term. Protecting marine life by establishing no-fishing areas would increase the number and size of species, and these species would eventually migrate to areas outside the no-fishing zones. Dispersal of these larger and more abundant populations would likely enhance fishing throughout the region for both recreational and commercial fishermen in the future. In addition,

permitting public access to minimally disturbed areas would enhance the quality and value of nonconsumptive activities such as ecotourism, photography, recreational diving, fish watching, cultural activities, and wilderness experience. The economic benefits for nonconsumptive activities would potentially offset and could exceed the current extractive value (Dixon and Sherman 1990).

Conclusion

Implementing alternative D would be expected to have negligible effects on tourism and recreational activities in Monroe County and the South Florida region. Eliminating recreational fishing and private boating from a portion of the park would not be expected to discourage visitors seeking these opportunities from coming to the Florida Keys. Much of the region's revenue would be expected to continue to come from tourism and retirees.

Establishing the multiagency contact facility could attract more visitors to Key West, resulting in minor long-term benefits to the county's economy. Minor short-term economic benefits would occur as a result of rehabilitation activities for the visitor contact facility, park staff housing in Key West, and the expansion of the fort's visitor center.

Awarding a concessions contract to one ferryboat business and one seaplane business would result in a long-term major economic benefit to the businesses receiving the contracts and a long-term major adverse impact on current operators who were not awarded a contract. Establishing intrapark transportation and eliminating private boating from the research natural area would provide additional revenue for the concessioner and more employment opportunities in the county. The added jobs would have a minor long-term beneficial impact on the area's economy. Charter fishing operators could experience a minor reduction in revenues from eliminating recreational fishing from the research natural area of the park. However, other opportunities would be available for CUA operators — such as overnight sailing excursions, fishing charters, wildlife viewing, and snorkel and dive trips.

The cumulative impacts of establishing no-fishing zones would have moderate long-term beneficial impacts on marine populations, recreational and commercial fishing, and the regional economy.

ALTERNATIVE E

Analysis

Implementing alternative E would not be expected to affect tourism or recreation activities in Monroe County or the South Florida Region.

Restricting private boating and eliminating recreational fishing from the park would not be expected to result in visitors discontinuing these activities in the Florida Keys. Implementing alternative E would have a negligible impact on the county and regional tourism and economy.

As described in alternative A, current trends in contributions to the county and regional economy by tourists and retirees would likely continue. The service and retail trade industries would be expected to remain in the top employment sectors of the regional economy. The economic benefits of the Key West facility attracting visitors to the area would have the same long-term minor impacts on the economy as described in alternative A.

The short-term minor beneficial economic impacts of rehabilitating buildings for the Key West visitor contact facility and staff housing and expanding the fort's visitor center would be the same as described in alternative A.

The impacts of this alternative on the commercial operators and the National Park Service would be essentially the same as described in alternative D. However, current CUA permittees would lose opportunities and income because the concessioner would provide all commercial services in the park. As a result, there could be more opportunities for the concessioner to increase revenues, and the commercial services would be more efficient for the National Park Service to manage.

Cumulative Impacts

Prohibiting recreational fishing in the majority of the park, in the Florida Keys National Marine Sanctuary ecological reserve, and in Tortugas South and those portions of Tortugas North that are in state waters or under the jurisdiction of the Gulf of Mexico Fishery Management Council would have adverse cumulative impacts on recreational opportunities and the local and regional economy. Access to areas for recreational fishing would decrease in number and diversity. Charter boat companies catering to recreation fishermen and support businesses such as that supply fishing equipment would experience a loss of revenue.

However, loss in revenue would be expected to be short term. Protecting marine life by establishing no-fishing areas would increase the number and size of species, and these species would eventually migrate to areas outside the no-fishing zones. Dispersal of these larger and more abundant populations would likely enhance fishing throughout the region for both recreational and commercial fishermen in the future. In addition, permitting public access to minimally disturbed areas would enhance the quality and value of nonconsumptive activities such as ecotourism, photography, recreational diving, fish watching, cultural activities, and wilderness experience. The economic benefits for nonconsumptive activities would potentially offset and could exceed the current extractive value (Dixon and Sherman 1990).

Conclusion

Current trends in tourism and recreation activities and contributions to the economy would be anticipated to continue. Eliminating recreational fishing and restricting private boating in the park would not be expected to discourage visitors from coming to the Florida Keys to engage in these activities. Implementing alternative E would be expected to have negligible effects on the county and regional economies.

Establishing the multiagency contact facility could attract more visitors to Key West, resulting in minor long-term benefits to the county's economy. Minor short-term economic benefits would occur as a result of rehabilitation activities for the visitor contact facility, park staff housing in Key West, and the expansion of the fort's visitor center.

Awarding a concessions contract to one ferryboat business and one seaplane business would result in a long-term major economic benefit to the businesses receiving the contracts and a long-term major adverse impact on current operators who were not awarded a contract. Establishing intrapark transportation, restricting private boating from the park, and permitting the concessioner to provide all commercial services in the park would provide additional revenue for the concessioner and more employment opportunities in the county. The added jobs would have a minor long-term beneficial impact on the area's economy. Charter fishing operators and other current holders of commercial use authorizations could experience a minor reduction in revenues from eliminating those recreational services from the park.

The cumulative impacts of establishing no-fishing areas would have moderate long-term beneficial impacts on marine populations, recreational and commercial fishing, and the regional economy.

IMPACTS ON LAND USE

Along with other agencies, the National Park Service is pursuing a land exchange with the Navy to develop a multiagency visitor facility in Key West. Use of the land would change from a military support function to recreational. Because the property is publicly owned and would remain in public ownership, the land exchange would not result in removing lands from the tax roles and a corresponding loss of revenue to the county. The visitor facility would remain compatible with adjacent land uses in Key West including other recreational facilities. The land exchange would not conflict with any known land use plans or regulations. Therefore, the impacts of implementing alternative A, B, C, D, or E on land use would be minor.

IMPACTS ON PARK OPERATIONS AND FACILITIES

METHODOLOGY

Basis of Analysis

The impacts of the alternatives presented in this *General Management Plan Amendment / Environmental Impact Statement* and other actions on park operations and facilities were determined by examining

- the affects of changes on staffing, infrastructure, visitor facilities and services
- the role of commercial operators in providing services

Intensity

The intensity of the impact considers whether the impact would be negligible, minor, moderate, or major. Negligible impacts were considered undetectable and would have no discernible effect on park operations and facilities. Minor impacts were effects on park operations and facilities that would be slightly detectable but not expected to have an overall effect on the ability of the park to provide services and facilities. Moderate impacts would be clearly detectable and could have an appreciable effect on park operations and facilities. Major impacts would have a substantial influence on park operations and facilities and include impacts that would reduce the park's ability to provide adequate services and facilities to visitors and staff.

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 the socioeconomic environment.

Type of Impact

Impacts are evaluated in terms of whether the impacts on park operations and facilities would be beneficial or adverse. Beneficial impacts would improve park operations and/or facilities. Adverse impacts would negatively affect park operations and/or facilities and could hinder the park's ability to provide adequate services and facilities to visitors and staff.

ALTERNATIVE A

Analysis

Because alternative A would continue the current management strategies, there would be no change in park operations. Administration of the park would remain with Everglades National Park, and visitor protection, maintenance, and interpretation functions would remain at the fort.

Establishing a multiagency visitor facility in Key West would require the addition of one half-time visitor contact person to help staff the site. Other park operations would continue at current levels of staffing, management, and maintenance. Operations such as monitoring visitor activities would continue to be inadequate due to understaffing. Monitoring would continue to occur only as time permitted and as required by specific circumstances. A high level of patrols would be needed, but staffing levels would remain too low to contact visitors and educate them adequately about the park's resources and the need to preserve them. Because the visitor protection staff size is limited, visitor safety could continue to be compromised if several visitors with emergencies need assistance at one time. Staff safety would continue to be at risk when rangers must investigate and board unfamiliar or suspicious vessels alone.

Utility systems capacities would remain inadequate to accommodate additional personnel at one time at Garden Key. The wastewater system for the restrooms at the dock would continue to be overstressed during peak visitation periods and require frequent maintenance. The dock would continue to be too small to accommodate all the people wanting to use the park's facilities and would require staff to perform harbor master duties. The current NPS staff is severely limited in their ability to monitor commercial activities in the park, which would continue. This would cause no new impacts on commercial operators but would perpetuate a less-than-desirable management situation for park managers. Implementing alternative A would have long-term moderate adverse impacts on the maintenance of facilities and the ability of park staff to perform all necessary duties, including monitoring visitor and commercial activities.

Establishing permanent housing for park staff in Key West would improve overall park operations and living conditions for park staff who rotate to Garden Key for tours of duty in temporary housing. The installation of energy-efficient inserts into the casemates would improve comfort, health, and safety for onsite employees and research staff by eliminating water leaks and material spalling from the fort. The improvements to the visitor center would assist in protecting the exhibits and other interpretive media. These improvements would result in reduced maintenance responsibilities for park staff, improve operational efficiency, and have long-term moderate beneficial impacts on facilities and park operations.

An improved communication system would enhance visitor and staff safety, particularly in emergency situations, and aid in dispersing information to visitors — including rules, conditions, and availability of services in the park. The use of renewable energy sources would reduce fuel consumption and reduce or eliminate fuel spills, resulting in operational cost savings, as well as reducing or eliminating air and noise pollution. Providing adequate and accessible administrative office and storage space would improve staff productivity and operational efficiency.

Pre-visit information would ease the burden of limited park staff in educating visitors.

Implementing alternative A would result in long-term major beneficial impacts for park staff by improving housing units at the fort and in Key West, by improving the park's communications systems, providing adequate office and storage space, using renewable energy sources, and dispensing pre-visit information to visitors.

Cumulative Impacts

No known cumulative impacts on park operations and facilities would be expected.

Conclusion

Implementing alternative A would have long-term moderate adverse impacts on park operations and facilities.

Continuing the current trend in park operations staffing would likely result in an increasing inability to meet demand for park operations, such as monitoring visitor and commercial services activities. Visitor facilities such as the dock and campground would not be able to accommodate all visitors during peak periods.

Actions in alternative A that would have long-term major beneficial impacts on park operations and facilities include installing energy-efficient inserts in the fort's casemates, improving the utilities and communications systems, providing adequate office and storage space, using renewable energy sources, and dispensing pre-visit information to visitors. These actions would relieve the workload of staff members and result in

improved operational efficiency. Visitor facilities would not accommodate all visitors during peak periods.

ALTERNATIVE B

Analysis

Park operations regarding visitor use management would be improved through enhanced education at Key West and in the park. Establishing the maximum numbers of visitors in selected areas while increasing park staff in interpretive, visitor protection, and resource management functions, along with added maintenance personnel, would distribute workloads more evenly than currently possible. This distribution would result in more efficient operations. Additional staff members would allow for a higher level of monitoring visitor activities and educating visitors about the resources and increased safety for staff and visitors. Implementing alternative B would have long-term moderate beneficial impacts on park staff and park operations.

Improving the communication system, using renewable energy sources, having adequate office and storage space, and improving housing conditions in both Key West and the park would have the same long-term benefits as alternative A.

Using mooring buoys or other devices would require a dedicated and cyclic budget (not currently available to the park) for installation and maintenance. Installations would be labor intensive and require specialized underwater tools, knowledgeable personnel, and up-to-date diving equipment. The mooring system would need frequent inspections for damage, cleaning sea growth, and replacing mooring lines. Labor and funding requirements would have long-term minor adverse impacts on park staff and operations.

More NPS staff time would be dedicated to monitoring commercial activities in the park, which would have no new impact on operators who are complying with all the conditions in their CUA permits but could have impacts on those that are not.

Charging visitors an entrance fee would be anticipated to have long-term minor beneficial impact on park revenues. The park's revenue would increase, and the additional funds could be used to improve facilities, hire additional staff, enhance interpretation and resource protection programs, improve visitor safety, and conduct research.

Cumulative Impacts

No known cumulative impacts on park operations and facilities would be expected.

Conclusion

Implementing alternative B would have long-term moderate beneficial impacts on park operations as a result of establishing visitor capacities and an increase in staff that would improve workload distribution and allow for greater visitor education than currently possible.

Actions that would have long-term major beneficial impacts on park operations and facilities include installing energy-efficient inserts in the fort's casemates, providing adequate office and storage space, improving the communications system, using renewable energy sources, and dispensing pre-visit information to visitors. These actions would relieve the workload of staff members and result in improved operational efficiency.

Using mooring buoys or other devices would be labor intensive and require special equipment and knowledgeable personnel and a dedicated and cyclic budget. Labor and funding requirements would have long-term minor adverse impacts on park staff and operations for monitoring and maintenance of a mooring system.

ALTERNATIVE C

Analysis

Park operations regarding visitor use management would be improved through enhanced education of visitors at Key West and in the park. Establishing maximum numbers of visitors in selected areas while increasing park staff in interpretive, visitor protection, resource management functions and maintenance, would distribute workloads more evenly among staff members than currently possible. This distribution would result in more efficient operations. More patrols than currently needed would be required to monitor visitor activities in and along research natural area boundaries. However, additional staff members would allow for this higher level of monitoring. In addition, there would be more time available to educate visitors, such as private boaters, about the resources and appropriate visitor behaviors. Added employees would increase safety for staff members when conducting patrols and for visitors in emergency situations.

Improving the communication system, using renewable energy sources, having adequate office and storage space, and improving housing conditions in both Key West and the park would have the same long-term benefits as alternative A.

Self-contained ferry operation would ease the burden on the park's limited, overstressed facilities and systems, including wastewater and freshwater systems and trash removal. The ferry should be accessible to visitors during the entire visit. An additional structure, such as a dock, would ease overcrowding and provide for more efficient operations, particularly when private boaters come to Garden Key for permits.

Implementing alternative C would have long-term moderate to high adverse impacts on the need for park staff and park operations.

Using mooring buoys or other devices in the research natural area would require a dedicated and cyclic budget (not currently available to the park) for installation and maintenance. Installations would be labor intensive and require specialized underwater tools, knowledgeable personnel, and up-to-date diving equipment. The mooring system would need frequent inspections for damage, cleaning sea growth, and replacing mooring lines. Labor and funding requirements would have long-term moderate to high adverse impacts on park staff and operations for the management and maintenance of the mooring system.

Authorizing the majority of commercial use in the park through concession contracts would increase the overall amount of NPS staff time required to manage the commercial services program. This would constitute a moderate to high adverse impact on park staff. Contracts contain operational, maintenance, and environmental plans that the concessioner is required to comply with. Concessioners are also required to pay a franchise fee to the government based on their gross revenues, 80% of which stay in the park to support the commercial services programs and resource protection projects. This would be a much-needed funding source as opposed to only recovering costs from commercial use authorizations. However, training the concessions staff in interpretation would require more oversight than is currently available.

Charging visitors an entrance fee would be anticipated to have long-term minor beneficial impact on park revenues. The park's revenue would increase, and the additional funds could be used to improve facilities, hire additional staff, enhance interpretation and resource protection programs, improve visitor safety, and conduct research.

Cumulative

No known cumulative impacts on park operations and facilities would be expected.

Conclusion

Implementing alternative C would have long-term major beneficial impacts on park operations as a result of establishing visitor capacities. An increase in staff would improve workload distribution and allow for a higher level of monitoring and educating visitors than currently possible. The efficiency of operations would improve as a result of self-contained ferry operation easing the burden on the park's limited facilities. An additional structure, such as a dock, would ease crowding and enhance safety for boaters.

The structured nature of visitor use in the research natural area would require more patrols than currently needed.

Actions that would have long-term major beneficial impacts on park operations and facilities include installing energy-efficient inserts in the fort's casemates, providing adequate office and storage space, using renewable energy sources, improving the communications system, and dispensing pre-visit information to visitors. These actions would relieve the workload of staff members and result in improved operational efficiency.

Using mooring buoys or other devices would be labor intensive and require special equipment and knowledgeable personnel and a dedicated and cyclic budget. Labor and funding requirements would have long-term moderate adverse impacts on park staff and operations for the management and maintenance of a mooring system.

Awarding concessions contracts would increase the overall amount of NPS staff time needed to manage and monitor the commercial services program. Concessioners would provide a funding source for the park through payment of a required franchise fee.

All aspects of this alternative would require more staff for patrols, monitoring, and training. This would constitute a long-term moderate to high adverse impact on staff requirements.

ALTERNATIVE D

Analysis

Park operations regarding visitor use management would be improved through enhanced education of visitors at Key West and in the park. Establishing maximum numbers of visitors while increasing park staff in interpretive, visitor protection, and resource management functions, along with added maintenance personnel would distribute workloads more evenly among staff members than currently possible. This distribution would result in more efficient operations. Additional staff members would allow for a higher level of monitoring visitor activities in the natural/ cultural zone. In addition, there would be more time available to educate visitors, such as private boaters, about the resources and appropriate visitor behaviors. Added employees would increase safety for staff members when conducting patrols and for visitors in emergency situations.

Improving the communication system, using renewable energy sources, having adequate office and storage space, and improving housing conditions in both Key West and the park would have the same long-term benefits as alternative A.

A higher level of patrols would be needed because of the structured and educational nature of commercial tours and the education inherent in the permit process for private boaters.

Self-contained ferry operation would ease the burden on the park's limited, overstressed facilities and systems, including wastewater and freshwater systems and trash removal. The self-contained ferry should be accessible to visitors during the entire visit. An additional

structure, such as a dock would permit this extended stay, ease overcrowding and provide for more efficient operations, particularly when private boaters come to Garden Key for permits. Implementing alternative D would have long-term moderate to high adverse impacts on park staff and park operations.

Using mooring buoys or other devices in the research natural area would require a dedicated and cyclic budget (not currently available to the park) for installation and maintenance. Installations would be labor intensive and require specialized underwater tools, knowledgeable personnel, and up-to-date diving equipment. The mooring system would need frequent inspections for damage, cleaning sea growth, and replacing mooring lines. Labor and funding requirements would have long-term moderate to high adverse impacts on park staff and operations for the management and maintenance of the mooring system.

Authorizing the majority of commercial use in the park through concession contracts would increase the overall amount of NPS staff time required to manage the commercial services program. Contracts contain operational, maintenance, and environmental plans that the concessioner is required to comply with. Concessioners are also required to pay a franchise fee to the government based on their gross revenues, 80% of which stay in the park to support the commercial services programs and resource protection projects. This would be a much-needed funding source as opposed to only recovering costs from commercial use authorizations.

Charging visitors an entrance fee would be anticipated to have long-term minor beneficial impact on park revenues. The park's revenue would increase, and the additional funds could be used to improve facilities, hire additional staff, enhance interpretation and resource protection programs, improve visitor safety, and conduct research.

Cumulative Impacts

No known cumulative impacts on park operations and facilities would be expected.

Conclusion

Implementing alternative D would have long-term moderate beneficial impacts on park operations as a result of establishing visitor capacities and an increase in staff that would improve workload distribution and allow for a higher level of monitoring and educating visitors than currently possible. The efficiency of operations would improve as a result of self-contained ferry operation easing the burden of the park's limited facilities. An additional structure, such as a dock, would ease crowding and enhance safety for boaters.

The structured nature of visitor use in the research natural area would require more patrols than currently needed.

Actions that would have long-term major beneficial impacts on park operations and facilities include installing energy-efficient inserts in the fort's casemates, providing adequate office and storage space, improving the communications system, using renewable energy sources, and dispensing pre-visit information to visitors. These actions would relieve the workload of staff members and result in improved operational efficiency.

Using mooring buoys or other devices would be labor intensive and require special equipment and knowledgeable personnel and a dedicated and cyclic budget. Labor and funding requirements would have long-term moderate to high adverse impacts on park staff and operations for the management and maintenance of a mooring system.

Awarding concessions contracts would increase the overall amount of NPS staff time needed to manage and monitor the commercial services program.

Concessioners would provide a funding source for the park through payment of a required franchise fee.

All aspects of this alternative would require more staff for patrols, monitoring, and training. This would constitute a long-term moderate to high adverse impact on staff requirements.

ALTERNATIVE E

Analysis

Park operations regarding visitor use management would be improved through enhanced education of visitors at Key West and in the park. Establishing maximum numbers of visitors in selected areas while increasing park staff over current levels in interpretive, visitor protection, and resource management functions, along with added maintenance personnel, would distribute workloads more evenly among staff members than currently possible. This distribution would result in more efficient operations.

Improving the communication system, using renewable energy sources, having adequate office and storage space, and improving housing conditions in both Key West and the park would have the same long-term benefits as alternative A.

A higher level of patrols to monitor visitor activities would be needed because of the structured and educational nature of commercial tours, but added staff would give park employees time to educate visitors about the resources and would increase safety for staff members when conducting patrols and for visitors in emergency situations.

Self-contained ferry operation would ease the burden on the park's limited, overstressed facilities and systems, including wastewater and freshwater systems and trash removal. The self-contained ferry should be accessible to visitors during the entire visit. An additional structure, such as a dock, would permit this extended stay, ease overcrowding, lessen the potential for boats to collide, and provide for more efficient operations. Implementing alternative E would have long-term moderate beneficial impacts on park staff and park operations.

Using mooring buoys or other devices in the park would require a dedicated and cyclic budget (not currently available to the park) for installation and maintenance. Installations would be labor intensive and require specialized underwater tools, knowledgeable personnel, and up-to-date diving equipment. The mooring system would need frequent inspections for damage, cleaning sea growth, and replacing mooring lines. Labor and funding requirements would have long-term major adverse impacts on park staff and operations for the management and maintenance of a mooring system.

Authorizing all commercial use in the park through concession contracts would further increase the overall amount of NPS staff time required to manage the commercial services program. Contracts contain operational, maintenance, and environmental plans that the concessioner is required to comply with. Concessioners are also required to pay a franchise fee to the government based on their gross revenues, 80% of which stay in the park to support the commercial services programs and resource protection projects. This would be a much-needed funding source as opposed to only recovering costs from commercial use authorizations.

Charging visitors an entrance fee would be anticipated to have long-term minor beneficial impact on park revenues. The park's revenue would increase, and the additional funds could be used to improve facilities, hire additional staff, enhance interpretation and resource protection programs, improve visitor safety, and conduct research.

Cumulative Impacts

No known cumulative impacts on park operations and facilities would be expected.

Conclusion

Implementing alternative E would have long-term moderate to high adverse impacts on park operations as a result of establishing visitor capacities. An increase in staff would improve workload distribution and allow for a higher level of monitoring and educating visitors than currently possible. The efficiency of operations would improve as a result of self-contained ferry operation easing the burden on the park's limited facilities. An additional structure, such as a dock, would ease crowding and enhance safety for boaters.

The structured nature of visitor use in the park would require more patrols than currently needed.

Actions that would have long-term major beneficial impacts on park operations and facilities include installing energy-efficient inserts in the fort's casemates, providing adequate office and storage space, improving the communications system, using renewable energy sources, and dispensing pre-visit information to visitors. These actions would relieve the workload of staff members and result in improved operational efficiency.

Using mooring buoys or other devices would be labor intensive and require special equipment and knowledgeable personnel and a dedicated and cyclic budget. Labor and funding requirements would have long-term major adverse impacts on park staff and operations. Overall operational staffing costs would increase significantly for the management and maintenance of a mooring system.

Awarding concession contracts would further increase the overall amount of NPS staff time needed to manage and monitor the commercial services program. Concessioners would provide a funding source for the park through payment of a required franchise fee.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse impacts are those impacts that cannot be fully mitigated or avoided.

ALTERNATIVE A

There would be unavoidable moderate to major adverse impacts on natural and cultural resources under alternative A as a result of increasing visitor use pressures that, with limited resources, tax the park staff's ability to effectively carry out resource protection measures. Fishing, boating, diving, and the use of anchors would continue the current trend of harmful effects on marine life and habitat, terrestrial wildlife and water quality. Visitors diving to explore shipwreck sites might remove artifacts or disturb associated archeological resources, compromising the information value of the site. These impacts would be avoidable only if human use were not allowed in the park. Mitigation measures would be taken where possible to reduce these impacts.

An increase in visitation would have the potential to reduce access to some activities and areas such as the campground and dock during peak visitation periods. Crowding and noise would increase and change the character of the visitor experience, resulting in minor to moderate adverse impacts on the visitor experience.

ALTERNATIVE B

There would be unavoidable adverse impacts on natural and cultural resources under alternative B. Even though management activities would limit some visitor numbers and activities at specific sites, moderate to major adverse impacts would occur due to continued visitor use and taxing the park staff's workload. Limiting visitor numbers at specific sites, monitoring resources and visitors, and enhancing visitor education would increase protection of resources over current conditions, but fishing, boating, diving, and the use of anchors would continue the current trend of harmful effects on marine life and habitat, terrestrial wildlife, and water quality. Despite implementation of a management strategy to provide more comprehensive protection of submerged cultural resources, there would likely continue to be instances where shipwreck artifacts and associated archeological resources are removed or disturbed by visitors exploring these sites. These impacts would be avoidable only if human use were not allowed in the park. Mitigation measures would be taken where possible to reduce these impacts.

Concentrating visitor use at mooring buoy locations would have an unavoidable impact If impacts become unacceptable, buoys might be relocated or other management action might be taken.

In addition to the above unavoidable impacts, staff increases would require additional operational funding.

ALTERNATIVE C

Aquatic habitats outside the boundaries of the research natural area zone might face moderate to major long-term unavoidable adverse impacts. This would be due to a lack of restrictions on use by boaters, fishermen, divers, snorkelers, and swimmers.

The implementation of a management strategy to provide comprehensive protection of submerged cultural resources along with other resource protection measures (e.g., zoning) would further reduce but not entirely eliminate the risk that shipwreck artifacts and associated archeological resources might be removed or disturbed by visitors exploring these sites.

Eliminating recreational fishing from the research natural area zone would decrease the diversity of visitor activities and result in long-term minor adverse impacts on fishermen.

Operators who currently provide transportation to the park and are not awarded concessions contracts would experience a major adverse economic impact. Commercial services providers who hold commercial use authorizations could experience minor adverse impacts as a result of competing with concessioners who would be permitted to offer similar services.

Visitors on tours to areas beyond Garden Key would have a structured experience and less need for self-reliance. Previous visitors by private boats might experience a loss of freedom to travel and a loss of solitude.

Concentrating visitor use at mooring buoy locations would have an unavoidable impact If impacts become unacceptable, buoys might be relocated or other management action might be taken.

ALTERNATIVE D

Aquatic habitats outside the boundaries of the research natural area zone might face moderate to major long-term unavoidable adverse impacts due to use by boaters, fishermen, divers, snorkelers, and swimmers.

The implementation of a management strategy to provide comprehensive protection of submerged cultural resources along with other resource protection measures (e.g., zoning) would further reduce but not entirely eliminate the risk that shipwreck artifacts and associated archeological resources might be removed or disturbed by visitors exploring these sites.

Eliminating recreational fishing and private boating from the research natural area zone would decrease the diversity of activities for visitors seeking these activities in the park and result in minor long-term adverse impacts on their visitor experience.

Operators who currently provide transportation to the park and were not awarded concessions contracts would experience a major adverse economic impact. Commercial services providers who hold commercial use authorizations could experience minor adverse impacts as a result of competing with concessioners who would be permitted to offer similar services.

Visitors on tours to areas beyond Garden Key would have a structured experience and less need for self-reliance. Previous visitors by private boats might experience a loss of freedom to travel and a loss of solitude.

Concentrating visitor use at mooring buoy locations would have an unavoidable impact If impacts become unacceptable, buoys might be relocated or other management action might be taken.

ALTERNATIVE E

Implementing a management strategy to provide comprehensive protection of submerged cultural resources, along with the designation of an expanded research natural area zone, would substantially reduce but not entirely eliminate the risk that shipwreck artifacts and associated archeological resources might be removed or disturbed by visitors exploring these sites.

Eliminating recreational fishing and private boating from the research natural area zone (the major portion of the park) would decrease the diversity of activities for visitors seeking these activities and result in moderate long-term adverse impacts on their visitor experience.

Operators who currently provide transportation to the park and were not awarded concessions contracts would experience a major adverse economic impact. Commercial

services providers who hold commercial use authorizations could experience minor adverse impacts as a result of competing with concessioners who would be permitted to offer similar services.

Visitors on tours to areas beyond Garden Key would have a structured experience and less need for self-reliance. Previous visitors by private boats might experience a loss of freedom to travel and a loss of solitude.

Concentrating visitor use at mooring buoy locations would have an unavoidable impact If impacts become unacceptable, buoys might be relocated or other management action might be taken.

RELATIONSHIP OF SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This section discusses the effects of the short-term use of resources resulting from implementing this alternative on the long-term productivity of resources.

ALTERNATIVE A

The continuation of consumptive uses and visitor activities would jeopardize the long-term productivity of the environment. Noise and human activities associated with ongoing visitor and administrative use of the park would prevent marine populations from reaching their full potential in size and population density. Noise, artificial lighting, and human activities such as fishing and boating would continue to adversely affect wildlife populations including birds, sea turtles, and sea mammals. Permitting activities such as boating, anchoring, and diving over coral and shipwrecks would continue to have deleterious effects on coral, sea grass beds, sand bottoms, hardbottom habitats, water quality, and cultural resources.

ALTERNATIVE B

Limiting visitor numbers and activities at specific sites and monitoring resources would provide greater protection of resources than alternative A. However, the continuation of consumptive uses and visitor activities would jeopardize the long-term productivity of the environment. Noise and human activities associated with ongoing visitor and administrative use of the park would prevent marine populations from reaching their full potential in size and population density. Noise, artificial lighting, and human activities such as fishing and boating also would continue to adversely affect wildlife populations including birds, sea turtles, and sea mammals. Permitting activities such as boating, anchoring, and diving over coral and shipwrecks would continue to have deleterious effects on coral, sea grass beds, sand bottoms, hardbottom habitats, water quality, and cultural resources.

ALTERNATIVE C

The relationship of the proposed action to the goals of the National Environmental Policy Act is expressed in terms of the NEPA objective to maintain and enhance the long-term productivity of the environment. The National Park Service and Dry Tortugas National Park are committed to this goal; consequently, the proposed action includes numerous elements that would enhance the long-term productivity of the environment.

Improving the management of natural and cultural resources, along with enhancing research within the park, would contribute to the long-term protection and preservation of all resources considered in the proposed action. Proposals to work cooperatively with the Florida Keys National Marine Sanctuary and other agencies' initiatives for resource and public use management would further enhance resource protection and the preservation of resources.

Establishing a research natural area zone within the park would reduce the short- and long-term adverse impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats within the zone. Restrictions on private boat use in the research natural area would reduce the threat of major damage to underwater (benthic) habitats from groundings and propellers. Eliminating anchoring and fishing in this zone would remove the threat of damage to underwater habitats. Limiting scuba diving, snorkeling, and swimming to deeper localized areas near mooring buoys would reduce the areal extent of damage on coral reefs. The zone

would protect 41% of the coral reef habitats in the park, 100% of the hardbottom habitats, 26% of the sea grass beds, and 41% of the sand bottom areas.

Establishing the research natural area would provide major short-term and long-term benefits to the abundance and diversity of exploited and unexploited and protected/ threatened fish and invertebrate populations by protecting coral reef habitats and eliminating fishing. The zone would provide increased protection for 88% of reef fish species found in the park and 97% of the species in the snapper-grouper-grunt complex, resulting in an increase in spawning population, egg production, and larger individual size.

Monitored and/or restricted access to portions of the terrestrial habitat and the use of guided tours and marked pathways would provide increased protection to land-based wildlife resources compared to alternative A. Eliminating fishing and restricting boat use in the research natural area would reduce short-term and long-term adverse impacts on bird and turtle nests and eggs. Restricted boat use would decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.).

If a permanent, shore-based design were selected for dock construction, short-term impacts would include increased sedimentation and turbidity, loss of habitat, animal mortality, air pollution, and dust dispersal. Potential long-term impacts include loss of habitat, shading of habitat, unnatural current patterns, artificial habitat creation, the buildup of sediment, and interference with turtle nesting. Most of these impacts would be minimized or eliminated by appropriate mitigation measures.

ALTERNATIVE D

Establishing a research natural area zone in the park would reduce the short- and long-term adverse impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats within this zone. Restrictions on private boat use in the research natural area would reduce the threat of major damage to underwater habitats from groundings and propellers. Eliminating anchoring and fishing in the zone would remove the threat of damage to underwater habitats. Limiting scuba diving, snorkeling, and swimming to deeper localized areas near mooring buoys would reduce the areal extent of damage on coral reefs. The zone would protect 35% of the coral reef habitats in the park, 38% of the sea grass beds, 20% of the sand bottom areas, and none of the hardbottom areas.

Establishing the research natural area would provide major short-term and long-term benefits for the abundance and diversity of exploited and unexploited and protected/ threatened fish and invertebrate populations by protecting coral reef habitats and eliminating fishing. The zone would provide increased protection for 80% of reef fish species found in the park and 83% of the species in the snapper-grouper-grunt complex, resulting in an increase in spawning population, egg production, and larger individual size.

Monitored and/or restricted access to portions of the terrestrial habitat and the use of guided tours would provide increased protection to land-based wildlife resources compared to alternative A. Eliminating fishing and restricting boat use in the research natural area would reduce short-term and long-term adverse impacts on bird and turtle nests and eggs. Restricted boat use would decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.).

Selecting a permanent, shore-based design for dock expansion would result in short-

term impacts, including increased sedimentation and turbidity, loss of habitat, animal mortality, air pollution, and dust dispersal. Potential long-term impacts include loss of habitat, shading of habitat, unnatural current patterns, artificial habitat creation, the buildup of sediment, and interference with turtle nesting. Most of these impacts would be minimized or eliminated by appropriate mitigation measures.

ALTERNATIVE E

Establishing a research natural area zone for most of the park would nearly eliminate the short- and long-term adverse impacts on coral reefs, sea grass beds, sand bottoms, and hardbottom habitats. Restrictions on private boat use in the research natural area would reduce the threat of major damage to underwater habitats from groundings and propellers. Eliminating anchoring and fishing in the zone would remove the threat of damage to underwater habitats. Limiting scuba diving, snorkeling, and swimming to deeper localized areas near mooring buoys would reduce the areal extent of damage to coral reefs. The zone would protect nearly 100% of all underwater habitat.

Establishing the research natural area would provide major short-term and long-term benefits to the abundance and diversity of exploited and unexploited and protected/ threatened fish and invertebrate populations by protecting coral reef habitats and eliminating fishing. The zone would provide increased protection for 100% of reef fish species found in the park and result in an increase in spawning population, egg production, and larger individual size.

Monitored and/or restricted access to portions of the terrestrial habitat and the use of guided tours and marked pathways would provide increased protection to land-based wildlife resources compared to alternative A. Eliminating fishing and restricting boat use in the research natural area zone would reduce short-term and long-term adverse impacts on bird and turtle nests and eggs. Restricted boat use would decrease the short-term risks to water quality from fuel and oil spills due to groundings and from pollution (trash, waste disposal, etc.).

Selecting a permanent, shore-based design for dock expansion would result in short-term impacts including increased sedimentation and turbidity, loss of habitat, animal mortality, air pollution, and dust dispersal. Potential long-term impacts include loss of habitat, shading of habitat, unnatural current patterns, artificial habitat creation, the buildup of sediment, and interference with turtle nesting. Most of these impacts would be minimized or eliminated by appropriate mitigation measures.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible commitment of resources is one that cannot be changed once it occurs except perhaps in the extreme long term; an irretrievable commitment means the resource is lost for a period of time and likely cannot be recovered or reused.

ALTERNATIVE A

Ongoing activities that result in the loss of nonresilient coral reefs, sea grass beds, sand bottoms, and hardbottom habitats would be an irreversible commitment of resources. Over time, an accumulation of adverse impacts on these habitats could result in an irreversible commitment of resources. Removing artifacts from a shipwreck or disturbing associated archeological resources would compromise the information potential of the site and result in an irreversible commitment of resources. Significant sites contain unique data that cannot often be replicated or recovered once lost or disturbed.

Limited amounts of nonrenewable resources would be used for construction projects and park operations, including energy and materials. These resources would be basically irretrievable once they were committed.

ALTERNATIVE B

Ongoing activities that result in the loss of nonresilient coral reefs, sea grass beds, sand bottoms, and hardbottom habitats would be an irreversible commitment of resources. Over time, an accumulation of adverse impacts on these habitats could result in an irreversible commitment of resources. Removing artifacts from a shipwreck or disturbing associated archeological resources would compromise the information potential of the site and result in an irreversible commitment of resources. Significant sites contain unique data that cannot often be replicated or recovered once lost or disturbed.

Limited amounts of nonrenewable resources would be used for construction projects and park operations, including energy and materials. These resources would be basically irretrievable once they were committed.

ALTERNATIVE C

Although the risks of resource impacts would be further reduced by the management actions proposed under this alternative, instances of irreversible or irretrievable commitments of natural or cultural resources might occur. For example, removing artifacts from a shipwreck or disturbing significant associated archeological resources would compromise the information potential of the site and result in an irreversible commitment of resources. Significant sites contain unique data that cannot often be replicated or recovered once lost or disturbed.

Proposed management actions would contribute to resource protection and preservation and would be expected to minimize the occurrence of irreversible or irretrievable impacts.

Limited amounts of nonrenewable resources would be used for construction projects and park operations, including energy and materials. These resources would be basically irretrievable once they were committed.

ALTERNATIVE D

Although the risks of resource impacts would be further reduced by the management actions proposed under this alternative,

instances of irreversible or irretrievable commitments of natural or cultural resources might occur. For example, removing artifacts from a shipwreck or disturbing significant associated archeological resources would compromise the information potential of the site and result in an irreversible commitment of resources. Significant sites contain unique data that cannot often be replicated or recovered once lost or disturbed.

Proposed management actions would contribute to resource protection and preservation and would be expected to minimize the occurrence of irreversible or irretrievable impacts. Limited amounts of nonrenewable resources would be used for construction projects and park operations, including energy and materials. These resources would be basically irretrievable once they were committed.

ALTERNATIVE E

Although the risks of resource impacts would be substantially reduced by the management actions proposed under this alternative, instances of irreversible or irretrievable commitments of natural or cultural resources might occur. For example, removing artifacts from a shipwreck or disturbing significant associated archeological resources would compromise the information potential of the site and result in an irreversible commitment of resources. Significant sites contain unique data that cannot often be replicated or recovered once lost or disturbed.

Proposed management actions would contribute to resource protection and preservation and would be expected to minimize the occurrence of irreversible or irretrievable impacts.

Limited amounts of nonrenewable resources would be used for construction projects and park operations, including energy and materials. These resources would be basically irretrievable once they were committed.

IMPACTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

ALTERNATIVE A

Limited amounts of nonrenewable resources would be used for construction projects including rehabilitating buildings for the Key West multiagency visitor facility and park housing. This expenditure of energy would be short term and negligible and include fuel for construction vehicles, construction materials, and energy used in manufacturing materials.

ALTERNATIVE B

Limited amounts of nonrenewable resources would be used for construction projects including rehabilitating buildings for the Key West multiagency visitor facility and park housing. This expenditure of energy would be short term and negligible and include fuel for construction vehicles, construction materials, and energy used in manufacturing materials.

An increase in energy expenditure would occur with proposed additional patrols to monitor visitor use and to augment resource monitoring. Added patrols would increase boat miles traveled and fuel consumption. The number of boat trips for patrols is uncertain at this time, but fuel consumption would be expected to be minor relative to overall fuel consumption in the park. From a regional context, the increase in fuel consumption would be negligible.

ALTERNATIVE C

Limited amounts of nonrenewable resources would be used for construction projects including rehabilitating buildings for the Key West multiagency visitor facility and park housing and the dock. This expenditure of energy would be short term and negligible and include fuel for construction vehicles, construction materials, and energy used in manufacturing materials.

An increase in energy expenditure would occur with proposed additional patrols to monitor visitor use and to augment resource monitoring. Added patrols would increase boat miles traveled and fuel consumption. The number of boat trips for patrols is uncertain at this time, but fuel consumption would be expected to be minor relative to overall fuel consumption in the park. From a regional context, the increase in fuel consumption would be negligible.

ALTERNATIVE D

Limited amounts of nonrenewable resources would be used for construction projects including rehabilitation of buildings for the Key West multiagency visitor facility and park housing and the dock. This expenditure of energy would be short term and negligible and include fuel for construction vehicles, construction materials, and energy used in manufacturing materials.

An increase in energy expenditure would occur with proposed additional patrols to monitor visitor use and to augment resource monitoring. Added patrols would increase boat miles traveled and fuel consumption. The number of boat trips for patrols is uncertain at this time, but fuel consumption would be expected to be minor relative to overall fuel consumption in the park. From a regional context, the increase in fuel consumption would be negligible.

Eliminating private boating from the research natural area zone could decrease fuel consumption by private boaters who would leave their boats near the fort and take a commercial tour. In a regional context, the decrease in fuel consumption would be negligible.

ALTERNATIVE E

Limited amounts of nonrenewable resources would be used for construction projects including rehabilitating buildings for the Key West multiagency visitor facility and park housing and the dock. This expenditure of energy would be short term and negligible and include fuel for construction vehicles, construction materials, and energy used in manufacturing materials.

An increase in energy expenditure would occur with proposed additional patrols to monitor visitor use and to augment resource monitoring. Added patrols would increase boat miles traveled and fuel consumption. The number of boat trips for patrols is uncertain at this time, but fuel consumption would be expected to be minor relative to overall fuel consumption in the park. From a regional context, the increase in fuel consumption would be negligible.

Eliminating private boating from the research natural area zone could decrease fuel consumption by private boaters who would leave their boats near the fort and take a commercial tour. In a regional context, the decrease in fuel consumption would be negligible.

ENVIRONMENTAL JUSTICE POLICY

Under a policy established by the secretary of the Department of the Interior, to comply with Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"), departmental agencies should identify and evaluate, during the scoping and/or planning processes, any anticipated effects, direct or indirect, from the proposed project or action on minority and low-income populations and communities, including the equity of the distribution of the benefits and risks. If any significant impacts on minority and low-income populations and communities were identified during the scoping and/or planning processes, the environmental document should clearly evaluate and state the environmental consequences of the proposed project or action on minority and low-income populations and communities.

It was determined that none of the actions of the alternatives considered in this *Final General Management Plan Amendment/ Environmental Impact Statement* would result in significant direct or indirect adverse effects on any minority or low-income population or community. The following information contributed to this conclusion:

- The developments and actions proposed in alternative C would not result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect negative or adverse effects on any minority or low-income population or community.

- The impacts on the natural and physical environment that would result from implementing alternative C would not have significant adverse effects on any minority or low-income population or community.

- The proposed action (alternative C) would not result in any identified adverse effects that would be specific to any minority or low-income community.

- The National Park Service has had an active public participation program and has equally considered all public input from persons regardless of age, race, income status, or other socioeconomic or demographic factors.

- No minority groups in Monroe County or the south Florida region would be disproportionately affected.

- Effects on the county and regional socioeconomic environment due to implementing alternative C would be marginally beneficial and would occur over a number of years. Impacts on the socioeconomic environment would not be expected to significantly alter the physical and social structure of the county or region.

CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION

SCOPING AND OTHER PUBLIC INVOLVEMENT EFFORTS

Currently the National Park Service and the National Oceanic and Atmospheric Administration are both involved in planning for the Dry Tortugas area. The National Park Service is amending the *General Management Plan* for Dry Tortugas National Park; the National Oceanic and Atmospheric Administration is completing a *Tortugas Ecological Reserve* plan for the Florida Keys National Marine Sanctuary adjacent to the park. The two agencies have similar, but distinct missions, and different ways of managing lands and waters within their jurisdictions.

At the onset of scoping, both agencies realized there was some confusion between the NPS and NOAA planning processes. As a result, the two agencies joined in a parallel, collaborative process to minimize confusion and maximize public involvement in both planning efforts. This collaboration included coordinated schedules, linked web sites, joint scoping meetings, separate but coordinated documents, and joint public meetings on the draft plans.

The National Park Service completed the scoping phase through a public involvement effort, including five public meetings and a newsletter requesting comments regarding the future of the park. During the period October 27, 1998 – November 17, 1998, public meetings were held in Washington, D.C., and four Florida locations: Ft. Myers, Key West, Marathon, and Miami.

Many public comments were given at the public meetings, and approximately 200 letters and Internet messages were received in response to the newsletter. All comments given in response to the scoping process have been considered and will remain in the administrative record throughout the planning process. A summary and listing of the public comments are available to the public and can be obtained through the contact information listed below.

As a direct result of the public responses received, the environmental impact statement considers the following issues: the protection of the pristine natural marine resources including coral reefs, birds, and sea turtles; the desire to maintain qualities of remoteness and tranquility; the appropriateness of specific visitor activities in the park; the need for limits on visitation; the preservation of Fort Jefferson; the effects of fishing on fisheries resources; the desire to establish a “marine reserve”; and the limitations of the park’s infrastructure in the face of increasing visitation.

A *Federal Register* notice and media announcements initiated the beginning of a formal public comment period on the draft plan. All interested agencies, groups and individuals were invited to review the document and submit comments.

Public meetings on the draft plan were held in Washington, D.C., and five Florida locations — Homestead, Naples, St. Petersburg, Marathon, and Key West. The date, time, and location of each meeting was announced in the *Federal Register* and through the regional/local media. The availability of the *Final General Management Plan / Environmental Impact Statement* was also announced in the *Federal Register.*

CONSULTATION

In accordance with Section IV of the 1995 programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, certain undertakings require only internal NPS review for Section 106 purposes (see table 8). Other undertakings

require standard Section 106 review in accordance with 36 CFR 800, and in those instances the National Park Service consults as necessary with the state historic preservation officer, the Advisory Council on Historic Preservation, tribal officials, the U.S. Fish and Wildlife Service, and other interested parties.

TABLE 8. CULTURAL RESOURCE COMPLIANCE WITH SECTION 106

Preservation maintenance actions intended to protect and stabilize historic structures at Fort Jefferson and Loggerhead Key (exclusion IV.B.1). Rehabilitation actions limited to "retaining and preserving, protecting and maintaining, and repairing and replacing in kind materials and features, consistent with the *Secretary of the Interior's Standards for Rehabilitation* and the accompanying guidelines" (exclusion IV.B.9). Actions proposed by the *Submerged Cultural Resources Strategy* for inventorying, monitoring, researching, interpreting, and protecting submerged cultural resources (exclusion IV.B.4).	These actions are programmatically excluded from Section 106 review outside the National Park Service
Expansion/rehabilitation of the Fort Jefferson visitor center into adjacent casemates. Upgrade of the casemates currently used for staff and visitor quarters. Extension of the dock requiring archeological assessment of areas anticipated to be disturbed by construction activities (alternatives C, D, and E).	These actions are anticipated to have no adverse effect (or unknown effects) on historic properties and would require consultation with the state historic preservation office during project design development

COORDINATION

The *Final General Management Plan Amendment / Environmental Impact Statement* has been developed pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969 (Public Law 91-190) and the Council on Environmental Quality regulations (40 CFR 1508.22). The scope of this process initially focused on commercial services and visitors. The public scoping process revealed the need to expand the scope to include an amendment to the existing management plan. The revised intent of this planning process is to prepare a comprehensive management plan that discusses protection and enhancement of the values for which Dry Tortugas was authorized as a national park. The document also includes recommendations for commercial services and visitor use management. During the planning process, management alternatives have been developed that address resource protection, user capacities, commercial services, and limitations of park facilities. Through scoping and the public comment review process on the draft document, the planning process was conducted with other federal agencies, state and local governments, and interested organizations and individuals.

LIST OF AGENCIES AND ORGANIZATIONS RECEIVING A COPY OF THE FINAL GENERAL MANAGEMENT PLAN AMENDMENT / ENVIRONMENTAL IMPACT STATEMENT

An * denotes agencies/organizations that commented on the draft document.

Federal Agencies

Advisory Council on Historic Preservation, Washington, DC

Army Corps of Engineers, Jacksonville, FL
- Jacksonville District Corps of Engineers, Colonel Joe R. Miller, District Engineer
- Chief, Planning Division, James Duck, Jacksonville District

U.S. Department of the Interior
- Assistant Secretary, Fish Wildlife and

Parks, Donald Barry, Washington, D.C.
Librarian, Washington, D.C.
Office of the Regional Solicitor, Kahlman Fallon, Atlanta, GA
Office of the Solicitor, Molly Ross, Washington, D.C.
U.S. Environmental Protection Agency
Chief Heinz Mueller, Atlanta, GA
South Florida Field Office, Richard Harvey, West Palm Beach, FL
National Oceanic and Atmospheric Administration (NOAA)
OCRM-Coastal Programs Division, N/ORM3, Silver Spring, MD
Superintendent Billy Causey, Florida Keys National Marine Sanctuary, Marathon, Key Largo, and Key West, FL
NOAA-National Marine Fisheries Service
Southeast Fisheries Center, Bradford E. Brown, Miami, FL
National Park Service
Jerry Belson, Regional Director, Atlanta, GA
Warren Brown, Program Analyst, NPS, Professional Services, Washington, D.C.
Gary Davis, Channel Islands National Park, Ventura, CA
Maureen Finnerty, Associate Director, Operations & Education, National Park Service, Washington, D.C.
John Ehrenhard, Manager, Southeast Archeological Center, Tallahassee, FL
Stuart Johnson, Chief, Planning and Compliance, NPS, Southeast Region, Atlanta, GA
Public Health Officer, NPS, Southeast Region, Atlanta, GA
Larry Murphy, Archeologist, NPS, Intermountain Cultural Resource Center, Santa, Fe, NM
Richard Ring, Superintendent, Everglades and Dry Tortugas National Parks, Homestead, FL
Mike Soukup, Associate Director, Natural Resource Stewardship, Washington, D.C.
Kate Stevenson, Associate Director, Cultural Resource Stewardship, Washington, D.C.
Superintendent, Big Cypress National Preserve, Ochopee, FL
Superintendent, Biscayne National Park, Homestead, FL
Superintendent, Virgin Islands National Park, St. Thomas, VI
U.S. Fish and Wildlife Service
Steve Forsythe, Vero Beach, FL
Refuge Manager, National Key Deer Refuge, Big Pine Key, FL
U.S. Geological Survey
Biological Resources Division, G. Ronnie Best, Miami, FL
Water Resources Division, Aaron Higer, West Palm Beach, FL

U.S. House of Representatives/Senate Washington, D.C.

The Honorable Peter Deutsch, U.S. House of Representatives
The Honorable Porter Goss, U.S. House of Representatives
The Honorable Bob Graham, U.S. Senate
The Honorable Connie Mack, U.S. Senate
The Honorable E. Clay Shaw, Jr., U.S. House of Representatives
The Honorable John Tierney, U.S. House of Representatives
The Honorable C.W. Young, U.S. House of Representatives

State Agencies

Florida Department of Agriculture and Conservation*
Florida Department of Community Affairs*
Florida Department of Environmental Protection*
Florida Department of State, Division of Historical Resources*
Florida Department of Transportation*
Florida Division of Marine Fish*
Florida Fish and Wildlife Conservation Commission*
Office of Environmental Services, Mary Ann Poole, Vero Beach, FL
Division of Marine Fisheries, Director Russell Nelson, Tallahassee, FL
Florida State Clearinghouse, Department of Community Affairs, Tallahassee, FL*
Governor's Commission for the Everglades,

Executive Director Bonnie Kranzer, Coral Gables, FL
Office of the Governor, Rick Smith, Tallahassee, FL
Park Manager, Bahia Honda State Park, Big Pine Key, FL
Park Manager, Ft. Zachary Taylor Historic Site, Key West, FL
Park Manager, John Pennekamp Coral Reef State Park, Key Largo, FL
South Florida Regional Planning Council*
South Florida Water Management District, Executive Director Frank Finch, West Palm Beach, FL
State Historic Preservation Officer, Tallahassee, FL
The Honorable Daryl L. Jones, Florida Senate, Miami, FL
The Honorable Ken Sorensen, Florida House-District 120, Tavernier, FL

Organizations

Center for Marine Conservation
Jack Sobel, Washington, D.C.
Florida Keys Field Office, Kim Anaston, Key West, FL
Gulf of Mexico Fishery Management Council, Wayne Swingle, Tampa, FL
Miami Group, Sierra Club, S. Miami, FL
National Audubon Society, Stuart Strahl, Miami, FL
National Parks Conservation Association
Libby Fayad, Washington, D.C.
Ron Tipton, Washington, D.C.
Natural Resources Conservation Service, Ron Smola, West Palm Beach, FL
Natural Resources Defense Council, Brad Sewell, New York, NY
Reef Relief, Executive Director DeeVon Quirolo, Key West, FL
South Florida Regional Planning Council, Hollywood, FL
Southwest Florida Regional Planning Council, Wayne E. Daltry, N. Ft. Myers, FL
World Wildlife Fund
Debbie Harrison, Marathon, FL
Everglades Coalition, Co-Chair Shannon Estenoz, Plantation, FL

City/County Agencies

City Council, Islamorada, Village of Islands, Islamorada, FL
Mayor Bonnie R. MacKenzie, Naples, FL
Mayor Shirley Freeman, Monroe County, Monroe County Commission, Key West, FL
Mayor Steve Shiver, Homestead, FL
Mayor Otis Wallace, Florida City, FL
Mayor Jimmy Weekley, Key West, FL
Monroe County Planning Dept., Marathon, FL
Reference Section, Collier County Public Library, Naples, FL
Reference Section, Homestead Branch, Miami-Dade Public Library, Homestead, FL
Reference Section, Miami-Dade Public Library, Miami, FL
Reference Section, Monroe County Public Library, Islamorada, FL
Reference Section, Monroe County Public Library, Key Largo, FL
Reference Section, Monroe County Public Library, Key West, FL
Reference Section, Monroe County Public Library, Marathon, FL
South Dade Regional Library, Miami-Dade Public Library, Miami, FL
St. Petersburg Public Library, St. Petersburg, FL

Local Businesses

Island Flying Service, Inc., Seaplanes of Key West, Inc., Mickey Frederickson, Key West, FL
Noble Air, Inc., Seaplanes of Key West, Inc., Ruebin Dunegan, Key West, FL
Sunny Days Catamarans, Sonny Eymann, Key West, FL
The Yankee Fleet, Alan G. Hill, Key West, FL

SUMMARY OF PUBLIC COMMENTS

WRITTEN COMMENTS

The National Park Service received 5,942 letters, memorandums, faxes, or emails regarding the draft Dry Tortugas *General Management Plan Amendment / Environmental Impact Statement*. Of these, 4,246 were emails of the World Wildlife Fund campaign supporting the Tortugas Reserve.

- 605 were part of an NPCA campaign that supports a plan at least as protective as alternative C, with a research natural area covering 43% of the park. There was support for limiting the number of visitors to a particular area in the park, anchor buoys for private boats, and educating visitors about how to avoid harming the resources.

- 263 letters were received, from a campaign by the Center for Marine Conservation, that support establishing a no-take research natural area inside the park to complement the sanctuary's proposed ecological reserve.

- 548 faxes and more than 30 letters supported alternative C with simplified boundaries.

- There were an additional 143 commentors who said they supported alternative C, specifically, or want the resources protected.

Comments from Businesses

There were letters from six businesses, three (the Sunny Days, Yankee Fleet, and Seaplanes of Key West) with substantive comments (explained below). Barrier Free Systems supports preservation in the Tortugas, Stellaris Charters does not wish to have Loggerhead Key closed to the public, and Bonsai Diving is concerned about the fairness of fees charged to small commercial operators.

Comments from the General Public

Regarding the research natural area boundary, one commentor said that 50% of the park should be a research natural area where no fishing or the general public was allowed; one commentor supported mooring buoys in the entire park and wanted to increase the RNA area to 70% of the park; 548 people faxed to say they wanted simplified boundaries; and four commentors wanted alternative E (or the most restrictive alternative.

There were some letters that opposed the plan

- 23 commentors were opposed, and 22 specifically mentioned fishing. One was opposed to closing off access to the park. There also was a petition with 185 signatures to be sent to President Clinton form the American Sports Fishermen, who were petitioning to let them fish in the Dry Tortugas.

- 15 organizations sent letters, and five contain substantive comments. There is one petition from the Word Wildlife Fund with 245 signatures supporting the ecological reserve. In addition, there is one letter titled "Organizations in support of a Tortugas Ecological Reserve" that contains names of 52 groups.

- Besides the organizations that sent letters containing substantive comments, the Merrimack River Watershed Council, the Friends of St. Sebastian River, the Calusa Group Sierra Club, the American Littoral Society, Marathon Guides Association, The Nature Conservancy, the Conservancy of Southwest Florida, and The Humane Society of the United States all support the plan. The Bluewater Network submitted

comments on appropriate marine engines that should be used in the park.

ORAL TESTIMORY

Five joint public meetings were held in Florida with the Florida Keys National marine Sanctuary during June 2000 in Homestead, Naples, St. Petersburg, Marathon, and Key West. One public meeting was held in Washington, D.C. on July 11, 200. A total of 45 speakers gave oral testimony at these meetings with 12 speakers representing organizations including the Sierra Club, Propeller Club, the Florida Biodiversity Project, the South Florida Sport Fishermen, the Center for Marine Conservation, Oceanwatch, Reefkeeper International, the World Wildlife Fund, the League of Women Voters of Florida, and the Southeastern Fisheries Association.

During these meetings, 25 attendees supported the preferred alternative, seven said they would like greater protection than the preferred alternative offered or would like maximum protection, and nine people gave substantive comments on the plan.

OTHER COMMENTS

Sixteen letters and emails were received after the comment period ended. Eight supported the preferred alternative and eight were opposed. Those opposed were not in agreement with limiting recreational fishing in a portion of the park.

RESPONSES TO COMMENTS / SUBSTANTIVE COMMENTS

The Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act requires the National Park Service to respond to "substantive" comments. A comment is substantive if it meets any of the following criteria (from *Draft Directors Order 12: Conservation Planning and Environmental Impact Analysis,* NPS 1999):

It questioned, with reasonable basis, the accuracy of information.

It questioned, with reasonable basis, the adequacy of environmental analyses.

It presented reasonable alternatives other than those proposed in the plan.

It would cause changes or revisions in the preferred alternative.

Many of the comments expressed an opinion but did not meet the above criteria. Others were outside the scope of the Dry Tortugas' *General Management Plan Amendment / Environmental Impact Statement.* Although the National Park Service values this input, no response is provided to such comments. Comments that identified errors such as misspelled words and typos were not included as substantive, but the National Park Service appreciates the information and has corrected the errors.

Photocopies of letters from agencies and photocopies of letters or oral testimonies with substantive comments from organizations, businesses, educational institutions, and individuals are provided at the end of this section. Each comment letter with a substantive comment was assigned a numeric code; oral testimonies were assigned an alphanumeric code. In the following list (table 9), the comment letter author's name is followed by one of these numeric or alphanumeric codes. That same code is printed at the top of the first page of the photocopy of that letter. For example, the Center for Marine Conservation's written comment letter, with code #034, is reprinted, with "#034" at the top of their letter. As required, all agency letters are reprinted. The ones without a numeric code did not have substantive comments.

The National Park Service's responses to the substantive comments in this (and the other) letters is printed on table 10, just before the letters have been reproduced. If the reader wants to know what the Park Service's responses are to the Center for Marine Conservation's letter, he/she would look on table 10 for #034, where the comment(s) is (are) paraphrased and the response is given. Letter #034 may have had several substantive comments, and on the table they will appear as 034.1, 034.2, etc. At the end of the letters, we have reprinted a sample of the 263 letters from the Center for Marine Conservation campaign, a sample of the 605 letters from the National Parks and Conservation campaign, and a sample of the 4,256 emails from the World Wildlife Fund campaign. Because none of these campaign letters, faxes, or emails had substantive comments, no responses have been provided.

Written transcripts for the public meetings and copies of all the written comments are available for public review at Everglades National Park headquarters.

TABLE 9. LIST OF COMMENTORS AND CODES

Federal Agencies

State Agencies

Organizations

Businesses

Educational Institutions

Individuals

TABLE 10. RESPONSES TO COMMENTS ON DRAFT PLAN

LETTER NUMBER/COMMENT NUMBER	COMMENT (PARAPHRASED)	Response
Overall Concept		
040.1; 040.2	The management plan does not identify scientifically justifiable goals and objectives. The *Draft General Management Plan Amendment / Environmental Impact Statement* does not define or identify indicators for assessing ecological integrity.	Park enabling legislation, mission goals, management zone prescriptions, and NPS-77 clearly state goals for the park (see the "Servicewide Laws and Policies and Special park Mandates and Agreements" section). Species-specific targets and measurable indicators will be developed in the next stage of planning (see the "Monitoring to Maintain Visitor Experience and Resource Protection" subheading in the "Management Zones" discussion). A visitor experience and resource protection plan would be completed after the *General Management Plan Amendment* is finalized. This plan will address visitor carrying capacity and identify the indicators, standards and monitoring strategies that can be used to ensure provision of quality experiences while protecting park resources. The public will have the opportunity to comment on the draft plan.
The Research Natural Area		
014.1; 015.1; 021.1; 024.1, 027.1, 028.1, 029.1, 040.3, 034.3, KW1.2, KW1.1	The plan should designate a portion of the park or the whole park as an off-limits preserve except for scientific research and other valid related activities where the general public is not allowed; this area would be no-take. The plan should reduce impacts on the reefs and grass beds around the fort by discontinuing the commercial sightseeing vendor permits.	Several areas (Long Key, Hospital Key, and the Long Key/Bush Key tidal channel) would be designated as special protection zones year-round. No activities except research would be allowed. Other areas, such as Bush Key, East Key and the beaches of Loggerhead Key, might be designated special protection zones for part of the year when turtle and bird nesting is taking place. The southwestern half of Loggerhead Key, inland from the beach, would also be closed to human activity except research. Consumptive use of resources would be prohibited in the special protection **z**ones and the entire research natural area zone (46% of the park under the proposed plan). See the text following this table entitled "Why Implement a "No Take" Area?: Rationale for Developing a Research Natural Area at Dry Tortugas National Park" written by Dr. Robert Brock, Supervisory Marine Biologist at Everglades/Dry Tortugas National Park.
011.1, 033.1, 035.1, 035.2, 035.3, 035.13, 035.12, W5.1	Expand the research natural area.	The proposed action has been revised to simplify and expand (by 3%) the boundaries of the research natural area. The National Park Service will consider enlarging the research natural area in the future if warranted to achieve resource protection goals.
042.1	The amount of fish taken in the Dry Tortugas area by sport fishing is totally insignificant to the reproduction rate of the fish species represented there. Sport fishing has no adverse effects on turtles, birds, and water quality.	Scientific research (Ault, et al. 1998, Ault and Bohnsack 1999) has shown that reef fish stocks in the Dry Tortugas are deteriorating due to overfishing. For further details, see the text following this table entitled "Why Implement a "No Take" Area?: Rationale for Developing a Research Natural Area at Dry Tortugas National Park" written by Dr. Robert Brock, Supervisory Marine Biologist at Everglades/Dry Tortugas National Park.
012.1, 023.1	All fishing in and around the park should be prohibited	The National Park Service does not have jurisdiction outside of park boundaries. See the text following this table entitled "Why Implement a "No Take" Area?: Rationale for Developing a Research Natural Area at Dry Tortugas National Park" written by Dr. Robert Brock, Supervisory Marine Biologist at Everglades/Dry Tortugas National Park.
Anchoring and Mooring		
034.6	Allow anchoring in the research natural area with conditions.	Anchoring would continue to be permitted in most areas within zones other than the research natural area. Not allowing anchoring in the research natural area provides greater assurances that coral and other sensitive habitat/resources would be protected to the greatest extent feasible in conformance with overall RNA management objectives.
034.30	Consider mooring buoys in sensitive areas outside of the research natural area.	The text has been changed to show that mooring buoys in areas outside the research natural area could be used as a management tool when appropriate.
012.2; 016.1	Private boats should not be allowed to drop their anchors in or around the park.	Anchoring is not allowed in the research natural area in order to meet resource management objectives. Prohibiting anchors outside the research natural area (but within the park) is not warranted at this time. Anchoring would continue to be permitted in most areas and in zones other than the research natural area. Not allowing anchoring in the research natural area provides greater assurances that coral and other sensitive habitat/resources would be protected to the greatest extent feasible in conformance with overall RNA management objectives. Regulating anchoring or fishing outside the park is not within NPS authority/purview.

LETTER NUMBER/COMMENT NUMBER	COMMENT (PARAPHRASED)	Response
022.1	Use mooring buoys in ALL areas of the Dry Tortugas. Use anchors only in an emergency. To protect coral reefs, ban anchoring and provide mooring buoys.	Total elimination of anchors in all areas of the park is not necessary to meet resource management goals at this time. Not allowing anchoring in the research natural area provides greater assurances that coral and other sensitive habitat/resources are protected to the greatest extent feasible in conformance with overall RNA management objectives. Mooring buoys will be used as deemed appropriate to achieve zone objectives outside of the RNA.
Visitor Experience		
013.1	The plan should restrict the number of visitors by limiting island access to the "fast cat/Yankee Cats."	The plan will limit island access through a concession contract that provides service similar to current commercial access. The proposed action has been revised to reduce the maximum number of people arriving by ferry from 200 to 150 per day. More than one boat would be used in the operation, and staggered arrival and departure times at the fort would be used as a management tool to maintain carrying capacity numbers and disperse use. Private boating must be allowed but will be limited by carrying capacity. Impacts on resources do not justify eliminating private boats at this point in time.
013.4	The plan should limit number of overnighters who can camp on the island.	The proposed action has been revised to reduce the maximum campground capacity from 100 to 68 campers per night. A reservation system would be implemented to replace the first-come-first served system currently in use.
KW4.1	Designate section of beach for visitor to walk their pet dogs on Garden Key.	Bringing dogs to the park would conflict with the goal of protecting wildlife resources. No dogs will be allowed in the park.
018.1	Enforcement would be easier if no fishermen, lobster hunters, or divers were allowed.	Lobster hunting is not allowed; fishing would not be allowed in the research natural area in order to permit baseline monitoring; management zone boundaries have been modified to permit easier enforcement (see Alternative C map). As long as public use occurs in the park, there must be enforcement.
020.1	Don't allow any visitors unless they travel by private sailboat and tie up only to moorings.	Commercial services facilitate access to the park. The National Park Service is mandated to allow access to parks unless there is a resource issue that would preclude access.
030.1, 031.1, 034.4, 034.28, 034.39, 035.6, 035.14	Simplify the boundaries of the research natural area to enhance the understanding by visitors of where no-take regulations apply.	See revisions to the RNA boundary on the Alternative C map, to which we have added latitude and longitude markings.
032.3	Simplify or modify the names of the zones so that visitors can more easily understand them.	Zone names were selected to be consistent with the 1983 *General Management Plan* with the exception of the research natural area. "Research natural area" is a special designation used by federal agencies for areas dedicated to protecting biological diversity, nonmanipulative research, and visitor education. All zones are described in detail in this *General Management Plan Amendment*, and interpretive materials will be developed to explain the zoning scheme to the public
040.5; 035.18	NPS should designate scientifically defensible carrying capacities.	The preliminary capacities are based on the considerable experience and sound professional judgment of knowledgeable resource managers and carrying capacity experts (see the "Preparers and Consultants" section). Capacity numbers will be tested and adjusted further during later implementation plans that are called for in the general management plan (see "Recommendations for Future Research and Planning" section). This planning process will involve further analysis of park resources, identification of standards and indicators, the establishment of a monitoring program, and additional research into resource and visitor experience sensitivities. Capacities in the general management plan are set at levels that the experts feel would not irretrievably jeopardize resource quality. Note that carrying capacities have been modified in the final document.
Resource Protection		
017, 034.14, 034.15, 034.16, W5.2	Manage fish and wildlife resources with bag limits and seasons, catch and release not closures, restore fish and wildlife populations.	For the response to this comment, see the text following this table entitled "Why Implement a "No Take" Area?: Rationale for Developing a Research Natural Area at Dry Tortugas National Park" written by Dr. Robert Brock, Supervisory Marine Biologist at Everglades/Dry Tortugas National Park.
043.1	It is the opinion of the state historic preservation office that alternative E provides the best protection for the unique and important cultural resources located within the park.	It is agreed that alternative E would provide the best level of resource protection. However, the proposed action provides both resource protection and visitor use levels that allow for the fulfillment the park's purpose and mission goals.

LETTER NUMBER/COMMENT NUMBER	COMMENT (PARAPHRASED)	Response
044	The elkhorn and fused staghorn coral formations in the Long Key-Bush Key tidal channel (sometimes called the 9-foot channel) are at risk. We have seen 40-foot lobster boats enter and exit the Garden Key anchorage using this channel. Broken branches of elkhorn coral are evidence that boats have run into the elkhorn coral. We recommend 9-foot channel be closed to vessel traffic, with the exception of those powered by oar or paddle. NPS staff could still use it for emergencies, but not routine activities. Potential concessioners should be discouraged from using the elkhorn coral patch as a routine tourist destination. Tidal current can be strong here. Many tourists have minimal snorkeling skills and could be injured and also damage the coral in this shallow areas. The status (patch and condition) of the coral should be monitored periodically.	The elkhorn and fused staghorn formations in the Long Key/Bush Key channel would be designated a special protection zone year-round. This area would be closed to visitor use and vessel traffic to provide added protection for this at-risk community. Limited research and monitoring would occur to assess resource conditions in this area. The boundaries of the zone may be adjusted, or management could be changed, in response to changing resource conditions.
H4.1	Allow net casting for bait fish.	This is not a GMP level issue. It is more appropriately answered in future implementation plans.
Entrance Fee		
013.3	Boaters should be charged a “per night” fee for anchorage around the fort.	All private boats will be charged an entrance fee on a schedule similar to the fees charged at other units, with multi-day and annual passes available.
Inadequacy or Accuracy of Information/Analysis		
039.1	More information is needed to fully assess the impacts. Management plan implementation, enforcement, and impact mitigation of both existing conditions and possible future impacts warrant further discussion in the *Final Environmental Impact Statement.*	See first response under Implementation Plans, below.
039.2	Page iii gives a summary of the ecological, cultural and historical significance of the Keys in Dry Tortugas National Park, with the exception of East Key. Page 53 contains a map that shows East Key as a combination of a natural zone and a historic zone. Please clarify East Key’s ecological and historical significance	Text has been added to pages iii and 6 to explain the significance of East Key. The Alternative A map has been redone to better show the 1983 zoning scheme for the park, including East Key.
040.7	The research and monitoring component should be more comprehensive.	See below under implementation plans.
034.25, 034.31, 035.7	Carrying capacity numbers should be adjusted for specific sites.	Carrying capacities have been modified in the final document.

LETTER NUMBER/COMMENT NUMBER	COMMENT (PARAPHRASED)	Response
Implementation Plans (Later Details)		
032.1, 032.2, 032.3, 032.5, 034.7. 034.8, 034.9, 034.10, 034.11, 034.12, 034.013, 34.017, 034.18, 034.19, 034.20, 034.21, 034.22, 034.24, 034.33, 034.34, 034.35, 034.36, 034.37, 034.38, 035.1, 035.4, 035.5, 039.3, 039.4, 039.6, 040.2, 040.5	More details on education and interpretation component, staffing, future research, monitoring (including selecting standards and indicators), specific concessions duties and schedules, and strategies to manage for capacities at specific sites (e.g., campground reservations) are needed. Page 133 mentions the park has solicited proposals for the preparation of solid waste management plan. In light of the Pollution Prevention Act passed by Congress in 1990, NPS should examine wastes produced in the park to determine ways to prevent or reduce that waste. The DEIS does not mention whether the park will maintain a recycling program as part of the management plan. The document should state the proposed measures to enforce regulations and manage visitor use of Dry Tortugas National Park with regard to the alternatives. The draft plan does not define or identify indicators for assessing ecological integrity. The document neither provides nor discusses measurable activities that could be used to manage natural resources in the park; does not mention whether a detailed implementation plan is forthcoming. More information should be included in the final EIS to describe how the NPS plans to manage visitors and impacts in the park. Further frequency and parameters of ecosystem monitoring should also be included.	General management plans in the National Park Service are intended to establish general, conceptual guidance for the management of the parks. General management plans document the conceptual decisions upon which all future plans and management actions will be based. General management plans are intended to apply to parks for a 15-year time period. For these reasons, parks undertake subsequent planning that tiers from the guidance of the general management plans. This second stage of planning provides more details for park management. They implement the concepts of the general management plan. Examples are resource management plans and interpretation plans. These implementation plans focus on activities, programs, or projects needed to achieve the mission goals and management prescriptions of the general management plan. Implementation planning generally is deferred until an activity or project under consideration has sufficient priority to indicate that action will be taken within the next several years. Sometimes the implementation plans immediately follow the general management plans to outline the specific actions or decisions needed to ensure adherence to the general management plan's general concepts. The waste management plan, with a recycling element, is an example of a more detailed implementation plan needed at this time. Also needed immediately is a detailed monitoring plan, with standards and indicators to measure the effectiveness of management actions being taken to avoid or correct impacts defined as unacceptable in the general management plan. Such a monitoring plan likely will be modified as change occurs in the resources. Likewise, an interpretive plan, outlining specific stories to be told and the media and staff needed to tell them with today's technology and resources is needed. Adaptability is one of the reasons to do such implementation planning after the long-range GMP planning has been done.
039.5	The environmental impact statement should discuss procedures for events such as unearthing archaeological sites during prospective ground-disturbing activities such as building repair and renovation.	See cultural resources" in "Mitigation Measures" section (page 82 of draft.)
039.7	The draft environmental impact statement does not include information regarding plans to mitigate impacts that are already present at the park. The document does not state whether efforts have been made to identify and quantify mitigation needs in the park, or whether any plans have been made for mitigation. Is there a time frame for mitigating areas, which need restoration and if so, what is the schedule for implementing the actions?	The goal of the research natural area is to mitigate fishing/coral reef impacts in a pristine system. All other mitigation measures would be discussed in subsequent resource management plans.
030.1 W7.1	Simplify the boundaries of the research natural area to enhance enforcement of where no-take regulations apply.	The RNA boundary has been revised. See the revision to Alternative C map.
040.7	The research and monitoring component should be more comprehensive.	
Commercial Services		
013.2, 019.1, 025.1, 034.20, 034.28, 036.1, 034.23, 034.32, KW7.1	Competition -- One comment (13) supported only one concession contract for transportation to the park. The rest of the comments supported more than one concession contract to promote competition citing that costs could be reduced, service would be better, and the quality of service would stagnate without competition.	The 1965 statute (Concessions Policy Act) that authorized *long-term* concessions contracts intended to minimize the scope of commercial operations (imprint on the land) by discouraging duplicate operations, hence competition. This has been the traditional way to manage concessions in parks for years. Although the 1998 statute states that contracts will not contain a clause granting an exclusive right to provide services, this does not mean that parks will necessarily have more than one operator providing a given service. However, the process of evaluating and selecting an operator is a competitive process. The decision to have a single ferry operator for Dry Tortugas is based on the need to provide an operator with a feasible business opportunity while providing additional funds for the park under the 1998 legislation. The concessioners' rates will have to be approved by the National Park Service and will be based on similar services operating outside of the park. The quality of services provided by the concessioner will be regularly evaluated.

LETTER NUMBER/COMMENT NUMBER	COMMENT (PARAPHRASED)	Response
036.2, 037.2	One Vessel -- The concept in the draft GMP of having one large "mother ship" ferry was challenged in favor of multiple ferry vessels. The advantages of multiple vessels cited include providing a back-up in case of mechanical or weather problems, the remoteness of the park, impacts of a large ship on the "adventure" visitor experience in the park, less capital expense, and staggered schedules which would alleviate point loading at the fort.	Alternative C stated that the long-term goal of the park was to have a "self contained vessel." This has been changed to say a "self contained **ferry operation.**" The intent is that the operation not be a strain on the existing infrastructure of the park, primarily the water and waste systems, dock and mooring space, and employee housing. Many of the advantages of a multiple vessel operation are correct. The proposal will be change to allow for "more than one boat."
036.3, 036.6	Don't eliminate the existing commercial operators or write vessel specifications that would preclude some contract bidders.	The Park Service is required to follow federal procurement and contracting regulations that strictly prohibit writing contracts that favor one party over another. The prospectus will be written to facilitate equal competition between bidders.
36.4, 37.3	Interim/Trial Period -- Both commentors suggested that the initial operation be with two contracts similar to existing conditions. This would allow time for an evaluation of numbers of vessels, side excursion trips, and other details of the operation.	The Park Service has the legal and contractual right to include an evaluation period as part of all contracts for new services to allow for necessary adjustments to the contract. If the Park Service issues one contract initially they have the right to issue a second contract if deemed appropriate; however, they can't withdraw one of two contracts if that is deemed appropriate.
036.5, 037.1	These comments questioned the draft plan's assessment of who would participate in side excursion trips. They contended that most existing visitors are "day trippers" interested in touring style excursion in stable, covered vessels and not inclined towards snorkeling, SCUBA diving, kayaking, or any of the more adventurous types of water activities. They cite weather and rough, open seas as being intimidating to most visitors.	The assessment of the current visitor interest in "touring style excursions" is correct, and with the aging of the population it would be expected that interest in those types of activities would continue. Informal discussions with tour providers in Key West indicate that if more adventurous types of water activities were aggressively marketed there would also be a desire to participate in those activities, given the near pristine resource conditions in the park compared to other opportunities in the region. Both types of experiences are appropriate, nonconsumptive uses. The Park Service will consider both when identifying specific activities during the prospectus development process and the evaluation period after a contract is awarded.
38.1	The allocations of visitors use (ferry – 200/day and seaplane – 50/day) do not take into consideration several factors that affect commercial operations at DRTO. These include the 20% Key West travel agent commission; 30% higher costs for seaplanes to operate in salt water; the variability of/dependency on the weather; and the average of "ideal days", when the services run at capacity, and the off season/bad weather days, when the service may not even operate.	The allocations of visitor use in the proposal are based on the ability of the resources to accommodate use without unacceptable impacts – carrying capacity. The National Park Service is required by law to consider carrying capacity in general management planning. The allocations are based on overall carrying capacity of the park and an equitable distribution between different user groups. The factors cited in the comments are economic factors and are also important. They were considered when the economic feasibility of the proposal was evaluated and contributed to the decisions for only one seaplane contract and one ferry contract. The allocations exceed what any one operator currently is allowed ensuring the economic feasibility of the proposal and respecting the ability of the resources to accommodate use without unacceptable impacts.
034.18, 034.28, 035.5, 035.15	Commercial service operations should not be solely responsible for interpretation in the park but should provide guided/supervised excursion trips (guide to visitor ratio of 1:8).	The Park Service has no intention of having the commercial operators doing all the interpretation and education in the park. They are intended to be partners in providing this service to visitors. NPS staff will take the lead in providing these services. NPS efforts will be supplemented by commercial staff that is trained by NPS staff to a competency equivalent to a seasonal NPS employee.
034.19, 035.19	Commercial operators should provide "low cost fare" days for economically challenged visitors that could not otherwise afford to go to DRTO.	The National Park Service cannot require in a contract that a concessioner subsidize trips. The NPS intent is to keep the cost of visiting the park as low as possible so as many visitors as possible can visit.
020.2, 041.1	Stopping all commercial visits to DRTO will reduce visitation by 90% and dramatically reduce visitor use associated impacts.	The NPS mission, and a primary objective of the park, is to provide for visitor enjoyment of park resources in a manner that leaves them unimpaired for future generations. Commercial transportation of visitors to the park is appropriate to enable public appreciation of park resources and values. At this time it would not be appropriate to eliminate this segment of visitors. The proposed action has been revised to lower the maximum number of visitors that would arrive by commercial ferry or seaplane from 250 to 210 people per day. The impacts of this level of use on resources and the visitor experience will be monitored, and use levels will be adjusted if impacts are unacceptable.
034.31	While it is commendable that the NPS attempt to enable concessioners to make an economic livelihood it is not in the criteria of park goals.	It is in the park goals to enhance visitor experience. The Park Service proposes to use partners (commercial operators) to accomplish this goal. It is not in the best interest of the Park Service, commercial operator, or visitors to propose a concession that is not economically feasible.
034.20	Concessions have to meet NPS "necessary and appropriate" criteria and specific standards would not be arbitrary and capricious to ensure compatibility with park objectives of protecting, conserving, and preserving resources.	The plan has demonstrated that transportation to the park is necessary and appropriate to accomplish the goals of resource protection, visitor experience, and education. Some of the detailed "specific standards" that would be imposed on the commercial operator are identified in the plan at a level appropriate for a general management plan. The remaining specific details to ensure resource protection will be developed during the prospectus process and included in the contract.

WHY IMPLEMENT A "NO TAKE" AREA?: RATIONALE FOR DEVELOPING A RESEARCH NATURAL AREA AT DRY TORTUGAS NATIONAL PARK

by Dr. Robert Brock, Supervisory Marine Biologist, Everglades/Dry Tortugas National Park

Introduction

In 1984, Dry Tortugas National Park (the park) had approximately 18,000 visitors. In 1992, visitation was approximately 24,000, an increase of a seemingly unalarming 25% over this time period. In 2000, however, it is estimated that visitation will be approximately 100,000, an incredible increase of 550% since the first surveys were taken in 1984. Although there is little argument that increased visitation to the park is in large part due to the advent of the commercial ferry service out of Key West, it also appears that the number of private boaters visiting the park has likely increased dramatically as well. In 1988, there were 17,499 boats registered in Monroe County (Florida Keys). According to the Monroe County Tax Collectors Office (personal communication), that number had steadily risen each year to 25,862 in 1999, an increase of 48%. There is little doubt that boats are bigger and faster today with improved navigational equipment (GPS), making a private journey to the park certainly more plausible. This increase in visitation and presumably increased recreational activities such as snorkeling, diving, and fishing are of great concern to the National Park Service (NPS) in being able to fulfill their legislated mandates and mission goals.

Congressional Legislation

The NPS was created "to *conserve* the scenery and the natural and historic objects herein and to provide for the enjoyment of the same in such a manner and by such means as well leave them *unimpaired* for the enjoyment of future generations" (Organic Act of 1916). In 1992, Public Law 102-525 established the Dry Tortugas National Park to (a) *protect* and interpret a pristine subtropical marine ecosystem, including an *intact* coral reef community; (b) to *protect* fish and wildlife; (c) to *protect* the pristine natural environment of the Dry Tortugas group of islands; (d) to *preserve* and *protect* submerged cultural resources; and (e) in a manner consistent with the above, provide opportunities for scientific research. In 1998, Executive Order 13089 mandated that Federal agencies "*preserve* and *protect* the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment." Clearly, Congressional enabling legislation and law demands that the park preserve and protect fish and wildlife and their essential habitat (see "Servicewide Laws and Policies and Special Park Mandates and Agreements" section). A "no take" research natural area (RNA) is the best and most appropriate mechanism that exits to fulfill the NPS mission and the park's enabling legislation.

Scientific Studies

During the development process of park's RNA alternatives, several different no-take evaluations were conducted using the best available scientific literature and information to provide the broadest possible protection and coverage for threatened, endangered, and rare marine resources. Historically, numerous fisheries surveys have been conducted in and adjacent to the park (Schmidt et al.1999). In fulfilling no-take RNA objectives/criteria, boundary alternatives were based on regional fisheries surveys, physical oceanography and larval dispersal pathways, and benthic habitat investigations. Fisheries surveys recently summarized by Ault et al. (1998)

involve 35 economically and ecologically important Florida Keys reef fish stocks being quantitatively compared using a systems approach that integrates sampling, statistics, and mathematical modeling. These data, collected from 1979 to 1996 (and still being collected) use a underwater visual fish census survey technique to (1) develop a reef fish population abundance index for individual species; (2) calculate the average length of the fish in the exploitable phase of the stock; and (3) correlate this information with head-boat catches in the Florida Keys. Results indicated that 13 of 16 grouper (81%), 7 of 13 snappers (54%) and 2 of 5 grunts (40%) were by definition overfished, or below the federal-state 30% SPR (Spawning Potential Ratio) threshold minimum standard for overfishing. These data indicated, for example, black grouper are currently seriously overfished. The average size of black grouper caught in 1997 is only 40% of what it was 50 years ago (22.5 versus 9 lbs.), and in terms of population stability and resiliency, black grouper SSB (Spawning Stock Biomass) is now only 5% of what it once was.

Data was further refined for making grouper/snapper/grunt species comparisons for locations sampled inside and outside the park boundaries using density (mean abundance) and fish size assessments. This information can be found in Schmidt et al. (1999). Specific criteria (boundary options) used in the RNA developmental process also suggested that the proposed park research natural area should be of sufficient size to contain and provide the greatest benefit in protecting important "apex predator species" such as overfished snappers and groupers. For each of the 3 RNA alternatives, fishery species were evaluated in a series of 15 assessments of fishery stock indicators — using density of recruits, adults (exploitable fish), and fish size as shown in table F-10 in the *Draft General Management Plan Amendment / Environmental Impact Statement*.

In addition to NOAA's and Univ. of Miami's stationary visual fish census surveys (Ault et al. (1998), a volunteer roving underwater fish census technique (RDT) has been developed by the Reef Environmental Education Foundation (REEF) and is used at the park and throughout the Florida Keys in collaboration with NOAA/UM. Species occurrence and abundance is obtained using a frequency of occurrence technique that allows comparisons between the two surveys. REEF stations are currently being compared for fish abundance indices throughout the Florida Keys and both inside and outside DRTO and the proposed Sanctuary's proposed Tortugas Ecological Reserve (TER). (Schmitt and Sullivan 1996, Schmidt et al. 1999, Schmitt et al. 1999).

Ecosystem Approach

The RNA developmental process also considered the "larger ecosystem" as a specific objective when evaluating the appropriateness of the boundaries for the various alternatives. This objective was satisfied when the park's RNA boundary was contiguous or shared a common boundary with the Florida Keys National Marine Sanctuary' proposed ecological reserve. It is hypothesized that larvae produced by spawning aggregations found in the deeper waters of the sanctuary's ecological reserve will settle and seek both refuge and food in the park's shallow water reefs and sea grass beds.

Summary

In summary, conventional species-specific fishery management tools such as allowable catch quotas, size, bag, or trip limits have not prevented overfishing or habitat damage.
The enabling legislation that created Dry Tortugas National Park is crystal clear in that fish and wildlife are to be preserved and protected and that the ecosystem is to remain intact and unimpaired. Extracting fish and wildlife from the park clearly goes against this legislative

mandate. A good example of why the park took the lead in developing this protective reserve can be compared with human health. A person does not take up preventative measures (i.e., improved diet, exercise) *after* a health problem is discovered; a person takes up these preventive measures so that a health problem will not occur. The Park Service should not wait until resource damage (perhaps irreparable) is obvious, the Park Service is being proactive in ensuring that resource damage such as depleted fish stocks is not allowed to occur. With population estimates of south Florida projected to add millions more people to the greater ecosystem, the park's research natural area will serve as an important "environmental insurance" against these added pressures.

References

Ault, J. S., J. A. Bohnsack, and G. A. Meester. 1998.
Schmidt, T. W., J. S Ault, and J. A. Bohnsack. 1999.
Schmitt, E, F., K. M. Sullivan-Sealy, and D. W. Feeley. 1999.
Schmitt, E. F. and K. M. Sullivan. 1996.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

July 31, 2000

4EAD

Mr. Richard G. Ring, Superintendent
Everglades and Dry Tortugas National Parks
Attn: Mr. Jeffery Scott
40001 State Road 9336
Homestead, Florida 33034-6733

RE: EPA Review and Comments on
Draft General Management Plan Amendment
Environmental Impact Statement
Dry Tortugas National Park, Monroe County, Florida
CEQ No. 000192

Dear Superintendent Ring:

Pursuant to Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the subject Draft Supplemental Environmental Impact Statement (DSEIS). The document provides information to educate the public regarding general and project-specific environmental impacts and analysis procedures. We appreciate your consistency with the public review and disclosure aspects of the NEPA process. Overall, the document is clearly written and well-organized.

The Management Plan Amendment is to set forth the management direction for the park for the next 15-20 years, replacing the previous Management Plan prepared in 1983. This DEIS presents and analyzes five alternative future management directions, (including the No-Action Alternative and four action alternatives) for management and use of the Dry Tortugas National Park.

Based on our review, we rate the DEIS "EC-2", that is, we have environmental concerns about the project, and more information is needed to fully assess the impacts. In particular, management plan implementation, enforcement, and impact mitigation of both existing conditions and possible future impacts warrant further discussion in the Final EIS. Our detailed comments are attached.

Thank you for the opportunity to comment on this project. If you have any questions or require technical assistance you may contact Ramona McConney of my staff at (404) 562-9615.

Sincerely,

Heinz J. Mueller, Chief
Office of Environmental Assessment

Attachment

Comments on
Draft Environmental Impact Statement (DEIS)
Dry Tortugas National Park, Monroe County, Florida
CEQ No. 000192

General - Page iii gives a summary of the ecological, cultural and historical significance of the Keys in Dry Tortugas National Park, with the exception of East Key. Page 53 contains a map that shows East Key as a combination of a natural zone and a historic zone. Please clarify East Key's ecological and historical significance.

Waste Handling - Page 133 mentions that the park has solicited proposals for the preparation of a solid waste management plan. In light of the Pollution Prevention Act passed by Congress in 1990, we recommend that the NPS examine wastes produced in the Park to determine ways to prevent or reduce that waste. The DEIS does not mention whether the Park will maintain a recycling program as part of the management plan. If the plan will include recycling, please give further information regarding these activities in the Final EIS.

In addition, procurement of recycled goods is necessary to stimulate markets and complete the recycling "loop". We encourage the NPS, as a consumer and purchaser of goods and services, to make purchasing decisions with this in mind. Specifications for the use of recycled goods may be incorporated into contracts for goods and services.

Alternatives - Alternative C is identified in the document as the proposed action/preferred future direction. This option would include establishing a research natural area zone, along with directing and structuring visitor use of the Park. It has been noted that current management conditions have resulted in impacts to the Park from visitors, including adverse affects on wildlife populations and cultural resources (page 205). The DEIS also notes the increasing numbers of visitors to the Park, which escalates the need to protect the area's natural resources.

Endangered Species: We note that federally-protected species are listed for the area by the U.S. Fish and Wildlife Service (FWS). EPA principally defers to the FWS regarding endangered species assessments and encourages NPS to continue coordination with the FWS as appropriate.

Vessel Maintenance/Safety Issues: Marine Operations (page 133) states that there is no cyclic nor continued funding for the upkeep of the Park's boats and related gear. However, the Visitor Protection section of page 133 lists park vessel upkeep and safety equipment upkeep amongst the duties of the Visitor Protection Staff, which apparently does have funding. Please clarify.

Management Details: The document neither provides nor discusses measurable activities that could be used to manage natural resources in the Park. The document also does not mention whether a detailed implementation plan is forthcoming from NPS. More information should be included in the Final EIS to describe how the NPS plans to manage visitors and impacts in the National Park. Further information regarding frequency and parameters of ecosystem monitoring should also be included.

Cultural Resources: EPA appreciates the discussion of historic preservation and compliance with Section 106 in the DEIS. The document discusses the inclusion of Fort Jefferson on the National Register of Historic Places. In addition, the EIS should discuss procedures for events such as unearthing archaeological sites during prospective ground-disturbing activities such as building repair and renovation. Such procedures should include work cessation in the area until SHPO approval of continued construction.

Enforcement: The document should state the proposed measures to enforce regulations and manage visitor use of Dry Tortugas National Park with regard to the alternatives.

EPA concurs that a plan to communicate with visitors regarding the environment and conservation may be beneficial; this option is included in the action alternatives. Better communication may result in better visitor compliance with regulations and support of conservation measures, resulting in fewer impacts to the environment.

Environmental Monitoring and Restoration: The DEIS does not include information regarding plans to mitigate impacts which are already present at the Park. While the document states the need to restore previously impacted areas, it is unclear how the new Management Plan would address this issue. The document does not state whether efforts been made to identify and quantify mitigation needs in the Park, or whether any plans been made for mitigation. Is there a time frame for mitigating areas which need restoration, and, if so, what is the schedule for implementing the actions? Please clarify.

JUL-05-2000 15:48 FL DEP PARKS & CONS [illegible]

COUNTY: State

DATE: 06/05/2000
COMMENTS DUE DATE: 07/05/2000
CLEARANCE DUE DATE: 07/20/2000
SAI#: FL200006050404C

Message:

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
X Agriculture Community Affairs Environmental Protection Fish & Wildlife Conserv. Comm State Transportation	South Florida WMD	Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

___ Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

_X_ Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

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___ Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

National Park Service - Draft General Management Plan Amendment/Environmental Impact Statement Dry Tortugas National Park - Monroe County, Florida. Available on the internet at: http://www.nps.gov/drto/planning/ever/drto/dgmpaels/index.html

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- [x] No Comment
- [ ] Comments Attached
- [ ] Not Applicable

Federal Consistency

- [x] No Comment/Consistent
- [ ] Consistent/Comments Attached
- [ ] Inconsistent/Comments Attached
- [ ] Not Applicable

From:
Jack P. Dodd, Planner
Division of Forestry
Forest Resource Planning
& Support Services Bureau
3125 Conner Blvd., Mail Stop C23
Tallahassee, FL 32399-1650

Division/Bureau: _____

Reviewer: _____

Date: 7-5-00

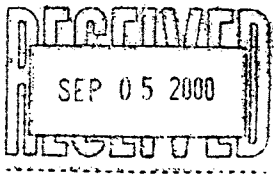
STATE OF FLORIDA

DEPARTMENT OF COMMUNITY AFFAIRS

"Dedicated to making Florida a better place to call home"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary



August 29, 2000

Mr. Richard G. Ring, Superintendent
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034-6733

RE: National Park Service - Draft General Management Plan Amendment/Environmental Impact Statement Dry Tortugas National Park - Monroe County, Florida
SAI: FL200006050404C

Dear Mr. Ring:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

The Department of Environmental Protection (DEP) offers several comments regarding the proposed project and notes that if additional docking or mooring facilities are required to complement the selected alternative, the applicant will need to apply to the DEP's Ft. Myers District office for an Environmental Resource Permit. Please refer to the enclosed DEP comments.

The Department of State (DOS) notes that it is the opinion of the State Historic Preservation Office that Alternative E provides the best protection for the unique and important cultural resources located within the park. Please refer to the enclosed DOS comments.

Based on the information contained in the above-referenced document and the enclosed comments provided by our reviewing agencies, the state has determined that the above-referenced project is consistent with the Florida Coastal Management Program.

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100
Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781
Internet address: http://www.dca.state.fl.us

CRITICAL STATE CONCERN FIELD OFFICE
2796 Overseas Highway, Suite 212
Marathon, FL 33050-2227
(305) 289-2402

COMMUNITY PLANNING
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-2356

EMERGENCY MANAGEMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 413-9969

HOUSING & COMMUNITY DEVELOPMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-7956

In addition, the South Florida Regional Planning Council (SFRPC) has identified the policies and goals of its Strategic Regional Policy Plan which may apply to the proposed activity. The comments provided by the SFRPC are enclosed for your review and consideration.

Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 414-5495.

Sincerely,

Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/cc

Enclosures

cc: Robert Hall, Department of Environmental Protection
Janet Snyder Matthews, Department of State
John Hulsey, South Florida Regional Planning Council

Department of
Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

June 30, 2000

Ms. Cherie Trainor
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Re: National Park Service, Draft General Management Plan Amendment, Environmental Impact Statement, Dry Tortugas National Park, Monroe County

SAI: FL200006050404C

Dear Ms. Trainor:

This Department has reviewed the above-described project proposal and based on the information provided, we submit the following comments and recommendations regarding the environmental aspects of the project.

It appears that Alternative C, the selected alternative, relies totally on all waste generation to be "self contained". Consequently, waste would not be treated or disposed of in the Park, beyond that which is currently in place. Any increase in Park visitations and usage appears to be the responsibility of concessionaires who provide those necessary services. However, if additional docking or mooring facilities are required to complement the selected alternative, the applicant will need to apply to the Department's District office in Ft. Myers for an Environmental Resource Permit.

Thank you for the opportunity of commenting on this proposal. If you have any questions regarding this letter please give me a call at (850) 487-2231.

Sincerely,

Robert W. Hall
Office of Legislative and Governmental Affairs

cc: Ron Blackburn

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State

DIVISION OF HISTORICAL RESOURCES

Ms. Cheri Trainor
Florida Department of Community Affairs
2555 Shumard Oak Blvd.
Tallahassee, Florida 32399-2100

July 13, 2000

RE: DHR No. 2000-04007 (Ref: 2000-04210)
Review Request: *Dry Tortugas National Park-Draft General Management Plan Amendment Environmental Impact Statement*
FL 2000 06-0504C

Dear Ms. Trainor:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), as well as the provisions contained in Chapter 267.061, *Florida Statutes*, we have reviewed the above referenced project for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical or architectural value.

After careful review of the Dry Tortugas National Park Draft General Management Plan Amendment Environmental Impact Statement, it is the opinion of the State Historic Preservation Office that Alternative E provides the best protection for the unique and important cultural resources located within the park.

If you have any questions concerning our comments, please contact Brian Yates, Historic Sites Specialist, at (850) 487-2333 or 1-800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Yby

COUNTY: State

Message:

DATE: 06/05/2000
COMMENTS DUE DATE: 07/05/2000
CLEARANCE DUE DATE: 07/20/2000
SAI#: FL200006050404C

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection Fish & Wildlife Conserv. Comm State X Transportation	South Florida WMD	Environmental Policy/C & ED

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

— Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

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Project Description:

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(850) 922-5438 (SC 292-5438)
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EO. 12372/NEPA

☒ No Comment
☐ Comments Attached
☐ Not Applicable

Federal Consistency

☐ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:
Division/Bureau: FDOT D6 Planning
Reviewer: Jo Laurie Penrose
Date: June 12, 2000

COUNTY: State

Message: GCI ✓

DATE: 06/05/2000
COMMENTS DUE DATE: 07/05/2000
CLEARANCE DUE DATE: 07/20/2000
SAI#: FL200006050404

STATE AGENCIES	WATER MANAGEMENT DISTRICTS	OPB POLICY UNITS
Agriculture Community Affairs Environmental Protection X Fish & Wildlife Conserv. Comm State Transportation	South Florida WMD	Environmental Policy/C & ED

RECEIVED BY GFC
JUN 0 6 2000
OFFICE OF ENVIRONMENTAL SERVICES

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evalutation and is categorized as one of the following:

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To: Florida State Clearinghouse
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Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- ☐ No Comment
- ☐ Comments Attached
- ☐ Not Applicable

Federal Consistency

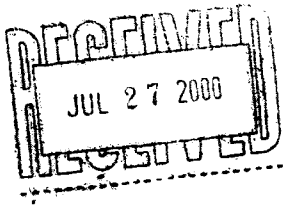
- ☑ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From:
Division/Bureau: [signature]
Reviewer: [signature]
Date: 6-8-00

FLORIDA MARINE RESEARCH INSTITUTE
100 Eighth Avenue SE
St. Petersburg, FL 33701-5095
(727) 896-8626

21 July, 2000

Richard Ring, Superintendent
Everglades and Dry Tortugas National Parks
404,001 State Road 9336
Homestead, FL 33034



Dear Superintendent Ring:

We participated in the public forum on the Dry Tortugas National Park, Management Plan Amendment, Environmental Impact Statement in St. Petersburg. Having been actively involved with Dry Tortugas since 1975, we were very interested in the presentation and materials available at the forum. We are supportive of zoning processes to protect resources and provide visitors with opportunities to experience the natural wonders of Dry Tortugas National Park. However, as you are well aware, protecting the more sensitive resources is of prime importance. A short list of recommendations follow for your consideration..

The elkhorn (*Acropora palmata* (Lamarck, 1816) and fused staghorn coral (*Acropora prolifera*, Lamarck, 1816) formations in the Long Key-Bush Key tidal channel (sometimes referred to as "nine foot channel.") are at risk. This elkhorn coral patch is the only place in Dry Tortugas where elkhorn coral is found. It is risky to allow non-NPS boat operators to navigate through this channel. We have seen very large boats (forty foot lobster boats) enter and exit the Garden Key anchorage using nine foot channel. Broken branches of elkhorn coral are evidence that boats have run into the elkhorn coral patch. We recommend nine-foot channel be closed to vessel traffic, with the exception of those powered by oar or paddle. NPS staff could still use nine-foot channel for emergencies, but not for routine activities. Potential concessionaires should be discouraged from using the elkhorn coral patch as a routine tourist destination. Tidal current can be strong in this channel. Many tourists have minimal snorkeling skills and could be injured and also damage to the elkhorn coral in this shallow area. The status (patch size and condition) of the elkhorn coral should be monitored periodically.

Patch reefs west of Loggerhead Key, referred to as, "Little Africa", have been impacted by vessel groundings. In 1995, we attempted to install anchor moorings and "restricted area" buoys in the area. However, we were unsuccessful because the substrate was not suitable for installing eyebolts. Plan C should protect this area by prohibiting anchoring in the area. If this area becomes designated as a tourist destination, a mooring would be beneficial. Monitoring of Little Africa should be considered part of the management of the area.

The area adjacent to the west moat wall is now the prime shallow-water snorkeling site. For a tentative swimmer the amenities are outstanding. The area is protected from currents, waves, and boats. The seascape is very captivating: the wall and debris are veneered with reef plants and animals, and fish including a small nurse shark which darts in and out of the caves and crevices. It is an outstanding place to reef watch with minimal risk or difficulty. There is little evidence of degradation as a result of relatively high visitor use. Modest monitoring of the area should be conducted including data on visitation. A simple sign in and out clipboard on the moat wall using underwater paper would suffice. The trend is for increased usage and making sure the area is not "trampled" should be a priority.

We strongly support a Loggerhead Key Research facility. Lodging besides the light keepers house should include a large kitchen area, bathroom and space where computers can be used. A laboratory with basic infrastructure would be a great asset. Cargo containers modified to be self-sufficient labs (water, electricity air conditioning, lab benches, fume hood), often used on research vessels would be an efficient way to quickly put in a system with minimal construction.

In consideration of a Loggerhead Key Research facility, moving the dive locker in the dock house at Garden Key to Loggerhead Key could provide support for diving operations.
If you have six divers doing two or three dives a day for a week, you are in need of supporting 18 cylinders a day or 90 cylinders a week. It would be much more productive to refill on site.
than hauling cylinders from Key West to Dry Tortugas.

Thank you for considering our comments and recommendations.

Sincerely,

Walter C. Jaap and Jennifer L. Wheaton
Coral Reef Research Group, FWCC

South
Florida
Regional
Planning
Council

July 5, 2000

Ms. Cherie Trainor
Florida Coastal Management Program
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

RE: SFRPC #00-0620, SAI #FL200006050404C - Request for comments on the Draft General Management Plan Amendment/Environmental Impact Statement, Dry Tortugas National Park, Monroe County.

Dear Ms. Trainor:

We have reviewed the above-referenced permit application and have the following comments:

The draft management plan, as proposed, is generally consistent with the goals and policies of the *Strategic Regional Policy Plan for South Florida*, specifically the following:

Strategic Regional Goal

3.8 Enhance and preserve natural system values of South Florida's shorelines, estuaries, benthic communities, fisheries, and associated habitats, including but not limited to, Florida Bay, Biscayne Bay and the coral reef tract.

Regional Policies

3.8.1 Enhance and preserve natural shoreline characteristics through requirements resulting from the review of proposed projects and in the implementation of ICE, including but not limited to, mangroves, beaches and dunes through prohibition of structural shoreline stabilization methods except to protect existing navigation channels, maintain reasonable riparian access, or allow an activity in the public interest as determined by applicable state and federal permitting criteria.

3.8.2 Enhance and preserve benthic communities, including but not limited to seagrass and shellfish beds, and coral habitats, by allowing only that dredge and fill activity, artificial shading of habitat areas, or destruction from boats that is the least amount practicable, and by encouraging permanent mooring facilities. Dredge and fill activities may occur on submerged lands in the Florida Keys only as permitted by the Monroe County Land Development Regulations. It must be demonstrated pursuant to the review of the proposed project features that the activities included in the proposed project do not cause permanent, adverse natural system impacts.

3.8.3 As a result of proposed project reviews, include conditions that result in a project that enhances and preserves marine and estuarine water quality by:

3440 Hollywood Boulevard, Suite 140, Hollywood, Florida 33021
Broward (954) 985-4416, Area Codes 305, 407 and 561 (800) 985-4416
SunCom 473-4416, FAX (954) 985-4417, SunCom FAX 473-4417
e-mail sfadmin@sfrpc.com

a) improving the timing and quality of freshwater inflows;
b) reducing turbidity, nutrient loading and bacterial loading from wastewater facilities and vessels;
c) reducing the number of improperly maintained stormwater systems; and
d) requiring port facilities and marinas to implement hazardous materials spill plans.

3.8.4 Enhance and preserve commercial and sports fisheries through monitoring, research, best management practices for fish harvesting and protection of nursery habitat and include the resulting information in educational programs throughout the region. Identified nursery habitat shall be protected through the inclusion of suitable habitat protective features including, but not limited to:

a) avoidance of project impacts within habitat area;
b) replacement of habitat area impacted by proposed project; or
c) improvement of remaining habitat area within remainder of proposed project area.

3.8.5 Enhance and preserve habitat for endangered and threatened marine species by the preservation of identified endangered species habitat and populations. For threatened species or species of critical concern, on-site preservation will be required unless it is demonstrated that off-site mitigation will not adversely impact the viability or number of individuals of the species.

3.8.6 Development of meaningful best management practices for fish harvesting.

Thank you for the opportunity to comment. We would appreciate being kept informed on the progress of this project. Please do not hesitate to call if you have any questions or comments.

Sincerely,

John E. Hulsey, AICP
Senior Planner

JEH/cp

PUBLIC COMMENT

By Jack Sobel

The Center for Marine Conservation

MR. SOBEL: Good afternoon, and thank you for the opportunity to present CMC's viewpoints. We will be submitting more detailed written comments.

CMC is a 100,000-member-plus national organization committed to marine conservation based on sound science, with a strong component of empowering citizens to protect their oceans.

I have a number of points to make today, and I will try to go through them quickly.

Ecological reserves, no-take reserves, is an issue that we started to become involved in at the end of the 1980s and early 1990s, and believe it is a critical component for marine conservation, both from a fisheries perspective, but also from an ecosystem perspective. There is a need to protect a portion of our oceans and preserve them for non-consumptive use.

I just want to stress that the issue of ecological reserves is not solely a fisheries issue, but is also an ecosystem protection issue.

With respect to Tortugas, this is a very special place that I have had a great deal of opportunity to explore, and I consider that a

privilege.

CMC has been involved both with research and advocacy work there. We have had an opportunity to be involved in some of the identification of the resources there, as well as some of the input for downstream recruitment that Billy Causey referred to.

For anyone who has been out there, it is a truly special place. The comments that Tricia Moran made with respect to this being a visit to her past, I think, is really critically important to consider. She stated it, as a Keys resident, in a way much more eloquently than I could.

But it is a look at that past that is very important, and it is very critical to have sites like that, both for fisheries management and for other opportunities for enjoyment, pleasure, and knowledge.

One of the things that is very special about Tortugas is that it is an opportunity both to protect a very special place and also to contribute to protection of a much bigger area due to replenishment opportunity.

Obviously, this of critical importance. The process so far as really raised expectations of a lot of citizens within the Keys and nationally as to what can be done here. The agencies have thus far developed a very good process based on very sound science and

involvement of a lot of sectors of the public in a very constructive process, and we compliment both agencies for doing that.

Both the T2000 process and the comprehensive review of the Tortugas National Park have both been models that, in terms of involving the public, we would like to see done elsewhere.

With respect to the NOAA process, we have some specific comments that I would like to go through. We support strongly the boundary extension and we think that that is the best way to provide comprehensive protection for this entire area.

We are very impressed that a number of agencies have gotten together to look at the ecosystem here. The sanctuary, we believe, is the way to protect the most comprehensive portion outside the park. So, we support the proposal to extend the boundaries of the sanctuary.

With respect to the ecological reserve, the size and the boundary issue, we don't believe that the size and the boundaries that have been proposed are ideal from our perspective. However, we did participate throughout this process and we think it was a sound process.

While it's not ideal from an ecological point

of view in some ways, we think that the process strongly supports the designation of the preferred alternative as the ecological reserve for NOAA because we think the buy-in of a cross section of interests is very critical to making this work, and because, while we don't think it's ideal ecologically, we think it's very good.

There is some uncertainty, so this is a step that will advance protection of some very important, very critical areas and it is a major step forward in that regard.

If there is one point that I would like to drill home, it's the issue of no-take meaning no-take. The proposed reserve throughout the process has been referred to as a no-take reserve.

There is a complicated relationship between the sanctuary program and the Magnuson Act, which I'm not going to go into in detail here. We will submit comments on that in our remarks.

However, we are very disturbed by the language in the proposed regulations that exist currently, which is to create a no-take reserve except for anything that may be allowed subsequently through other regulations. We think a no-take reserve should be a no-take reserve, it should be stated clearly in the regulations that

it's a no-take reserve.

That is important from an enforcement perspective, it's important from an ecological perspective, and it's important from a credibility perspective for the participants who have been involved in this process from the get-go.

With respect to diving, we think that the sanctuary has proposed a good alternative. We think that it needs to follow through on making sure that diving does not become a problem in this area.

We think that is unnecessary to ban or prohibit diving, but we think the kind of options that have been proposed to protect this area as diving may develop subsequently are important to follow through on.

MODERATOR TOMASTIK: Mr. Sobel, if you could wrap up your remarks.

MR. SOBEL: We think that with regards to the length of the reserve, that it needs to be a permanent reserve. We think that the benefits over the long term increase and the costs decrease. That does not mean that it should not be monitored or reviewed, but it should be set up as a permanent reserve, which you may need to adjust at subsequent times.

Finally, with respect to NOAA, the time frame,

we think there is still an opportunity to complete this process under this administration and we think that would be very worthwhile.

With respect to the National Park Service, and I'll run through these very quickly, we believe that with respect to the reserve area that's been proposed within the park, we generally support that as a minimum area to be protected, but we think that the line on the eastern boundary should be extended to the southern portion of the park so that it will be better for enforcement and will be more ecologically representative.

We believe that additional fishing regulations in those areas outside of the reserve are probably worth implementing. One thing that we suggest for consideration is a maximum bag limit of two fish within the national park outside of the closed area.

We believe that the carrying capacity issues that the Park Service is addressing in their plan are critical, and we encourage them to follow through on those.

We are very glad to see that, with respect to their time line, they are proposing to get this completed before the end of the year, and we hope that NOAA can do the same with respect to completing its

process, which has in some ways been going on for close to 10 years.

Thank you.

MODERATOR TOMASTIK: Up next is Mr. Scott Burns, representing the World Wildlife Fund International.

Comments on the Draft General Management Plan Amendment Environmental Impact Statement for the Dry Tortugas National Park

Submitted by

Kim Anaston
Florida Keys Field Office Manager
Center for Marine Conservation

8/1/00

August 1, 2000

Richard G. Ring, Superintendent
Everglades and Dry Tortugas National Parks
Attn: Jeffery Scott
40001 State Rd. 9336
Homestead, FL 33034-6733

Re: CMC Comments on the Draft General Management Plan Amendment Environmental Impact Statement for Dry Tortugas National Park

VIA EMAIL & USMAIL

Dear Superintendent Ring:

The Center for Marine Conservation (CMC) appreciates the opportunity to provide these comments on the Draft General Management Plan Amendment (DGMPA) Environmental Impact Statement for the Dry Tortugas National Park (DRTO). CMC's comments are based upon the first hand experience of CMC staff at DRTO, research and scientific reviews conducted by CMC staff and others, conversation and interactions with DRTO staff, a wide variety of researchers and scientists, resource managers, DRTO visitors and other stakeholders.

CMC has worked to protect Florida's coastal and marine resources, including the magnificent Florida Reef Tract and the spectacular subtropical marine ecosystems surrounding the Florida Keys, for more than two decades. We are committed to protecting ocean ecosystems and conserving the global abundance and diversity of marine wildlife. In support of this mission, we would like to submit the attached comments on behalf of our 120,000 members nationwide and nearly 10,000 in Florida CMC has approximately 120,000 members nationwide, and nearly 10,000 members in Florida. We have a field office in Key West, and a regional office in St. Petersburg in addition to our national headquarters in Washington D.C.

CMC has advocated for the restoration and protection of the Dry Tortugas region for over ten years. CMC strongly supports efforts to restore and preserve the natural diversity and abundance of marine life and habitats surrounding the Dry Tortugas. We commend the cooperative efforts of the National Park Service (NPS) and the National Oceanic Atmospheric Administration (NOAA) to create a no-take ecological reserve for the Tortugas region. While the mandates of the Florida Keys National Marine Sanctuary (FKNMS) and Dry Tortugas National Park are not identical, they share much in common and working collaboratively on their respective plans has been mutually beneficial and conducive to setting good policy.

Sincerely,

Kim Anaston, Florida Keys Field Office Manager

Comments on the Draft General Management Plan Amendment Environmental Impact Statement for Dry Tortugas National Park

TABLE OF CONTENTS

Center for Marine Conservation (CMC) Comments on the Draft General Management Plan Amendment Environmental Impact Statement for Dry Tortugas National Park

Summary:

The Center for Marine Conservation (CMC) strongly supports adoption of the Preferred Alternative 'C' with several modifications to strengthen and enhance its proposed actions. CMC believes that the Preferred Alternative as amended would provide the minimum level of resource protection consistent with the Dry Tortugas National Park's legislative mandates and the stated mission goals of the National Park Service (NPS) South Florida Units. Specifically, **CMC supports and recommends adoption of a modified Alternative C as the Preferred Alternative with the following changes:**

1. Modify the proposed boundaries of the Research Natural Area (RNA) in Alternative C to include the entire western half of the park with the exception of the proposed Historic Preservation/Adaptive Use Areas around Garden and Loggerhead Keys and:

- **a. changing the RNA's eastern boundary to run along the 82 degree 52 minute longitudinal line all the way from DRTO's northern boundary to its southern boundary;**
- **b. removing the "notched" area cut out of the RNA north of Garden and Bush Keys and;**
- **c. removing the "squiggly" line of the Historic Preservation/Adaptive Use Zone and replacing it with a boundary line similar to the one currently in use- a 1 Mile radius of Fort Jefferson.**

The DRTO's enabling legislation (PL 102-525) calls for it to "protect...a pristine subtropical marine ecosystem including an intact coral reef community...and to protect populations of fish and wildlife". In accordance with this mandate, it can certainly be argued that the entire DRTO should be included in a "no-take" RNA. This more moderate proposal including only the western half of DRTO is certainly well-justified.

Furthermore, the above changes will enable enforcement, simplify public understanding and expedite implementation due to decreased measures of boundary changes necessary (utilizes existing buoys, natural chart lines and policies currently in use).

2. Adopt the No-take restrictions in the RNA, including no 'catch and release' fishing.

3. Allow for anchoring in the RNA area, only when accompanied with ranger orientation with a diagram or chart of area, and guidelines to demonstrate appropriate areas and anchoring techniques. Must have monitoring and analysis program to set resource management policies to assess if damage is occurring. The FGMPA should include benchmarks set to incorporate incremental progressive protective measures to counteract impacts.

4. Require a full time resource manager on site to oversee research, inventory and monitoring, and coordinate all other science/research in DRTO to set resource management policies. The Resource Manager should not serve as a visitor protection (enforcement) ranger.

5. Refurbish and update interpretation signage and educational programs to encourage understanding and interpretation of park resources to reflect the cultural diversity of Park visitors.

National Parks have long been considered the "Best Idea That Congress Ever Had" because of the American Heritage that is preserved and protected. DRTO represents natural, cultural and historic values representing an important link in preserving our marine resources. The American public understands the "no removal" concept of national park units, be it floral, faunal or archeological objects. Fishing is the exception to this rule.

The predominate wildlife of DRTO is that of marine organisms, or birds that rely on the sea for survival. Given the world's decline in fisheries and coral reefs, specifically within the Florida Keys, the NPS should be the agency to fulfill a strong conservation role. In 1916, the Organic Act mandated the NPS to be the caretakers of our nations treasures and more recently, Executive Orders were enacted for coral reef protection, and to establish marine protective areas (MPA). This further demonstrates the need for NPS to be proactive in carrying out this missive for marine resource protection.

The NPS utilized a resource rich, scientifically sound data series on which to base the management decisions. The combined team of researchers responsible for the recommendations include well respected and published scientists. The expected results include:

- Protected Habitat- the irreplaceable marine life, biodiversity and habitats of the Tortugas' coral reefs
- Improved the Visitor experience - Provide increased opportunities for education and interpretation
- Enhanced Scientific Research -help scientists distinguish between natural and human-caused environmental changes.
- Provide an excellent opportunity to protect one of Florida's last wild ocean places – Zoning for increased protection is comparable to the wilderness zoning of the terrestrial national park units.
- Replenished commercially and recreationally important fish populations throughout the Keys to sustain our valuable fisheries
- Act as an insurance policy against unexpected problems on less-protected reefs.

I. Purpose and Need for the Plan

A. Purpose and Need for the Amendment

1. Description and Purpose of Park (Pg. 9):

The Dry Tortugas is a historic and beautifully remote cluster of seven islands that lie 70 miles west of Key West. Surrounded by the near pristine aquamarine waters of the Gulf of Mexico and the Atlantic Ocean, the Tortugas is known for its abundant avian and marine life. This incredibly diverse region is home to a magnificent array of rare species including black coral, purple-mouthed morays, jewfish, red-tail triggerfish, and green sea turtles.

Visiting historic Fort Jefferson on Garden Key is to take a step back into history. Besides the historic features of the fort, there is also the opportunity to experience a remote and isolated sub-tropical island. As the NPS' most remote park, the visitor can experience the near absence of human generated sounds, the clearest waters, healthiest fish communities, and highest coral cover found in the Florida Keys.

The very reasons that Dry Tortugas National Park (DRTO) was designated in 1992 as a national park are now becoming threatened. The remoteness of the Park, once it's saving grace, is now subject to many of the same pressures of other national parks. In just three years, visitors to DRTO have doubled from 30,000 to 60,000 annually.

The impacts confronting the resources of the DRTO include the strain on visitor facilities, decrease quality of the visitor experience, and coral reef decline due to the burgeoning visitor use. Fishing pressure from commercial vessels outside the park and recreational anglers throughout the area, has increased dramatically in recent years.

Declining fishing conditions upstream in the Florida Keys, improved navigation, and more efficient fishing gear have all added up to fewer fish and damage to habitats in the Dry Tortugas. There are up to 100 commercial fishing boats working the areas outside the Park. Thirteen of fifteen targeted reef fish species are overfished throughout the Keys, including the Tortugas. Though fish communities remain healthier in the park than those elsewhere in the Keys, research indicates that the average size of reef fish caught in the Park is down. Add anchor damage and declining water quality, and the coral reefs are at risk.

The coral reefs throughout the Keys have shown increases of diseases both in number and varieties. The causes have not been fully determined, but theories have been postulated that they are in part due to the changes in water quality and human impacts. The DRTO region can serve as a research site as a control study for being the furthest removed from human impacts in the Florida Keys.[1]

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[1] Refer to "Effected Environment, -Fishery Resources", DGMPA Pg. 113 for detailed data

The combined resources of the DRTO and the FKNMS offers us the chance to preserve and protect a very significant marine wilderness in Dry Tortugas through both the Park's General Management Plan Amendment and the FKNMS Ecological Reserve (ER).

2. Understanding Park Planning:
General Management Plans (GMP) are required by the National Park Service to set the intended management for the future. The plans are a holistic view of the park unit, focused on why the park was created (enabling legislation), desired resource conditions (resource management objectives) and visitor experience (including education and outreach) that should be achieved and maintained. These goals and actions are based upon on the best available science, significance, laws and policies directing the management of the NPS.

3. Issues and Concerns (pg.11):
CMC agrees with the information supporting the need for the GMPA, and the many complications surrounding each topic.

i. Over fishing of the area
ii. Significant increase in park visitation
iii. Commercial services management
iv. Coral reef damage
v. Need for consistent and long term research, inventory and monitoring

4. Issues beyond the scope of this plan (pg. 13)

CMC would like the NPS to provide a timetable for the planning of the interpretation and education, and concessions provision. Both plans are critical to the integrity of the park resources and success of the process.

a. Education: Throughout the DGMPA, there are references to the value of visitor education. Yet there are no concrete plans to meet this need. The educated visitor is much more likely to understand and support the need for more protective measures in the park. Visitor education is the foundation to enable positive change, and is one of the reasons that the park system is beloved by the public.

The interpretation and education provided by NPS helps the visitor gain a better understanding of each NPS Unit. Everglades National Park has considerable materials specifically on the history and ecology of DRTO that will take minimal effort to use. However, as stated above, this component does not have a timeline associated with the DGMPA, and it would be a good strategy for the NPS to make this a priority. The initiative the park has shown with this plan can be improved with the understanding from the public of the value of conservation and protection.

b. Concession: The transportation concession plan needs to be included in the Final General Management Plan Amendment (FGMPA), as this is the main source of transportation to the park. The details should be included with the DGMPA. More detailed description of comments will follow in the section on the Preferred Alternative C. Again, as in the education/interpretation, a project timeline would ensure the process is completed and successful.

B. Servicewide Laws and Policies and Special Park Mandates and Agreements

1. Mandates and Agreements: NPS is to be commended for responding to the increased usage and impacts currently facing DRTO. The GMPC preferred Alt. 'C' is consistent with the mandates listed below, therefore setting a precedent to proactively manage resources.

a. NPS is responsible for upholding the Organic Act that instructs the Service to:

Conserve the scenery, and the natural historic objects, and the wild life therein, and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.

b. The preferred Alternative 'C' is consistent with the Organic Act, and meets the specific mandates of the DRTO Enabling Legislation (SEC. 201)

(a) In General.- In order to preserve and protect for the education, inspiration, and enjoyment of present and future generations nationally significant natural, historic, scenic, marine, and scientific values in South Florida, there is hereby established the Dry Tortugas National Park.

2. Further, the National Park Service (NPS) is directed to manage the park: (16USC 410xx-1 SEC.202)

(b) Management Purposes.- The park shall be managed for the following purposes, among other;

i. To protect and interpret a pristine subtropical marine ecosystem, including an intact coral reef community.

ii. T protect populations of fish and wildlife, including (but limited to) loggerhead and green sea turtles, sooty terns, frigate birds, and numerous migratory bird species.

iii. To protect the pristine natural environment of the Dry Tortugas group of islands.

iv. To protect, stabilize, restore, and interpret Fort Jefferson, an outstanding example of nineteenth century masonry fortification.

v. *To preserve and protect the submerged cultural resources.*

vi. *In a manner consistent with paragraphs (1) through (5), to provide opportunities for scientific research.*

Coupled with the Park's unique enabling legislation, and new protective mandates- Executive Orders for Coral Reef Protection (13089), and Marine Protected Areas (13158), NPS not only should, but also must ensure protection of the resources of DRTO. This is met by the proactive measures detailed to reduce the impacts to the natural, marine and historical resources. As cited in the review and comments of Preferred Alternative C, the above mandates clearly outline the justification for the NPS to select a management alternative with stricter protective measures. (ref. 1) (Also, refer to pgs. 14 – 19 for a complete list of applicable Laws and Policies)

The 1998 Omnibus Act, which enabled funds collected from park visitors to remain within the park it was collected, will help provide the funds necessary to meet the increased needs of visitor protection, mooring and marking buoys, research, monitoring, interpretation and education. The most important avenue of protection will come from the collaborative efforts of Federal and State agencies for a holistic approach to research, education and visitor protection.

C. Impact Topics Eliminated From Further Evaluation:
CMC has no comment on this section.

D. Relationship with Other Planning Efforts: (pg. 23)

1. The FKNMS ER as proposed, is also consistent with the Florida Keys National Marine Sanctuary Act and Protection of 1990. As described in Vol. I of the Final Management Plan and Environmental Impact Statement as described in the Strategies in the Preferred Alternative, Z.2. Ecological Reserves

"Replenishment reserves are designed to encompass large, contiguous diverse habitats. They are intended to provide natural spawning, nursery and permanent residence areas for the replenishment and genetic protection of marine life and to protect and preserve all habitats and species...."

2. Creating an ecological reserve that links resources within DRTO to FKNMS areas will serve to replenish the fisheries, aid in research and education, thus giving NOAA the responsibility to promote this process. As stated on page 23, under relationship to other planning efforts,

"...Therefore the actions of one agency will effect the effectiveness of the agencies' actions. It is the intent of both agencies that the plans and subsequent management of the park and sanctuary compliment and support each other"

3. There are myriad reasons and benefits for the implementation of a RNA. By maintaining intact habitat where fish can feed, grow, and spawn, the RNA and the ER will effectively increase reproduction, boost populations, and export larvae, juveniles and adults across its boundaries to enhance fish populations elsewhere.

4. This can also facilitate educational opportunities to teach citizens about the declining health of coral reef communities and fisheries. The potential long-term benefits of holistic interagency cooperation is being realized through this process. The Key West interagency (FKNMS, NPS and the US Fish and Wildlife Service) cooperative Nancy Foster Visitor Education Center will advance efforts toward public understanding of marine resources and the need for conservation measures.

II. Alternatives, Including the Proposed Action

A. The Proposed Action and the Alternatives -

CMC's comments focus upon the Preferred Alternative 'C', and will base comments upon the draft plan action alternatives intention:

1. **support the Park's purpose and significance**
2. **address issues (visitor experience, natural resources, and related issues to enable implementation)**
3. **avoid unacceptable resource impacts**
4. **respond to public wishes and concerns**
5. **meet the park's long term goals.**

B. Background for Developing the Management Zones

1. Introduction:

In the introduction summary, CMC agrees the resource management plans (specifically the RNA) were correctly based upon sound science. Zoning is used effectively for terrestrial parks to manage different habitats and uses. Current NPS/GMPs address enabling legislation, visitor use and nature of the park unit for future resource management. For example, the guidelines for resource management and visitor experience in the wilderness areas of Yosemite would be completely different than those of the Capital Monuments Units.

As stated above in the mandates and policies section, the use of the RNA is compatible to meet management directives for DRTO. The DGMPA study team reviewed impacts currently facing the park, extrapolated future trends

based on current increases in visitation, as well as reviewed similar areas such as Buck Island, St. Croix, VI. The result is a well thought out management plan that will serve as a guide for optimal resource preservation, and realize park mandates.

Appropriately, the DGMPA addresses actions and uses necessary for DRTO to remain as nearly pristine 20 years from today as it was yesterday. Please note, the zoning terminology is very confusing, and will not be clear to the average visitor. Understanding the needs and uses is a major step for public support. We would recommend that the terminology be simplified for clarity to the visitor.

2. **Background on research Natural Areas – The basis of the RNA use is well thought out and well documented, and we offer no additional comments.**

C. **Management Zones:**

1. **Historic Preservation/Adaptive Use Zone – Fort Jefferson is within this zone. This area will experience a heavier visitor use, and will need a different set of policies to adequately manage than the RNA.**

a. **The NPS is the best provider for interpretation and education to visitors of national park units. The concessionaire will be expected to provide education to their customers, but this should not be in lieu of the NPS interpretive ranger educational provisions. Several needs: increased interpretive signage (revised and/or refurbished), and educational activities offered (such as turtle and fish talks, night sky, history walks, etc.) within the Park. Also, There is a need for a full time (FTE) interpretive ranger to meet the increased visitor demands.**

b. **CMC agrees that no additional provisions are to be offered such as fresh water showers, food concessions, etc.**

c. **Soundscape – The remote location and experience expected should be as removed from sound intrusions as possible. Understanding that this area should and will expect to experience greater human generated sounds. All reasonable efforts should be made to limit intrusions from human generated intrusions. Consider limiting flights per day incoming flights to eight per day; and generators should be soundproofed to the greatest extent possible.**

2. **Natural and Cultural Zone- This area is appropriate for the more consumptive activities such as fishing. CMC agrees with the basic parameters of this action management zone.**

a. **Decreases in fish size within the park is not from commercial fishermen[2], but from "recreational" fishing including charter boats. It is**

[2] J. Ault, and J. A. Bohnsack, 1999 "Reef Fish Assessment in Dry Tortugas Park and Adjacent Waters Including Florida Keys National Marine Sanctuary" NURC/UNCW Report, and personal conversations

not intended to place arbitrary and capricious regulations upon the users, but to serve as a consistency factor to Park goals. This measure will still provide fish for consumption, but within reasonable limits.

Consider:

i. **Unlimited catch and release (C&R) practices in this zone**

ii. **Decrease of catch limits to total recreational catch limit. We suggest a five fish limit per person. This will be consistent with the efforts of the park to recover and maintain the fish populations within Park boundaries as well as the overall Tortugas region efforts to replenish the fisheries and habitats. The five fish limit MUST be in agreement with current state allowable size & species limits.**

b. **Bait- Currently there is a five gal. limit on the baitfish collection. As per the DEIS Natural Resources Affected Environment report (March 2000)**

> ***"The animals, habitats, and unique environment of the park all exist in a delicate balance, and changes to any component represent risks to all others".***

Consequently, baitfish taking should also have limits to removal. Various fish, birds, etc. feed upon the baitfish, and this link in the food chain needs to be addressed. We suggest:

i. **15 to 20 Pilchers per persons is adequate for the 5 fish per person, and will meet the needs of the recreational and C&R angler.**

ii. **Cast nets should be banned for the indiscriminate catch it removes.**

iii. **Additionally, the current five gal. limit is not enforceable. In order to check the baitfish take on a fishing vessel, rangers would have to drain the live bait well to inventory, which would result in loss of the bait.**

c. **"Rule of possession" would simplify the above rules for all, enabling visitor protection and understanding from the public.**

3. Research Natural Areas:

a. The establishment of this zone will place a greater protective element than the other two zones. As previously stated, this type of zoning area as described in the DGMPA, has myriad benefits for the natural resources, and can be implemented to achieve different goals:

i. Ensure adequate quantity of genetic material
ii. Maintain or increase fishery yield
iii. Eliminate by-catch mortality
iv. Allow for population rebuilding and provide insurance against
v. Stock collapse
vi. Facilitate scientific studies

vii. Simplify enforcement
viii. Protect sensitive habitats, and
ix. Foster eco-tourism and education. [3]

b. Goals must be clearly determined prior to implementation, and must be coupled with a monitoring program to assess the effects. Given the park's mandates, this can be readily applied. In addition to the previously stated expected results, the RNA success is dependent upon minimizing human disturbances within these areas. CMC would like to see goal driven objectives in the FGMPA.

c. CMC supports the use of the RNA, and specifically the no-take action to control the visitor travels and actions. The concept as described for the RNA, has been used successfully in many areas as a valuable and effective management tool. [4] Numerous scientific documents exist as to the effectiveness of a RNA type resource management tool, being successfully used in smaller areas within the FKNMS Sanctuary Protection Areas (SPA).[5]

d. The benefits are being recognized and accepted to manage the Tortugas region. For example, the Gulf of Mexico Fishery Management Council also adopted the No-take management for their resources within the proposed FKNMS T2000 planning effort for the multiple benefits expected for the fisheries.

The benefits go beyond the park boundaries as demonstrated by the increased larval production and extrinsic dispersal of larvae to areas up the Keys. Prohibiting fishing activity in the RNA as placed in Alt. III, 88% of the reef fish species found within the park and 97% of the snapper-grouper-grunt complex will be provided significantly more protection. This level of protection for a high portion of the park species provides stability to the community and reduces adverse risk. The following excerpt validates this opinion:

> *"The StOCaST simulation results show that in 20 years, the RNA zone will produce an 800% increase in spawning stock biomass, over a 1000% increase in egg production, and only a 20% drop in yield in weight to the fishery for groupers residing in DRTO. The results for snappers show a 300% increase in spawning stock biomass, 1500% increase in egg production, and a 40% decrease in yield in weight. Likewise, the grunts show a 400% increase in spawning stock biomass, a 500% increase in egg production, and only 20% decrease yield in weight."* [6]

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[3] Final report to NPS, DRTO DEIS, Natural Resources Affected Environment, Ault, Meester, Luo, Smith, and Lindeman, Mar.1, 2000, pg. 9
[4] CMC Bibliography of Scientific Literature on Marine Reserves 1998
[5] NOAA/FKNMS Zone Performance Review, 2nd Year Report 1999
[6] Final report to NPS, DRTO DEIS, Natural Resources Affected Environment, Ault, Meester, Luo, Smith, and Lindeman, Mar.1, 2000, pg. 22 -23

e. The expected outcomes in these areas would include increased overall visitor experience by abilities to view wildlife, larger fish, and generally better opportunities to experience the "remoteness" of the park.

4. Special Protection Zones:
As described, this management tool can be utilized in special cases or needs for closures. CMC will agree to the use of these closures when the conditions warrant special needs, such as seasonal turtle nesting sites, nurse shark breeding areas, or other areas deemed necessary as indicated from scientific research. Additionally, this can be used as a tool when the on-going monitoring indicates a severe problem area that would require more restrictive measures to ensure health and vitality.

5. Managing for Visitor Experience and Resource Protection:
The use of the various zones will ultimately result in the long-term viability of the positive visitor experience. Provisions have been made to accommodate, and even improve the visitor experience. Opportunities to increase the average visitor's ability to access areas of the Park, in addition to the Fort, represents the NPS' working to accommodate the mandates of providing a positive visitor experience, without undue degradation of the resources.

6. Monitoring to Maintain Visitor Experience and Resource Protection:
CMC would like to see the monitoring of activities, visitor numbers and uses, and environmental conditions as part of the long-term management of the Park. Benchmarks should be set in the preliminary studies to note changes or impacts to resources and subsequent management actions developed to rectify the problems via use of these zoning tools.

7. Parkwide Management Actions (taken from Table 4, pg. 48)

a. Visitor Experience- NPS is the most qualified and appropriate provider of the visitor experience. This responsibility can be shared by the concessionaires, but the majority of the information should come from park staff and services from the fort and Visitor Education Center (Key West educational/interpretation staff.) Education is referred to as an "aggressive visitor education program" but there are no indications of specifics or timelines.

The concessionaire currently provides food, water, and services including the management of wastewater. Additionally, we would suggest for the Concession:

- **i. Not to be solely responsible to provide education/interpretation to visitors**
- **ii. Provide guided/supervised snorkel trips- to prevent/decrease impacts to vulnerable corals during shallow depth snorkel and dive trips (suggested ratio of guides to visitor in water activities 1:8)**

iii. **Prohibit gloves, knives, and limit size of fins- to decrease inadvertent contacts with corals and benthic organisms**
iv. **Remove wastewater from park wastewater facility (on dock) after each trip** [7]
v. **Post a monitor with a whistle to walk the moat wall to direct tired visitors, or those adjusting equipment, off of environmentally sensitive areas to safer sand patches to stand.**

However, given the impetus to bring a greater ethnic and cultural diversity to the national parks, there should be allowances to provide passages for those that would not be able to pay a full fare. Suggestions could include allowing one day a week to transit with no amenities other than water (allowing for the visitor to provide own food and equipment).

b. Resource Protection:

i. **Natural resources: No change or addition needed, we agree with the cooperative work with FKNMS, and the need to protect the night sky and soundscape.**
ii. **Research: Research is an integral part of understanding and management of the resources, therefore needs to be included in all alternatives. Loggerhead Key is the appropriate area to house the scientific community and allow for the research station to be housed. All research conducted within park boundaries should be relevant to park management and protection, but should not require Park resources.**
iii. **Park Operations and Facilities- We support the use of Key West for the administrative offices and utilization of the housing on a rotating basis for seasonal staff, or additional maintenance and special project staff. This is in order to prevent further closing of fort areas to provide staff housing.**
iv. **Park Boundary and Buoy System- to be addressed under the Alt. C discussion.**
v. **Visitor Center- DGMPA states there will be an expansion, but no details were provided. We would like to see further details of a time line or schedule and education/interpretation plan.**
vi. **Utilities: CMC completely agrees with improving the utilities to become more ecologically friendly (such as solar and wind generated power, without changing the integrity of the Park).**
vii. **Communications – This action should take priority, as it is crucial to the implementation of the proposed changes (radar, and reliable radio and phone).**
viii. **Necessary and Appropriate Commercial Activities – Commercial activities should have increased responsibilities in their provision of services to the visitor as previously**

[7] As per conversations during the Key West Public hearings, June 21, 2000, from the concessionaires to agree to remove wastewater after each trip to decrease impacts from high visitor volume.

mentioned. As recommended in the preferred Alt. C, the one concession service should not replace the current two providers, mainly for the safety of the visitors. Many references are made to the ability to have more than one provider for transport and touring. [8] Currently, two boats are serving the park and therefore can offer backup transportation in case of mechanical failure. The park does not have the resources to provide for stranded visitors.

Concessionaires have to meet a set of standards as allowed by NPS as "necessary and appropriate" to individual park units. [9] It would not be considered arbitrary and capricious to require specific standards to be compatible with the objectives of protecting, conserving and preserving resources of a national park unit.[10]

D. Alternative C: Proposed Action

CMC will only address Alt. C, as it best meets the criteria established by the SAC WG and park mandates. Our comments suggest modifications to enable the most immediate avenue to see the GMPA realized.

1. Overall Concept: To offer a high level of protection to significant park resources.

a. The five overarching laws and policies that guide all policy management decisions meet at least one of the following criteria:

i. Preventing the loss of resources
ii. Maintaining and improving the condition of the resources
iii. Providing visitor services, and educational and recreational opportunities.
iv. Protecting public health, safety and welfare
v. Improving operational efficiency and sustainability
vi. Protecting employee health, safety and welfare

b. Implementation of the RNA: As discussed previously, with the no-take actions, simplification of the boundaries, need for education and interpretation, responsible and appropriate commercial services, and staffing increases (resource manager, maintenance and visitor protection) should be addressed in the FGMPA. These are crucial to the implement the plan.

2. Visitor Experience: The mandate to provide for the visitor experience is very clear for DRTO. Some aspects of the visitor experience have been discussed previously, but others are specific to the Alternative C and the different zones.

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[8] DOI/NPS 36 CFR part 51 Concession Contracts; Final Rule, April 17, 2000, as per the "outfitting and guiding".
[9] 36 CFR part 51.3, "Visitor Services", Pages. 20636- 20637
[10] 36 CFR part 51.20, "Selection factors: Pg. 20640

a. Interpretation- NPS should be the main provider of education and interpretation opportunities

b. Camp ground capacity maximum. In keeping with the experience of a remote location including soundscape, night sky and relative isolation, a reservations system to be instituted and can be administered through the Key West administrative office or the Visitor Center.

i. suggested 25-30 person maximum

ii. Small sites- #1-5 max. 4 persons, larger sites to hold 6 max.

c. Fort Jefferson capacity max – 100, Interpretation provided, adult supervision for those under age 16

i. Update the interpretation signage, to reflect the diversity of cultures in Florida

ii. Provide additional educational materials and programs

ii. Add a full-time (FTE) Interpretative Ranger

d. Allow for Commercial Fishing Anchorage: The need for overnight protected anchorage for working commercial fishing boats can be met via allowing them to anchor within the one mile radius of fort. This will also require shifting the eastern boundary line west to the 52nd degree longitude line. Continue to prohibit anchoring on corals, and sensitive areas. This allows for safe anchorage, without requiring anchoring/mooring in Fort harbor,

e. Recreational Fishing to be allowed in Garden harbor and Natural/Cultural Area only, as this will provide visitors a chance to catch and prepare a fresh caught meal, and will be consistent to GMPA goals and Florida State fishing regulations.

3. **Resource Protection- CMC agrees with the basis of the resource protection guidelines. It is important to reinforce the need for appropriate monitoring systems to access the results of new policies, and prevent damage from actions beyond the scope of this plan. Benchmarks should be set within the monitoring analysis to indicate if an action is too restrictive or needs greater restrictions. Delineate areas of special concern and possible closure if policy actions are not adequate.**

a. Boundaries: The major change we see necessary is to change the eastern and southwest boundaries of the proposed RNA.

Problems: As currently configured, the eastern and southwest boundary line, Historic Preservation/Adaptive Use and "notch":

i. Creates confusion to the general public -Park boundary buoys already exist; adding additional sets of marker buoys in close proximity will make it difficult to distinguish from the RNA boundaries.

ii. Difficult to enforce boundaries -Park rangers will not be able to adequately enforce the multiple boundaries due to the irregular lines. Also, straight, simple lines will add to ease of enforcement

iii. Will add unsightly buoys to the park's remote beauty (based upon the number of necessary buoys to adequately mark the area).
iv. May delay implementation (funding- will have to get funds appropriated to buy, install and maintain the extra buoys needed for the area)

Solutions: Simplify the boundaries (this will increase ease of enforcement and visitor understanding of the proposed zoning boundaries)-

i. Utilize the 082*52' longitudinal meridian line to mark eastern boundary for the proposed RNA,
ii. Delete use of the "notch"
iii. Move southern RNA boundary to meet existing park boundary (extending the area south),
iv. Delete the Historic Preservation/Adaptive 'Squiggly line' boundary surrounding Ft. Jefferson. The confusing pattern will make the plan practically unenforceable, and will decrease the likelihood of expedited implementation.
v. Continue the current one-mile radius of the Fort for anchoring (in keeping with the principles of safe anchoring and coral protection).

b. Mooring buoy installation: The argument is clear for the need of mooring buoys to protect the resources from anchor damage. These should be installed in areas that have corals, submerged cultural resources and seagrass beds.

We offer the following suggestions:

i. Placement of mooring buoys inside the Fort/ Garden basin (within the current 1 mile radius around the fort),for overnight anchoring. This can help to prevent collisions from anchor swing mishaps in the harbor.
ii. Install mooring buoys in sensitive or high risk areas of damage.
iii. Allow for small boat anchoring in remote areas with sand patches. The new system of permit use will allow for ranger instruction of appropriate anchoring. This doubles as resource protection and visitor experience enhancement - enables the visitor to experience other areas of the park, with decreased chances of anchor damage.
iv. Require a maximum number of buoys should be set to discourage over-use of selected areas. We suggest: four mooring buoys placed east and west of Loggerhead Key, and two on the Windjammer. Impose a two-hour limit at each location.

4. Submerged Cultural Resource Strategy- CMC offers no comments here.

5. Commercial Services – CMC agrees with the setting of visitor capacities for park preservation. The increase in park visitation has been amply documented, as the integrity of park resources have been degraded.

a. CMC disagrees with the one concession provision of services for ferry operations (please refer to the above section on commercial services to see suggestions, applicable laws and mandates). The intention to provide increased resource protection and visitor experience is evident. However, some of the provisions may be difficult to achieve. NPS rangers should continue to have contact with visitors, through walks, programs, etc. It should not be the sole responsibility of concessionaire to provide education, although concessionaire should be required to:

i. Provide and require snorkel vests for all,

ii. Administer a swim and snorkel equipment check and familiarize visitors to basic snorkel techniques such as mask clear, vest inflation (will also help prevent standing on corals and benthic organisms)

iii. Post a monitor on the moat wall to walk with a whistle to help prevent damage and direct tired swimmers or those making equipment adjustments to appropriate areas.

iv. In sensitive marine resource areas, a ratio of guides (in the water or a dingy) to visitors, 1:8.

b. Provision of the ability for the multiplicity of ethnic groups represented in Florida to visit DRTO may require special arrangements. FGMPA should acknowledge these needs to consider for further study.

c. It is to be commended that NPS makes attempts to enable outside concessionaires to continue to make an economic livelihood, but it is not in the criteria of park goals. Again, we emphasize the importance of appropriate monitoring systems to assess the results of new policies, and prevent damage from actions beyond the scope of this plan.

d. We are in agreement with all other points submitted by planning team.

6. Park Operations and Facilities

a. Maintenance - As previously mentioned, staffing will continue to become a greater need with the increased responsibilities on park staff. The myriad park resources and needs - from the crumbling historical resources, aging utilities, educational, visitor safety and administrative needs, and scientific research and assessment coordination will require creative use of staffing. Maintenance staffing will need to be increased to meet the demands.

b. Housing Alternatives -selection of partners to share work responsibilities (such as husband and wife NPS teams) can help to meet the demands, and will need to be addressed in the FGMPA.

c. Resource Manager -One of the most critical positions will be to have an on-site resource manager to coordinate research and advocate resource management. The Resource manager will coordinate the research, inventory and monitoring, zoning and uses, etc. This position should have a strong natural resource background and should not serve secondarily as an enforcement or visitor safety ranger.

d. Park Manager - assigned and administrates from an office in Key West. Responsibilities should range from procurement to budget. With the additional support of the Everglades National Park (EVER) this could bring the GMPA plan to fruition. The advantages can be multiple from establishing relationships to city, County, State and EVER.

e. Additional Housing -should be considered outside of Fort Jefferson. Research Facility – Located on Loggerhead Key, research only, paid visits (through grants), all research to augment NPS resource Management actions and decisions and to be approved through the resource manager or team. Impose max. capacity for facility, which should not be supported through park funding or resources. This includes disallowing family and friends to overnight at the facility. Additionally, prior to opening the station, an EIS should be conducted on the site.

f. Other -NOAA/FKNMS presence should not result in less of a NPS presence.

7. Park Entrance Fee - CMC agrees with the collection of fees, as authorized by the 1998 Omnibus Bill on National Parks to help meet the many financial needs of DRTO.

III. Conclusion:

CMC commends the planning team for a thorough and resource protective rich plan to enable the DRTO to remain the national park treasure that is dear to so many. The justifications are based in sound science, and the preferred action takes into account the broad range of necessary components to produce a plan that is both wise in policy and fair to visitors and users.

Our comments are submitted to augment the plan, not to criticize. As discussed previously, implementation of the RNA with the no-take actions, simplification of the boundaries, need for education and interpretation, responsible and appropriate commercial services, staffing increases (resource manager, maintenance and visitor protection) should be addressed in the FGMPA. Crucial to the process is the ability to implement the plan. Our comments suggest modifications to enable the most immediate avenue to see the GMPA realized.

No-take restrictions in the RNA

Zoning boundaries simplified – to expedite implementation, as well to improve public understanding and enable visitor protection (enforcement) while protecting the greatest portion of the resources.

A full time resource manager on site-To oversee research, inventory and monitoring, coordinate all other science/research in DRTO to plan and manage resources. **Refurbished and updated interpretation signs** - to encourage understanding and interpretation of park resources.

PUBLIC COMMENT

By Elizabeth Fayad, Esq.

National Parks Conservation Association

MS. FAYAD: Hi. My name's Libby Fayad, and I'm counsel for the National Parks Conservation Association. Sorry I didn't sign up sooner. I got in here and then didn't want to leave while the comments were going on.

I just have a few brief comments to direct towards park planning officials. Basically, the over-arching responsibility of the National Park Service is to preserve the resources unimpaired for future generations.

While they do have other responsibilities and we recognize those responsibilities, like visitor enjoyment, research, and others, their main responsibility has to be to protect the resources unimpaired for future generations.

I think the preferred alternative goes a long way towards doing that, but I think there are areas that could be part of the reserve that are not that should be added in the end.

I also think that the carrying capacity issues and the issues of limiting the numbers of visitors to the Dry Tortugas has been sensitively addressed in the

plan, but our concern is that the management of visitor limits not be rested solely upon the expense of the concessions operations.

I mean, we definitely support limiting the number of concessions operators, but the concessions operators have to be able to provide the service effectively, and also in a financially sound manner, and I'm not sure that the entire burden of that can fall on the visitors.

The last thing I would urge, is that the boundaries of the reserve be more straightforward and not have any jigs and jags in them for ease of enforcement.

The reality is, the Park Service does not have enough resources to have elaborate enforcement mechanisms. We will have to rely on education, and of course the desire of most Americans to be protective of park resources, but the boundaries should be more straightforward.

Thank you.

MODERATOR TOMASTIK: Are there any other folks who have not registered but would like to make public comment for the record?

(No response)

MODERATOR TOMASTIK: At this time, I think

NATIONAL PARKS CONSERVATION ASSOCIATION

Protecting Parks for Future Generations

July 31, 2000

Jeffery Scott
Supervisory Park Planner
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

Comments on the Dry Tortugas General Management Plan Amendment

Dear Mr. Scott:

On behalf of the National Parks Conservation Association, I offer the following comments regarding the Dry Tortugas National Park Draft General Management Plan Amendment Environmental Impact Statement. NPCA is America's only private, non-profit advocacy organization dedicated solely to protecting, preserving and enhancing the National Park System. NPCA was founded in 1919 and has more than 455,000 members.

The Dry Tortugas National Park (DRTO) is of particular interest to this organization because of its clear overarching purposes, which are to preserve and protect for the education and enjoyment of present and future generations nationally significant natural, historic, scenic, marine and scientific values in South Florida.[1] The Park is located in a unique pristine subtropical marine ecosystem that includes an intact coral reef community. Given the declining state of the world's coral reefs and other marine resources, NPCA believes that national marine parks have an obligation to play a leadership role in providing models for marine ecosystem protection. The DRTO management plan should provide such a model, setting the stage for other marine parks in the United States and elsewhere.

The significance of the proposed management changes at DRTO is amplified by the fact that it is a critical part of the area-wide effort to protect the Tortugas region. Again, the park should provide a model and exportable example of how national parks should be managed. In this case, it can provide of model of successful cooperation between the National Park Service (NPS) and other private, state and federal agencies to produce a marine conservation strategy that cuts across jurisdictions.

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Summary of Recommendations

Overall, NPCA is extremely pleased with the direction and approach to resource protection, visitor experience and commercial services in DRTO. The preferred alternative contains innovative measures addressing the challenges posed by the area's growing popularity as a major tourist, diving and recreational fishing destination. While the preferred alternative would improve park management considerably, in some areas it does not go far enough to protect the Park's fragile ecology. Therefore, NPCA supports a combination of Alternative C and E, with emphasis on the following recommendations.

- The establishment of the Research Natural Area (RNA) is imperative and should be explicitly designated for both resource protection and research purposes.

- At first, the RNA should encompass an area larger than proposed in Alternative C, but not the entire park. The initial area should include the entire Park west of the 82°51' longitude. This larger RNA would not include a regularly shaped area around Fort Jefferson/Garden Key and a small portion of Loggerhead Key containing the 19th century brick lighthouse, both of which should be designated historic preservation/adaptive use areas.

- After five years, the RNA should be expanded to permanently encompass almost the entire park, coterminous with the RNA in Alternative E. This alternative best satisfies the RNA selection criteria related to resource protection, but its implementation should be delayed five years so that data can be collected to address the concerns of recreational fishing interests.

- If the data on fish stocks is inconclusive after five years, or the data indicates that stocks in the RNA and the natural/cultural area exhibit the same increasing trends, the expansion of the no-take zone could be delayed for another 5 years.

- The commercial services plan to enable visitors to reach more dispersed regions of the park, as outlined in Alternative "E," should be adopted, but this must be accompanied by effective monitoring of the effects of increased visitation in new areas.

- Concessioners should provide guides for supervised snorkel trips, and disallow equipment such as knives, large fins and gloves which encourages more physical contact with vulnerable coral.

- The configuration of the Historic Preservation/Adaptive Use Zone around Garden Key should be altered to make enforceability easier.

- The park should adopt the proposed approach to controlling visitor numbers based upon the carrying capacities of the different places in the Park

- The preliminary carrying capacity numbers should be revisited, using a more precautionary approach that sets these levels at the lowest possible number, as determined by the panel of experts, that ensures the resources will be protected.

- The process used to determine carrying capacity must be open and transparent, with adequate public involvement.

- The park should hire a full-time resource manager on-site to coordinate research and oversee resource management.

- The park should devise an effective strategy to attract a more diverse group of visitors to the park, and enable a broader community to have a high quality experience there. To accomplish this, focus groups and partnerships with ethnic communities should be investigated, and fair ways to provide fee waivers for low income visitors might be considered.

Discussion

The preferred alternative set forth in the EIS does not sufficiently protect the resources and needs several improvements. NPCA considers Alternative "E" to be the best fit in terms of most of the stated criteria and the region's needs. However, we recognize the value of having both a Research Natural Area and a control area against which it can be compared, in order to better justify and eventually, after five to ten years, lead to a more sizable RNA. We also recognize the need to satisfy concerns of recreational fishing interests, who claim that Florida's gillnet ban imposed in 1995 is already addressing the declines in fish stocks.[ii] Thus we are recommend a hybrid alternative, which combines the best aspects of the most resource protective alternatives with some suggestions which would strengthen the overall proposal.

Resource Protection

NPCA strongly supports the designation of the Research Natural Area as it supports both purposes for which the park was established, research and education and to maintain biological diversity.[iii] The EIS (p. 35) emphasizes only the RNA's purpose of protecting the marine resources, while stating it would offer an "opportunity" for outstanding research. Because one of the most controversial issues facing acceptance of the RNA is the prohibition of sportfishing, a major purpose of the RNA should be to attempt to determine the quantifiable and scientifically conclusive effects that a no-take zone has upon the biomass of reef fish. This is important because it will help establish the park as a true laboratory for testing the hypothesis that no-take zones are beneficial to fish in the Tortugas region.

This is not to say that this management action is not justified by existing scientific evidence. Throughout the world, scientific evidence and peer reviewed reports have

documented the benefits of no-take marine reserves on fish populations.[iv] For example, the Western Sambo Ecological Reserve has benefited the spiney lobster, closed areas in Georges Bank have resulted in higher groundfish and scallop populations, and rockfish are larger and more numerous in reserves off the coast of northern California.[v] There are numerous other examples. However, much of the fishery declines are caused by the excessive exploitation of commercial fishing operations. Unsubstantiated claims have been made that the lower levels of fishing done by anglers is insignificant, thus sport fishermen should not be included in a fishing prohibition imposed for conservation purposes.[vi] With their political influence, recreational fishing interests attempt to influence public opinion, and rather than take a precautionary approach the industry appears to be adopting an "allow me to take fish until you can prove I am causing harm" position. The RNA is first and foremost a resource protection zone. But also establishing the RNA as a "control zone," from which data can be compared against that of the zone exploited by recreational fishermen, could help provide important insights about the impacts of recreational fishing.

The designation of the RNA is not provisional or automatically rescinded if the comparative data is inconclusive. The burden of proof that recreational fishing is causing harm to fish stocks does not rest with the National Park Service (NPS). Under its Organic Act, NPS has the responsibility to preserve resources for the benefit of future generations.[vii] Establishing the RNA is a reasonable action toward the goal of protecting the resources, and the burden to prove that it is not reasonable rests with the recreational fishing interests. It is not the responsibility of NPS to show that the establishment of the RNA and the prohibition of all fishing has improved the protection of the resources. It would be the burden of those opposed to the RNA to demonstrate that the establishment of the RNA has no positive impact on protection of the resources.

The NPCA Alternative would include an RNA that would be expanded after five years, unless certain conditions are fulfilled. The rationale for this approach is to use the initial five years to collect data and observe results of a no-take zone.

The initial RNA should encompass an area larger than the area proposed in the EIS's preferred alternative, since we consider the RNA described therein as failing to adequately fulfill the most important selection criteria involving ecosystem protection. We recommend establishment of an RNA that includes the entire Park west of the 82°51' longitude, except for a regularly shaped area around Fort Jefferson/Garden Key and a small portion of Loggerhead Key containing the 19th century brick lighthouse which would be designated historic preservation/adaptive use areas. We feel this area, which represents over 60% of the park area, is the absolute minimum acceptable size, based on our analysis of the criteria as set out below.

After five years, the size of the research natural area should be expanded to permanently encompass the entire park. We feel this time is necessary to allow the fishing public to gradually phase themselves out of the Park, allowing charter companies and long-time users to find other areas. We are confident that data collected over the five years will show the benefits of the no-take provisions upon size and/or abundance of reef fish. As

mentioned, we consider this data collection and analysis to be important, since it would provide more scientific evidence about the effects of such areas. But even if the benefits to fish stocks are not immediately apparent, this does not mean that the no-take zones are not providing a significant benefit. The Tortugas is located adjacent to two coastal current systems that provide a mechanism for larval entry into coastal habitats. Tracking studies have shown that larva are transported from the Tortugas to nursery grounds in Florida Bay during periods of southeast winds.[viii] Thus benefits to fish or shrimp biomass in the region may not be apparent from local data collection studies, but providing and important benefit for the region.

NPCA supports the caveat that if the data on fish stocks was inconclusive after five years, or the data indicated that stocks in both areas demonstrated the same increasing trends, the expansion of the no-take zone could be delayed for another 5 years. The rationale is that due to recruitment patterns and outside influences, it might take more than five years for some species to demonstrate measurable changes in productivity.

That said, this approach which allows a stepped approach to designating the RNA should not be interpreted as a requirement that scientific research must "prove" that the no-take zone benefits fish stocks before the no-take zone is expanded. On the contrary, the immediate expansion of the RNA is justified by application of the criteria (see below). The delayed implementation of the large no-take zone is simply a compromise, with the burden of proof in the correct place. Only in the unlikely event that sound interpretation of data indicates that the RNA has a demonstrably *detrimental* effect on fish biomass after ten years, ahould the Park consider revisiting its management decision on recreational fishing.

Rationale for NPCA's Recommended RNA Size and Configuration

The size of the RNA in the NPCA alternative, which covers over 60% of the Park (increasing to almost 100% after five years unless certain conditions are met) is the best size and configuration based upon the Park Service's own criteria. The rationale is based upon an analysis of the criteria for identifying the RNA listed in the EIS Table F-9, page 239. Below is a summary of this analysis. Since the tables listing selection criteria indicated that Alternatives A,B, and D fell far behind C and E, this comparison only considers C and E for simplicity's sake.

Criteria I: **Represents the full range of Habitats of the Park**. According to the EIS Table F-9, Alternative E and C contain at least 20% each of the full range of habitats, and provide protection for species at risk. Because the seagrass community is so unique this far from the mainland, the seagrass benthos and associated organisms deserve special protection, beyond the 38% of DRTO seagrass afforded by Alternative C. The NPCA 1-5 year RNA would shift the boundary east, adding a significant area of seagrass. Also, one of the "best" examples of seagrass communities is barely within Alternative C's RNA, and the EIS acknowledges that it "might not be sufficiently buffered from activities outside the RNA" (EIS p. 237). Because the NPCA 1-5 year RNA shifts the boundary

transecting the seagrass beds to the east, the best example of the seagrass benthos (listed as siteB-10) would be included and far enough inside the RNA to escape outside effects.

Criteria II: **Includes Previous Research and long-term monitoring sites**. Since the monitoring sites have chronicled the history of the area, the more sites included in the RNA will yield more information on the effects of the no-take zone. While Alternative E includes 100% of the all of the "types" of sites sites in its RNA, Alternative C does not even include 50% of the seagrass monitoring sites, violating one of the criteria. By adjusting the boundary to the NPCA recommendation, three more seagrass monitoring sites are included, bringing the percentage up to almost 80%, thus satisfying this criteria.

Criteria III: **Sufficient Size to Contain Apex Predators.** Alternatives C, E, and NPCA's recommendation satisfy this criteria completely.

Criteria IV: **Large Enough to be Self Sustaining**. Alternative C's RNA only partially includes a known snapper spawning aggregation area. It contains none of the known grouper aggregation areas. While the NPCA's 1-5 year RNA also only contains part of the snapper area, it contains more of it, and it encompasses the entire grouper aggregation area. Although the location of these areas were not identified in the EIS, NPCA consulted Park Service personnel to ascertain locations and confirm that they fell within the parameters.

Criteria V: **Enforceable and Identifiable.** According to the EIS, Alternative C best encourages compliance and facilitates enforcement. According to Tables F-6 and F-6A, it appears that this is because the area is smaller and there is a shorter distance from the furthest corner to the ranger station. However, another consideration of this criteria is the complexity of the boundary. Since the NPCA alternative boundaries are a straight line conforming to a longitudinal line, it compares favorably with the "notched" boundary proposed in Alternative C. The full park, Alternative E and NPCA's post-5 year RNA is clearly the least complex boundary.

Criteria VI: **Considers Socioeconomic Impacts**. The socioeconomic impacts of Alternative C are smaller than NPCA's proposed alternative, since the impacts on recreational fishing are smaller. While NPCA considers this factor to be important, it is not as directly linked to the primary purposes of DRTO. The primary purposes are to protect and preserve the natural, historic, scenic, marine and scientific values for the enjoyment of present and future generations. Further, the park includes only a small portion of the fishing areas available to population centers in Florida. Thus, socioeconomic impacts should not be weighed as heavily as selection criteria as the other factors.

Criteria VII. **Considers Larger Ecosystem.** This criteria, since it is mainly defined as whether the RNA is contiguous with the Sanctuary's proposed ecological reserve, clearly favors Alternative E, since it shares more of the boundaries. The NPCA 1-5 year RNA, and Alternative C are fairly similar.

Of the alternatives presented in the EIS, Alternative E's RNA clearly satisfies the stated criteria much better than any of the other options. The rationale for selecting alternative C described in Appendix F did not adequately explain the reasons for setting aside the alternative that best satisfied the most criteria. It is unclear if any other criteria were applied by the park service to select C's RNA, or if less critical criteria, i.e. maximization of operational efficiency, was given more weight than others. It might be inferred that the Park Service diverged from its stated criteria, and applied an unwritten but accepted additional criterion. Discussions with park planners indicate that a criteria may also have been a desire to "leave the least footprint" by management, by imposing the minimal amount of controls while still adequately satisfying the selection criteria. This is consistent with 1995 recommendation of a blue ribbon panel of professionals charged with reviewing National Park Service management policies for biological resources, which read:

> "We recommend the minimum management necessary to achieve park goals. Because knowledge will always be imperfect, we recommend that management interventions be the minimum needed to maintain or restore park ecosystems within the parameters defined by the advisory panels. Management is not an end in itself, and it should only be used with that viewpoint."[ix]

Whether or not the source of this additional criterion is from this obscure report or not, if it were a factor in the decision it should have been discussed in the EIS. The fact that Alternative C was selected over Alternative E was not adequately explained and is not supported by the selection criteria.

Resource Protection – Other Issues

In its comments on the DRTO, the Center for Marine Conservation (CMC) recommends a full time resource manager, on-site at the park. CMC also advocates strict requirements for concessioners to supervise snorkelers, as well as prohibitions on equipment and fin sizes that encourage harmful contact with fragile, vulnerable corals.[x] We incorporate those comments by reference. The resource manager is a vital link in ensuring that adaptive management takes place, and that the innovative plan is effectively implemented. The protection of sensitive coral from inadvertent snorkeler contact is a very important requirement, given the federal government's commitment to and recognition of the need to protect coral reefs.[xi]

Fort Jefferson is an important national treasure and its conservation and protection is of paramount importance. NPCA feels that decrease in visitors as a result of the carrying capacity determinations and the other actions intended to rehabilitate the structure are necessary. We agree that mortar falling from the fort into food, furniture and clothes at employee's quarters are indeed an "inconvenience," (EIS p. 135) and NPCA supports the use of prototype quarters like the prototype installed in July 1999 because it is self-contained and does not use any of the Fort's historic fabric.

Likewise, the artifacts at shipwreck sites are also of great national significance. NPCA supports the submerged cultural resources strategy outlined in Appendix J. Full evaluation and documentation of sites is a commendable goal. The multi-party National Register nomination will have many potential benefits, including justification for more investment in resource protection, and greater eligibility for designation as a world heritage site.

Visitor Experience

NPCA supports the approach to mooring and anchoring that the park service proposes in alternative E. No private boats should be allowed to anchor or moor in the RNA, and passengers from the boats would be required to join a highly structured tour conducted by a concessionaire in order to visit many of the sites they are now allowed to visit. Although private boat owners will be more constrained, the overall plan offers a significant increase in visitor experience opportunities. All visitors will have access to areas served by a concessioner offering guided trips within the park, areas that were once only accessible to private boaters. All activities in these areas will be carefully controlled by the concessioners. .

The proposed plan to disperse visitors, however, is unacceptable unless there is careful monitoring of the concessioner's effectiveness at controlling visitors and preventing resource harm by NPS personnel. There must also be effective monitoring of the effects of increased visitation in new dispersal areas.

The configuration of the Historic Preservation/Adaptive Use Zone around Garden Key should be altered to make enforceability easier. The irregular shape of the current zone, based on a depth isobar, makes it difficult for boaters to anticipate the boundary. The Park should configure zone so that its boundaries are easily identified using the Global Positioning System or calculating the distance from the island.

NPCA strongly supports the controls on visitor numbers based upon the carrying capacities of the different places in the Park. The results of a national survey completed in 1986 indicate that this management approach has tremendous support among Americans. When asked whether NPS should limit visitation if the number of visitors is harming park resources, an overwhelming 92% responded in the affirmative.[xii] In fact, a large proportion also supports limiting visitors in order to ensure that crowding does not detract from park visits.[xiii] While the top priority in controlling visitor access to DRTO is resource protection needs, the EIS acknowledges that visitors experience large crowds during the popular tourist season. Thus limiting visitors to preserve the quality of the experience for other visitors also justifies the approach.

Indeed, visitation has increased significantly, as described in the EIS, and unless limits are placed on it, the unique natural qualities that recommend it, and its remote isolated feel, the park experience will be significantly diminished. The visitor numbers will not decrease: whereas it was once expensive and difficult to get to the park, GPS positioning and daily ferries have made it easier to find and more affordable.[xiv]

The EIS did not adequately explain how it arrived at its preliminary capacity numbers for its known and potential recreation sites, set out in Table D-1 on page 227. The explanation on page 37 reads:

> "A group of staff and researchers who have had extensive experience in managing coral reefs and have observed the relationship between visitor use and the condition of the resource was assembled to develop preliminary numbers. Then several other experts reviewed the results of their efforts."

The experts are not identified, nor were the sizes of the expert and reviewing groups. Since no systematic formula or objective criteria was involved, the numbers could be somewhat arbitrary. This is not a major failing, since the EIS makes it clear that these are simply "starting points" and "preliminary numbers" and that "through monitoring the park staff will determine if these numbers are viable/acceptable." But in the initial phases of determining capacity, more systematic or defensible strategies should be set adopted for setting these initial parameters.

NPCA recommends that the preliminary numbers should be revisited, using a more precautionary approach that sets these numbers at the lowest number which gives the panel of experts confidence that the resources will be protected. Obviously, none of these numbers will be precise and they will be subject to the same adaptive scrutiny and follow-up. But if the preliminary numbers are set too high, there is a greater risk of not being able to reduce the number of allowable visitors in the future. This would result in higher risks to the resource, bad publicity, disappointed expectations from concession contract holders, and suspicion from the public that they are being "phased out" of the park. If the preliminary numbers are set with deliberate caution and bias towards conservatism, future numbers may, in fact, go up.

The approach to adjust carrying capacity limits (EIS p. 37) should be systematic and normative. In general, the approach in the EIS is good. Development of indicators for resource conditions and visitor experiences, followed by setting a standard for each indicator, and finally establishing monitoring for feedback and determination of goal achievement is the right approach. We agree that it is appropriate to adopt a standards-based approach to carrying capacity rather than a formula-based approach, which is less transparent about the value judgments being made.[xv] Since the treatment of the approach is so ill-defined, NPCA strongly recommends that the process used to determine the actual standards and indicators be part of an open, public participation process, and that the information gathered in the monitoring stages also be made available to the public.

Finally, we encourage NPS to include a section in its plan indicating how park managers will attract a more diverse set of visitors and enable them to have a high quality experience at the park. This should include an approach that will address English language limitations of some visitors, and the prohibitive costs of transportation to the

remote park for many members of the public. While we are not putting forward any specific plan to address this need, we urge the park to consider reaching out to ethnic minority communities and low income groups to help identify ways to bring the unique DRTO experience to a broader range of visitors.

Conclusion

The Park Service should be congratulated on its vision for managing DRTO in the 21st century. The general approaches proposed for managing visitor use, providing commercial services and protecting natural and cultural resources are, on the whole, innovative and standard-setting. With a few recommended improvements, the General Management Plan Amendment will effectively guide DRTO management for decades to come. NPCA supports the concept of the RNA, and believes that it will prove to benefit both the resources, and eventually resource-users, as spawning stock and sizes of fish within and outside the RNA and increase. RNA significantly larger in size and simplified in configuration than the preferred alternative's RNA is recommended. The new opportunities for park visitors to visit.

Submitted on behalf of NPCA by:

Mary A Munson

Mary A. Munson
Director
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END NOTES

[i] 16 USC 410 (1992).
[ii] See, Wickstrom, K., Should Dry Tortugas wasters be closed to fishing? Palm Peach Post, 6/25/00 p. 1E, and Wicksrom, K., Block the No-fishing gang, Florida Sportsman, August 2000, p. 9.
[iii] NPS-77 Guidelines, Special Park Designations, Research Natural Areas, Ch. 4 p. 13.
[iv] See, Sobel, Jack, 1997. Marine Reserve: Necessary tools for biodiversity conservation? Global Biodiversity, 6(1), pp. 8-18, Ticco, P.C. 1995. The Use of marine protected areas to rpeserve and enhance marine biological diversity: a case study approach. Coastal Management 17:37-53
[v] Sewell, Brad, Comments of the Natural Resources Defense Council on the Scoping of the Tortugas 2000 Initiative and the Dry Tortugas National Park Visitor Use and Commercial Services Plan, Dec. 17, 1998.
[vi] See, Karl Wickstrom, Fishing Ban is Overkill, Palm Beach Post, June 25, 2000.
[vii] 16 USC 1 (Pub.L. 91-383, § 1 (1970)).
[viii] Proposed Rule, Florida Keys Marine Sanctuary Regulations, 65 Fed. Reg. 97, May 18, 2000 p. 31635.
[ix] Wagner, Frederic et. al, 1995 Wildlife Policies in the U.S. National Parks, Island Press, p. 175.
[x] Anaston, Kim, Comments on Dry Tortugas GMP Amendment EIS, July 31, 2000.
[xi] See, Executive Order 13089, Coral Reef Protection, 6/11/98 (EIS Appendix C, p. 226).
[xii] NPCA and Human Dimensions in Natural Resources Unit of Colorado State University, 1996. American Views on National Park Issues Summary Report, May 21 (On file with author) P. 23.
[xiii] Ibid. p. 23. The actual proportion was 83% of the respondents in favor of limiting visitors based on the need to control overcrowding.
[xiv] Klingener, Nancy, The Miami Herald, Sept. 20, 1998, p. 1B.
[xv] Graefe, Alan R., Fred R. Kuss and Jerry J. Vaske, 1980. Visitor Impact Management: The Planning Framework Vol. II, NPCA, Washington, DC p. 83.

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

August 1, 2000

Jeffery Scott
Supervisory Park Planner
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

Comments on the Dry Tortugas General Management Plan Amendment

Dear Mr. Scott:

The Natural Resources Defense Council (NRDC) submits the following comments regarding the Dry Tortugas National Park Draft General Management Plan Amendment Environmental Impact Statement. NRDC has over 400,000 members nationwide and over 20,000 members in Florida.

First, NRDC strongly supports the creation of the Research Natural Area (RNA). The RNA should be designated for resource protection and research purposes. Specifically, all fishing, including sportfishing and "catch and release", should be prohibited. This prohibition is consistent with the Organic Act, the Park's enabling legislation, and the Executive Orders for Coral Reef Protection (13089) and Marine Protected Areas (13158).

The RNA's boundaries should be at least those proposed for Alternative C. We strongly recommend that more inclusive boundaries be considered and specifically that Alternative C's boundaries be expanded into the southwest and northeast portions of the Park. Alternatively, more inclusive boundaries could be phased in over a predetermined schedule, with adjustments made depending upon the success of the RNA. We note that Alternative E's boundaries appear to be the best fit with the stated criteria for the RNA and the region's recognized environmental protection needs.

Second, it is critical that the Park adopt the proposed approach to controlling visitor numbers based upon the carrying capacities of the different Park areas. The visitor numbers should be set conservatively and should clearly be significantly below current peak visitor rates, given: (a) the Park's significant innate values in terms of remoteness,

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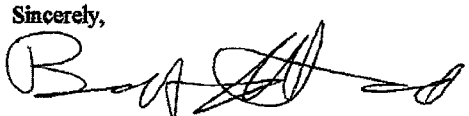
wildness, and natural quiet, (b) the Park's fragile natural and cultural/historical environment, and (c) the extreme current degradation of such values because of excessive visitor use. As we wrote to Superintendent Ring more than a year ago, visitor enjoyment at the Park is currently severely compromised. We also strongly recommend that there are adequate public and private resources devoted to monitoring and supervision of visitors throughout the Park, and particularly in the more sensitive locations. The above-described measures – like the fishing prohibition -- would be consistent with the Organic Act (e.g., leaving park resources "unimpaired") and the Park's enabling legislation.

Sincerely,



Bradford H. Sewell
Senior Project Attorney

MR. WARREN JOHNSON: My name is Warren Johnson, and that's my address. (P.O. Box 2322, Key West, Florida 33045)

I'm a national vice president of the Propeller Club of the United States for the southeast region, which is from Mississippi up to the Carolinas.

My concern as a local Propeller Club member of Key West is the maritime business that exists currently, specifically vessels that transport people to Tortugas, who in my estimation have developed the attractive nuisance to the Tortugas, when 25 years ago Tortugas was a rat-invested island.

The point is, what consideration is going to be given to these, probably handful of local business? Are they going to be allowed to be permitted and grandfathered in automatically without competition from outsiders, specifically west coast California ferries, people from France, England, etc., some venture capital firms that just want to make people go from A to B, because we now have an attractive attraction, being Tortugas.

I would like a response. I am also a member of the Florida Keys National Marine Sanctuary Advisory Council, and I represent the maritime boating industry. So I will look forward to a response.

sure that people are using it, using the facility. Thank you.

MS. MARY GLADDING: Mary Gladding. My mailing address is P.O. Box 5325, Key West, Florida 33045.

The only thing my husband and I were questioning was how the user fees were going to work in the park. We commercial fish, and our primary fishing was down at the Fort. And a lot of times we go in there at night or sometimes during the day just to anchor up to sleep.

We don't, like maybe on rare occasions, because we've been going down there so much, we might go up on the Fort to use the, you know, look at the Fort if we have company aboard the boat or anything. But primarily pretty much it's just the two of us.

We were wondering how the user fees were going to work, if we were still, just for anchoring up inside of the harbor, if we were going to be charged a fee for that when everything comes down. That's the only thing we were wondering about, how that was going to work.

And another thing, I was wondering if there was any chance we could get a doggy beach put in

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July 20, 2000
Operations Center

Mr. Jeffery Scott
Dry Tortugas National Park
40001 State Road 9336
Homestead, Florida 33034-6733

RE: Draft General Management Plan Amendment/Environmental Impact Statement for the Dry Tortugas National Park

Dear Mr. Scott:

ReefKeeper International supports the establishment of a two-part Tortugas Ecological Reserve, with the taking of all marine life and anchoring prohibited within the reserve. For that portion of the Tortugas Ecological Reserve contained within the Dry Tortugas National Park, we support the boundary and regulatory recommendations of the Working Group or other equivalent boundary options.

ReefKeeper International, the non-profit coral reef conservation organization, has been working to protect the coral reefs of the Florida Keys since 1989. ReefKeeper International has worked with the Florida Keys National Marine Sanctuary ("FKNMS") since its inception to develop a marine reserve in the area of the Dry Tortugas.

The Need For Action

Located 70 miles west of Key West and over 140 miles from the mainland, the coral reefs in the Dry Tortugas are isolated from land runoff, resulting in the cleanest, clearest waters in the Florida Keys. The marine resources of the Dry Tortugas boast the highest coral coverage and the healthiest coral in the region, high biodiversity, high productivity and important spawning sites.

The Dry Tortugas support a thriving seabird population, including the only roosting population of magnificent frigate birds in North America. Of great significance, the Dry Tortugas are located at a crossroads of major ocean currents, which carry larvae of fish, lobster and other creatures downstream to replenish populations in the Florida Keys and beyond.

While the Dry Tortugas are in relatively good condition, threats are on the increase. Fishing pressure has increased dramatically. Over 100 commercial fishing vessels and many recreational fishers work the ocean

environment outside of the Dry Tortugas National Park. Divers converge on the area to view its breathtaking coral reefs. Visitor use at the Dry Tortugas National Park has doubled in the last three years, increasing to 84,000 visitors per year in 1999. The FKNMS has prohibited anchoring by freighters on the lush reefs of Tortugas Bank, but this practice still threatens other parts of the region. All of these factors have resulted in threats of depleted fish populations and habitat damage.

The Goals of the Proposed Tortugas Ecological Reserve

In its management plan developed in 1996, the FKNMS stated its intention to establish an Ecological Reserve in the area of the Dry Tortugas as part of the FKNMS zoning plan. The goal of the FKNMS zoning plan is to

> "protect areas representing diverse Sanctuary habitats and areas important for maintaining natural resources (e.g. fishes, invertebrates) and ecosystem functions while facilitating activities compatible with resource protection" (zoning action plan, Final Environmental Impact Statement/Management Plan, Vol. I, pg. 255).

To meet this goal, the FKNMS outlined nine objectives that must be accomplished. Included in these objectives are the creation of non-consumptive zones and restricted access areas. For example, Objective 2 of the FKNMS zoning plan is to:

> "protect biological diversity and the quality of resources by protecting large, contiguous diverse habitats that are intended to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life and to protect and preserve all habitats and species" (Ibid.)

The proposed Tortugas Ecological Reserve is consistent with the goal and objectives of the FKNMS zoning plan. As proposed, it will protect a wide range of habitats in two large sections, contribute larvae for the replenishment of resources outside of the reserve, protect biodiversity and ecological function, and allow for activities such as non-consumptive diving that are compatible with resource protection.

The Tortugas 2000 Working Group

In an initiative called Tortugas 2000, a 25-member working group representing commercial fishing, recreational angling, diving, conservation, science, citizens-at-large, and government agencies used the best available scientific and socioeconomic information to develop a boundary and regulatory proposal for the Tortugas Ecological Reserve. The proposed Tortugas Ecological Reserve is a product of consensus by twenty-five diverse representatives of every constituency concerned with the reserve. The Working Group was charged as follows:

> "Using the best available information, the Tortugas 2000 Working Group will collaborate in seeking to reach agreement on a recommendation to the State of Florida and the Sanctuary Advisory Council regarding a preferred alternative for an ecological reserve in the Tortugas area. The Working Group will develop criteria for evaluating a range of alternatives regarding location, size, and regulations that are consistent with the objectives for 'Ecological Reserves' that were defined in the Florida Keys National Marine Sanctuary's Final Management Plan."

The Working Group then crafted a consensus vision that the Tortugas Ecological Reserve would:

- -- protect biodiversity
- -- protect a diversity of critical habitats
- -- protect species diversity

- protect ecological structure, function, and integrity
- capture a suite of habitats critical to productivity
- have influence beyond its boundaries
- be able to function for replenishment
- be relatively unimpacted
- have simplified boundaries for users and enforcement
- maximize socioeconomic benefits
- be primarily no take with gradient of uses
- allow non-consumptive use

The Working Group assigned six criteria and relative percent weight rankings for developing the reserve boundaries:

- Biodiversity and Habitat (27%)
  Try to choose an area that would contain the greatest level of biological diversity and that would encompass a wide range of different contiguous habitats.
- Fisheries Sustainability (26%)
  Try to choose an area that would provide the greatest benefit in protecting and enhancing commercially and recreationally important fish species, especially those that are rare, threatened or depleted.
- Enforcement (17%)
  Try to choose boundaries and craft regulations that would facilitate enforcement and encourage compliance.
- Sufficient Size (16%)
  Try to choose boundaries that would encompass an area that is large enough to meet the criteria listed above and to achieve the potential benefits and goals of an ecological reserve.
- Socioeconomic Impacts (9%)
  Try to choose an area and craft recommendations that would serve to minimize adverse socioeconomic impacts on established users of resources in the area.
- Reference Area/Monitoring (5%)
  Try to choose an area that would serve as a reference or control area to facilitate the monitoring of anthropogenic impacts and to evaluate the consequences of establishing the ecological reserve.

Based upon the objectives and criteria decided upon by the Working Group, the members then drafted boundary alternatives without any consideration of political jurisdictions. The Working Group balanced the needs of the resources along with the needs of the users so that no one user group bore an unfair burden, while at the same time protecting the most significant marine environments.

By unanimous consensus, a boundary recommendation was accepted by the entire Tortugas 2000 Working Group. Also by unanimous consensus, the Working Group recommended that the removal of any marine organisms be prohibited within the Tortugas Ecological Reserve and that anchoring be prohibited to protect the fragile resources.

Other Endorsements and Approvals

In June 1999, the FKNMS Sanctuary Advisory Council unanimously approved the recommendation of the Working Group. The Gulf of Mexico Fishery Management Council ("Gulf Council") has also given approval to fishery management plan amendments that prohibit fishing in the entire Tortugas South reserve and that portion of the Tortugas North reserve that lies within their jurisdiction. During its public comment process, the Gulf Council received over 3000 letters in support of the no-fishing restrictions in the Tortugas reserve.

As part of the Dry Tortugas National Park Draft General Management Plan Amendment/Environmental Impact Statement ("Draft GMPA/EIS") public comment process, a letter endorsed by 55 groups representing over 3.8 million members that supports the recommendation of the Working Group has also been submitted. A copy of that letter is attached for your reference.

The National Park Service Alternatives

The Draft GMPA/EIS for the Dry Tortugas National Park sets forth five alternatives for consideration. The first, Alternative A, represents the "no action" alternative and clearly will not adequately protect the resources within the park. The remaining four alternatives offer varying degrees of protection to various portions of the park.

Boundary Alternatives

The boundaries presented in Alternative D of the Draft GMPA/EIS for the Dry Tortugas National Park conform to the recommendation of the Working Group. These boundaries represent the compromises made by the members of the Working Group and match with the boundaries currently being considered by the FKNMS and the Florida Fish and Wildlife Conservation Commission ("FWC"), as well as matching those already approved by the Gulf Council. Together, approval of the Working Group's recommendation by all 4 agencies would result in a cohesive Tortugas Ecological Reserve with easily recognized, and enforceable, boundaries.

The intent of the National Park Service Draft GMPA/EIS is to plan for the future management of the Dry Tortugas National Park and its resources. This document, and the decisions outlined within, are not designed for the sole purpose of establishing an Ecological Reserve, as are the plans prepared by the FKNMS and the Gulf Council. In fact, in evaluating the alternatives, the National Park Service focuses on maximizing benefits within the boundaries of the Dry Tortugas National Park, rather than within the entire proposed Tortugas Ecological Reserve. This focus by the National Park Service is significantly different than the strategy employed by the Tortugas Working Group, which looked at the entire region of the Dry Tortugas without considering jurisdictional boundaries. It is therefore completely understandable that the preferred alternative for a no-fishing zone contained in the GMPA/EIS has different boundaries than that recommended by the Working Group.

When comparing the National Park Service preferred Alternative C with Alternative D in terms of protection of habitat and fisheries benefits, little overall difference is apparent. Alternative C protects slightly more representative habitat and is expected to yield slightly more fisheries gains than Alternative D. The sizes of the Research Natural Areas proposed in Alternative C and D are almost identical. Both alternatives protect critical habitat types at all depths. Alternatives C and D are significantly better than the other 3 alternatives (A, B, and E) in terms of balancing resource protection and visitor experience within the boundaries of the Dry Tortugas National Park.

However, as proposed, the boundaries of Alternative C are far too complex to allow for adequate enforcement. It would prove extremely difficult for a recreational fisher to determine whether he is within the Research Natural Area, where fishing is prohibited, or within the Natural/Cultural Area where fishing is allowed, given the convoluted nature of the boundary.

ReefKeeper International recommends the following changes to the boundaries of Alternative C to ease enforcement and make the area more easily recognizable, if that alternative is chosen.

1. Make the eastern boundary a straight line. Currently, a "notch" is present north of Bush Key where fishing would be allowed, This "notch" complicates a boater's ability to determine where they can fish.
2. Establish a simple square one mile around Garden Key where fishing would be allowed to accommodate people going to or anchoring near Fort Jefferson. This would replace the extremely convoluted boundary proposed in Alternative C to delineate fishing and no-fishing zones around Garden Key.

With these changes, except within one mile of Garden Key, fishing would be prohibited within a simple square Research Natural Area that can be easily marked and the boundaries easily identified. The one-mile fishing zone around Garden Key could be easily enforced by park personnel.

ReefKeeper International supports the adoption of the Research Natural Area boundaries outlined in Alternative D or a modified version of Alternative C, as discussed above.

Regulatory Alternatives

Alternatives C and D would designate a portion of the Dry Tortugas National Park a no-take Research Natural Area, consistent with the goals of the Tortugas Ecological Reserve and the recommendation of the Working Group. These alternatives would also prohibit anchoring in the Research Natural Area to protect the fragile coral reefs, again consistent with the decision of the Working Group. Non-consumptive diving would be allowed within the boundaries of the Research Natural Area, allowing for continued use of the area by visitors without harming the resource.

ReefKeeper International supports the creation of a Research Natural Area with the prohibition of anchoring and the taking of any marine organisms within the area.

Thank your for your consideration, and anticipated support, of our request for no-take and no-anchoring areas within the Dry Tortugas National Park.

Sincerely,

Alexander Stone
Director

Diane M. Rielinger
Senior Policy Associate

MR. JOHN D. DANNELLY: This is a comment on the Dry Tortugas National Park portion. My name is John D. Dannelly. My address is 10680 Southwest 96 Street, Miami, Florida, 33176-2645.

One of the concerns that my fishing club has, which is South Florida Sport Fishermen, is access to bait in the immediate area of the Fort. Bait, primarily pilchards, have a tendency to gather up under the dock and also in the flats area that might be considered a cove or a little lagoon bounded by Butch Key and Long Key. If we could continue to have access to gathering bait in that general area, these are with cast nets, then that would go a long way toward allowing us to accept the loss of some fishing areas, but it would be a terrible impact to lose both fishing areas and access to bait.

So we would like to see something incorporated in the plan that would continue to allow cast net usage around the dock when conditions were met and on that flats area between Butch Key and Long Key, realizing that you have to stay far enough off Butch Key and Long Key to protect the birding habitat. Thank you.

DRTO Planning
08/01/2000 11:47 AM MDT

To: Margaret DeLaura/DENVER/NPS
cc:
Subject: Fwd:WWF COMMENTS ON TORTUGAS

cc:Mail Forwarding Information

World Wildlife Fund
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Marathon, Florida 33050
305/289-1010 phone
305/289-0113 fax
forpanda@bellsouth.net

SUBMITTED VIA EMAIL

31 July 2000

Jeffery Scott, Supervisory Park Planner
Everglades and Dry Tortugas National Parks
4001 State Road 9336
Homestead, Florida 33034

Comments on Draft General Management Plan Amendment/Environmental Impact Statement for Dry Tortugas National Park

Dear Mr. Scott -

I would like to take this opportunity to offer World Wildlife Fund's comments regarding the National Park Service's Draft General Management Plan Amendment/Environmental Impact Statement for Dry Tortugas National Park. We generally support the concepts embodied in the proposed action/preferred future direction of Alternative C, and also offer suggestions to increase the effectiveness of this plan.

Recognized worldwide by our panda logo, World Wildlife Fund leads international efforts to protect the diversity of life on earth. Through our work in the United States and more than 100 other countries around the world, we are recognized for our ability to translate decades of on-the-ground conservation experience into action at national, regional and even global scales. With the support of more than one million members around the world, WWF's South Florida and Florida Keys field offices and Endangered Seas Campaign have made protection and restoration of the Florida Keys coral reefs and greater South Florida ecosystem a global priority.

Our Florida Keys field office has participated actively in the Tortugas 2000 Working Group process since its inception. We are proud to be part of the powerful consensus this process generated among commercial and recreational fishermen, conservationists, divers, business owners, scientists, resource managers (including those representing Dry Tortugas National Park), and others, which led to the design of the Tortugas Ecological Reserve that is endorsed unanimously by the diverse interests of both the Working Group and the Advisory Council of the Florida Keys National Marine Sanctuary. The National Park Service's current proposal to establish a Research Natural Area within the boundaries of Dry Tortugas National Park, complementary to and contiguous with the reserve in Sanctuary waters, is an essential component of the plan to establish effective protection for this region's unique and fragile marine

ecosystems.

WWF is firmly committed to implementing strong protection for the coral reefs, seagrass beds, hardbottoms and related systems of the Tortugas region. We strongly believe that establishment of a no-take Research Natural Area within the park is essential for effectively protecting the region's irreplaceable marine life and the habitats they depend on. The management plan detailed in Alternative C has received our endorsement as it promises to help meet the critical goals identified by the Working Group - protecting biodiversity; protecting a diversity of essential habitats; protecting ecological structure, function and integrity; capturing a suite of habitats critical to productivity; having an influence beyond its boundaries; being able to function to replenish marine populations; being relatively unimpacted; having simplified boundaries for users and enforcement; maximizing socioeconomic benefits; being no-take; and allowing non-consumptive use.

Specifically, we request that the National Park Service act expeditiously to establish the Research Natural Area in which fishing will be prohibited and boating activity regulated to minimize adverse environmental impacts. We also recommend strengthening the educational component of the plan; hiring an on-site resource manager; and simplifying the zone boundaries.

A jewel in the crown of the Florida Keys archipelago, the Tortugas boast the clearest and cleanest waters in the region. Ranging from shallow mangroves and seagrass beds to lush coral reefs and hardbottoms, the Tortugas encompass a marvelous, nearly-pristine, highly productive marine ecosystem. Powerful currents deliver a rich supply of larvae from the Caribbean Sea and Gulf of Mexico, explaining in part why the Tortugas have such high biodiversity. The Tortugas also include the densest coral cover in the region, the most sea turtle nests, and North America's only breeding colonies of magnificent frigate birds, sooty terns and other species; and serve as one of the most prolific spawning areas for reef fish in the Gulf of Mexico and the southeastern United States.

Within this remarkable ocean wilderness, Dry Tortugas National Park is home to some of the most flourishing and untouched marine resources: the area's highest diversity of seagrasses, rich communities of sponges and gorgonians, spectacular coral formations like Loggerhead Forest, more than 300 species of reef fish, and a variety of endangered and threatened wildlife, including five species of sea turtles.

World Wildlife Fund joins Dry Tortugas National Park in its concerns that skyrocketing visitation rates to this remote region (which have quadrupled over the past 14 years to 84,000 visits annually) are rapidly escalating resource use and degrading fragile habitats. With coral reefs under threat worldwide, and the Florida Keys identified as an ecosystem at risk, it is imperative that immediate action be taken to protect the Tortugas. Preferred Alternative C clearly fulfills the park's mandate to protect and interpret a pristine subtropical marine ecosystem, including an intact coral reef community; and to protect populations of fish and wildlife. Its implementation is critical to the success of the Tortugas Ecological Reserve and an important component of the United States Coral Reef Task Force National Action Plan to Conserve Coral Reefs, and has therefore earned the support of our organization.

We are generally supportive of the National Park Service's use of zoning to satisfy its varied and often competing mandates, and highly supportive of the designation of the Research Natural Area zone to provide the highest level of protection. Experience in more than 130 marine protected areas worldwide has confirmed World Wildlife Fund's belief that such zones can meet - and even exceed - important environmental protection objectives; experience which is borne out by

more than 250 peer-reviewed scientific papers documenting fisheries and conservation benefits.

More than 60% of reef fish species in Keys are overfished, and exploitation has altered the fundamental structure and dynamics of the reef fish community. Though populations remain healthier in the park than elsewhere in the Keys, fishing pressure is escalating in the Tortugas and repercussions are already being felt. Models indicate that without intervention, for example, the park's snapper, grouper and grunt populations will certainly continue to decline.

Commercial fishermen - who are credited with making some significant concessions recently to protect Florida's fisheries resources - are already banned from fishing in the park. In Alternative C, the National Park Service has correctly identified the need to tap the conservation ethic of recreational fishermen to secure the future of the Tortugas' marine life.

Creating a true no-take zone by eliminating all types of recreational fishing (including catch-and-release and trolling) will significantly simplify enforcement, eliminate fishing-related mortality and habitat damage, protect spawning aggregations, allow for natural ecosystem structure and function to be restored, help insure against stock collapses, and provide a source area to replenish fisheries throughout the region.

By protecting spawning stock, biomass and habitats, the proposed no-take zone promises to effectively increase reproduction. Models predict that implementation of Alternative C will generate an 800% increase in spawning populations of groupers in the park, for example, and a more than 1000% increase in their egg production. Such increased reproduction, in turn, will not only bolster fish and invertebrate populations within the protected area (the Sanctuary's no-take Western Sambos Reserve has significantly larger and more abundant lobsters, and more abundant yellowtail snapper, hogfish and groupers after one year of protection), but is also expected to lead to the dispersal of larvae, juveniles and adults across the zone boundaries to replenish depleted populations elsewhere.

World Wildlife Fund believes that the National Park Service's plan will also serve to ameliorate the negative impacts of boating in the Tortugas, which include damage from propellers, groundings, anchoring and pollution. Increased regulation of boating activity is essential to curtail damage to fragile seagrass and coral habitats, especially in the face of ever-increasing boat traffic in the region. The Research Natural Area will also provide an invaluable tool for assessing human impacts in the region, and for improving marine conservation practices. And it will serve as an invaluable "insurance policy" against unanticipated problems in more poorly protected parts of the ecosystem.

We would like to propose that several additional issues be evaluated in assessing the Draft General Management Plan Amendment/Environmental Impact Statement for Dry Tortugas National Park. First, we recommend the appointment of an on-site staff person dedicated full-time to managing the park's resources, and overseeing/coordinating research. To be effective, resource manager should have a strong environmental management/natural science background and should not be charged with enforcement/visitor safety duties.

We also recommend that the provisions for education be strengthened significantly. While the plan frequently makes references to the importance of visitor education, it does not detail the actions envisioned for implementing this essential component. Without innovative, widespread and evolving educational programs - and the resources necessary to support them - the success of the park's

conservation initiative is likely to be limited. Public understanding is a fundamental requirement for the support and compliance necessary to protect the Tortugas' resources.

We also find merit in Center for Marine Conservation's suggestion that the zoning boundaries be simplified to minimize confusion, improve enforcement and speed implementation. Specifically we recommend utilizing the 082*52' meridian line within the Research Natural Area to mark the eastern boundary; eliminating use of the "notch"; moving the southern Research Natural Area boundary to meet the existing park boundary to the south; and eliminating the "squiggly line" boundary surrounding Ft. Jefferson.

Other issues World Wildlife Fund has deemed important include the need for the park to support and expand marine research (including inventory and monitoring) to better understand the region and improve management capabilities; ensure highest level of protection for wildlife breeding and nesting areas; adequately address water quality problems, including wastewater impacts; improve enforcement capabilities to ensure the region is protected successfully; and continue to monitor and regulate visitation and use of the park to minimize adverse human impacts to the marine environment.

We would like to thank the planning team for developing a scientifically-sound, conservation-oriented plan for Dry Tortugas National Park that is compatible with the goals of both the Tortugas Ecological Reserve and the United States Coral Reef Task Force National Action Plan to Conserve Coral Reefs. We hope that the National Park Service will act expeditiously to ensure that the proposed Research Natural Area/Tortugas Ecological Reserve will become a bright beacon for the effective, cooperative protection of our coral reefs and other living marine resources. It is our sincerest wish that the Tortugas' wildlife and habitats be protected for current and future generations.

World Wildlife Fund appreciates this opportunity to submit comments on the Draft General Management Plan Amendment/Environmental Impact Statement for Dry Tortugas National Park, and we thank you for your attention to our requests. If you have any questions regarding our position, please contact me at 305/289-1010.

Sincerely,
Debra S. Harrison
Florida Keys Program Director
World Wildlife Fund

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SEAPLANES of KEY WEST

Jeffery Scott
Supervisory Park Planner
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

July 25th, 2000

Dear Mr. Scott,

Seaplanes of Key West would like to thank you for the opportunity to give our opinion on the proposed rules for the Dry Tortugas, I think everyone agrees that 'something' needs to be done to protect our beautiful National Park for future generations. Seaplanes of Key West has been operating out of Key West to the Dry Tortugas since December of 1996. Currently we are the only seaplane service with regular service to the Dry Tortugas, we have been the only service since January 1998 when Key West Air Service went out of business.

I think it is important to realize that visitation to the Dry Tortugas via seaplane service has seen **no** significant increase in the last 7 years.

YEAR	FLIGHTS	PASSENGERS (Seaplanes of Key West)
1997	1526	5481 (average 15 per day)
1998	2222	7748 (average 21 per day)
1999	1661	8520 (average 23 per day)

At first glance of the above numbers it looks like seaplane visitation has increased by around 30%. However, in 1997 there were 2 seaplane services operating. When this is taken into account there was actually a drop in numbers in 1998 and slightly less in 1999. The numbers for the first 6 months of this year are identical to the same period last year.

The maximum number of passengers that we can carry under 'ideal conditions' in one day is 76. We rarely fly this many people but we need to be able to do so in order to make up for the 'slow days' we encounter during the rest of the year. If you look at the daily average you can see that it is extremely low compared to the amount of people that the ferries carry. Seaplane passengers are staggered throughout the day so our impact on the Fort is also extremely low, we only have a maximum of 19 passengers at the Fort at any given time, for an average time of only 2.5 hours and 50% of all of our passengers are there during times when the ferries are not at the Fort. We cannot be limited to an arbitrary 50 people per day, this would make it financially impossible for us to continue operating at our present level of service.

Key West International Airport • 3471 South Roosevelt Blvd. • Key West, FL 33040
(305) 294-0709 • Fax (305) 296-5691 • 1-800-950-2FLY

There are no 'National Averages' for costs when computing the operating costs of Seaplanes in a salt water/tropical weather environment. The expenses incurred for running our seaplanes are **at least** 30% higher than a comparable seaplane operation in fresh water. Even highly experienced seaplane operators such as Ward Air (Key West Air Service) have greatly under estimated these expenses, this under estimation led to their demise in Key West. Booking agents in Key West from which most of our business is derived, take a 20% commission, twice the industry standard. We agree with an admission charge to the Park and would be happy to collect this fee for the Park Service. However any additional fees for seaplane service would need to be looked at very carefully. We already operate on a very small profit margin to remain competitive with other means of transportation.

Even though we are the only seaplane service actively operating I feel we provide an excellent service to our customers and the National Park Service. As you know we recently purchased a brand new Cessna 208 Caravan with a price tag of 1.5 million dollars. This aircraft is the most state of the art seaplane available any where in the world. We had plans to purchase a second Caravan but have yet to receive an answer from the Park Service to my letter dated December 20, 1999 (copy enclosed). As a result we have lost a $50,000.00 deposit on the airplane.

It is important to take into account that Seaplanes of Key West is owned by the same owners as Island City Flying Service (Key West's only aviation maintenance and fuel facility). All of our maintenance and fuel is at cost and we do not pay rent to ourselves to operate out of Key West. Even with these things considered we still had a small financial loss for 1999.

We can see no viable operating area for another seaplane operator to come into Key West. There is no space at Key West Airport and the 2 water take off areas used by previous seaplane operators (that were approved by the FAA) are now inaccessible due to marine sanitary rules and new construction. Even if there was space available how could you expect another operator to have their own maintenance facility and provide the quality of service that we currently provide? Marathon is not a viable option due to the amount of fuel required and the weight restrictions on float equipped aircraft for that distance.

Since Seaplanes of Key West is the only viable operator to service the Dry Tortugas we would like to begin negotiations immediately with the National Park Service so that we can come up with a plan that will help us do our part to provide our service to the public.

Sincerely,

Paul dePoo, Jr.
President

SEAPLANES of KEY WEST

December 20th, 1999

Richard G Ring
Superintendent
Everglades National Park
40001 State Road 9336
Homestead, Florida 33034-6733

Dear Mr. Ring,

At Seaplanes of Key we fly the best aircraft available to us. Due to the harsh environment we operate in, especially salt water, it is imperative that we periodically replace our aircraft. At this time we are looking to replace both of our Cessna 206 aircraft N200KW and N111KW. Cessna Aircraft ceased production of the 206 in 1982 and although they have recently resumed production, the new aircraft are not available for float conversion. There is no equivalent new aircraft available that can offer the same passenger loads and reliability.Our plan is to replace both Cessna 206's with one Cessna Caravan identical to the aircraft we already operate N208KW.

We are obviously aware of the growing concerns over Dry Tortugas National Park visitation, however we do feel the above change will be beneficial to both the National Park Service and Seaplanes of Key West. The benefits to the National Park Service would be as follows;

- Passenger maximum capacity will actually be less. (We would be trading two 5 passenger planes for one 9 passenger plane)
- Our take off and landings at the Dry Tortugas would be reduced by at least 30%.
- Shorter take off and landings
- Quieter operating levels.

In addition to benefits for the environment operating two Cessna Caravan's will further enable us to offer our passengers the ultimate in safety, comfort and reliability. At this time we look for your approval for the changes to aircraft and permit use before undertaking such an expense. Delivery time for this aircraft is 8 to 12 months so a prompt response would be appreciated. If you have any questions or concerns please do not hesitate to contact me.

Sincerely,

Paul DePoo
President

Key West International Airport • 3471 South Roosevelt Blvd. • Key West, FL 33040
(305) 294-0709 • Fax (305) 296-5691 • 1-800-950-2FLY

To: Dick Ring -Superintendent July 25 2000
Everglades and Dry Tortugas National Parks
From: Sonny Eymann- Sunny Days Catamarans
1326 10 th St Key West FL 33040
Subject: Comments on Draft General Management Plan for the Dry Tortugas

I operate one of the two ferry services that offer daily trips to Fort Jefferson and the Dry Tortugas National Park. We are entering our fifth year of operation. I started with a 49 passenger vessel that I designed and built myself. In the early days we went to the fort only 3 or 4 times per week, as did our competitor. As the marketing success of both ferry companies has grown, both ferry services have replaced their vessels with larger, faster 100 passenger vessels . Both ferry services are operating at, or near, capacity. Unless a new service was allowed to start up, there will be very little new growth in visitation.

Competition has increased the quality of the trips and the equipment used.

Because of the 70 mile remote location in open water and sometimes very rough seas, it is a very challenging trip. Both ferry companies have met this challenge by building faster vessels that ride better in the rough water that we often encounter. The quality of the personnel, guided tour, snorkel gear, and visitor amenities, as well as the effort that goes into educating the public as to the sensitive environment, all have improved.

Without competition, the quality of the trips would stagnate.

I have experienced boat tours in many parts of the world. The quality of the trip provided is proportional to the level of competition.

We are very often told that our trip was the best day of their vacation or the best boat trip that they have ever taken. We also receive many compliments on the speed of our new high tech vessel, our environmentally aware crew and knowledgeable tour guides, the food and beverages provided, and the quality of the snorkel gear. All of our efforts to improve equipment and provide a quality trip are strongly affected by the very competitive arena in which we operate.

In comparison,we have been told that the quality of the boat trip and the personnel provided by the one concessionaire in the Everglades National Park are not good. In my opinion, this is a direct result of the lack of competition.

There is need for more than one vessel.

Because of the remote location there is no back up for getting passengers home after weather change or equipment failures other than the competing services. We have brought seaplane passengers home after a weather change and we have brought our competitor's campers home after equipment failure. Our competitors have brought our passengers home for the same reasons.

Let free enterprise find the solutions.

We realize you have a mandate to protect the resources and we support that. However, we recommend protecting those resources by setting rules, installing mooring balls and working with ferry and seaplane services to solve the problems. **All three companies providing service have made major investments in planes and vessels, none of them should be eliminated.** Losing the ability to provide daily service to the park would be a major loss for any one or all of us. **We believe that the park and the public are best served by the competitive nature of the two ferry companies !!!!** Please consider these points in drafting the final plan.

Conclusion

I recommend that an interim solution that is not as drastic as Alternative C be implemented and given a chance for success. This solution may include such components as limiting the number of visitors to the park, installing mooring buoys, setting operating guidelines, and staggering arrival times. This interim plan should be evaluated in 5 to 10 years to assess its effectiveness in protecting the valuable natural resources of Dry Tortugas National Park.

Points to consider if Alternative C is selected

1. Instead of specifying one large vessel with smaller sub vessels, make requests for proposals that offer solutions to concerns such as;

a). The number of visitors on Garden Key at one time.
b). Bathroom facilities
c). Other services the park would like to see provided with limits on the number of passengers.

2. The concept of one large vessel carrying 150 -- 200 visitors with smaller boats as stated in alternative C of the Draft Plan is not a good idea for several reasons:

a. A passenger vessel capable of carrying that many visitors plus Coast Guard certified sub - vessels would be very large and expensive. It's fuel consumption would be much higher than 3 or 4 smaller vessels. **You would still have the problem of 200 passengers arriving and departing at the same time. So much for solitude.**

b. It's not practical to have a back - up for this mother vessel, it would be too expensive. Service would be interrupted and campers could be stranded if mechanical failure occurs.

c. If you specify one single vessel to carry more than 149 passengers you automatically eliminate all composite vessels (fiberglass vessels). Current Coast Guard rules for vessels for carrying more that 149 passengers are required to be built out of steel or aluminum. This rule is currently under review and may be changed, but it may take several years for change. This greatly limits the number of vessels available to meet a proposal of more than 149 passengers.

d. All sub - vessels carrying more than 6 passengers would also be required to be Coast Guard certified and be operated by Coast Guard certified captains with additional crew. This requirement increases the size of the mother vessel.

3. We believe that the public and the park would be better served by having multi vessels that are geared to do specific things such as snorkeling, diving, kayak tours, and visiting the fort. One proposal might be the use of multi vessels; vessel number one able to carry 100 passengers going directly to Fort Jefferson and staying there for four hours. Whereas vessels 2 and 3 with 49 - 100 passengers would leave Key West at a later time to do snorkeling, diving and kayak tours first, then visit the fort only after vessel number one leaves. This would offer the maximum chance for solitude and back up in case of equipment failure.

4. Side trips- we currently are the only ferry service that offers side trips to snorkel in other parts of the park. This is a concept that sounds great but has real life realities. First, it is not practical during very rough weather, which is the majority of the winter. Second, when we charge $10 extra for the side trip only a small number of people participate.

5. As a result of multiple passenger surveys, we have found that the four hour stay is a desirable time. When you add that to the ferry travel time, it is a full day. If you add snorkeling, diving, kayaking, and nature tours to this itinerary, visiting Fort Jefferson for two hours would probably be enough time to tour the Fort and enjoy Garden Key. This leaves the opportunity for multi - vessels to visit the fort during daylight hours at staggering times as suggested.

6. The time line which you propose in your request for bids will determine whether the vessel be custom built for this application or bidders will have to draw on existing equipment that may not be as well suited.

7. Please don't make specifications that favor one vender over another.

THE YANKEE FLEET
GLOUCESTER, MASS
KEY WEST, FLORIDA

Yankee Whale Watch • Deep Sea Fishing • Cruises
Dry Tortugas National Park Ferry

Superintendent Belli
Everglades and Dry Tortugas
National Park
4001 State Road 9336
Homestead, FL. 33034-6733

Dear Mr. Belli,

Please find enclosed our comments of the Dry Tortugas National Park Draft Plan. Please feel free to give myself or Carol a call anytime should you have any questions about our comments.

I have attached at the bottom of this page a confirmation that you are in receipt of our comments. If you would fax this page back to us upon receipt it would be greatly appreciated.

We look forward to reviewing the final plan and a continuing relationship with the park service.

Sincerely,

Capt. Alan (Jerry) G. Hill

Please fax back to:
978-283-6089

This is to confirm that the comments submitted by Yankee Fleet have been received by the Dry Tortugas National Park service.

_____
signature

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www.yankeefleet.com

THE YANKEE FLEET
GLOUCESTER, MASS
KEY WEST, FLORIDA

Yankee Whale Watch • Deep Sea Fishing • Cruises
Dry Tortugas National Park Ferry

July 26, 2000

Dry Tortugas National Park Draft General Management Plan

Gentlemen:

Please entertain our comments on the Draft General Management Plan for Dry Tortugas National Park. Having operated vessels in the park since 1977, we are very interested in the parks well being as a company and personally.

We recognize the good intentions of the draft plan and agree with its underlying premise. Although we are not in disagreement with Alternative A, or B, we feel that Alternative C has the most merit for obtaining the objectives of the park service mandates. In that light we would like to comment specifically on Alternative C.

Alternative C:

The park has size, great beaches, accessible coral reefs and wrecks, and wonderful history that is an integral part of the educational and interpretive program being stressed in the draft plan. We agree with:

#1. The enhancement of the interpretive program,
#2. Bringing forth more educational opportunity
#3. Creating a National Park office in Key West.
#4. Having the ferry docked at all times

These factors would have a positive effect on the visitor to the park. We believe #4 would play a significant roll in the enjoyment of the trip for many passengers for many reasons. It would provide shelter, act as class room facility, be available for visitors to have access to personal or recreational equipment, i.e.: snorkel gear, kayaks, PFDs, food and beverage etc. and most importantly bathroom facilities which would alleviate one of the major concerns at the park presently. Whether the dockage is made available through the existing dockage at Ft. Jefferson or having the concessionaire build one, it is in keeping with enhancing the overall experience for the visitor and the preservation of the park.

MEMBER NAPVO
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MEMBER N.T.A.

The area that we do not agree with in Alternative C, is the overall concept plan for diversifying activities and the distribution of visitors because it overlooks three important factors:

Factor #1. The nature of the park visitor coming on the ferry or seaplane:

A considerable portion of plane and ferry visitors are not inclined towards scuba diving, snorkeling off a boat, kayaking, or any of the more adventurous types of water activities. Rather, they are "day-trippers" and campers of all ages who are very satisfied with the "adventure" of the ferry or plane ride, enjoying and learning about Ft. Jefferson and looking to do a little snorkeling off the beach over the coral reef rather than being challenged by snorkeling off a small boat. The "security" of the beach, we have found over the years, is a very high factor for most of the snorkelers. We can attest to the validity of this having catalogued comment cards and visitor behavior since founding the ferry service in 1994.

We have offered kayaking opportunities to our passengers and although we have some interested passengers on each trip, it is in no way a large percentage. It is also a documented fact that there doesn't seem to be a great deal of interest in a side snorkeling trip to the wrecks in that 1 ferry service presently offers that trip and does not get a great deal of interest. On the other hand, we have offered a side excursion in past years to Loggerhead Key, when we were allowed to use the dock, and had a great deal of participation in that trip. The only reason we stopped this side trip was because we were denied access to the dock when it was rebuilt. With these facts in hand, we would expect, that a boat tour of the park and/or excursion to Loggerhead would be of more interest to most park visitors than a small craft trip to go snorkeling or diving to accomplish the goal of dispersing visitors to other areas and their overall enjoyment of the park.

For these reasons, we feel if the goal of dispersing the most amount of visitors throughout the park is to be met, the most feasible way would be to offer side trips of a tour nature in a vessel offering stability and partial cover vs. snorkeling and diving activities. Diving and snorkeling may be offered in rubberized craft for the more adventurous person but should not be focused upon to handle the majority of the distribution of visitors.

Factor #2. The weather conditions at Dry Tortugas are unfavorable for small boat activity much of the time.

The weather conditions at the Tortugas very often preclude snorkeling or diving from small boats because of not only low visibility but high sea conditions. We do not agree that the park service should set its sights on snorkeling and diving activities as the major component to disperse the visitors as mentioned above. The weather is more conducive to the possibility of "touring" side trips with a large enough vessel and the non dependency of the clarity of the water.

Factor #3. Requirement of ferry vessel size

The words "self-sustained" vessel, as related to on pg. 68, implies a "ship". Any vessel that is going to be big enough to be able to carry all of the side activity vessels, i.e.: tour boat, dive boat, kayaks etc. back and forth to Key West for the park and at the same time maintain a level of creature comfort and an acceptable speed, is going to have to be in the "ship" category. We believe that if the primary ferry vessel becomes a "ship", it will dramatically alter the nature of the visitor experience to the park for not only the ferry passenger but for the visitor who has come to the park by sea plane or private vessel as well. It will reduce the "adventure" feel of the trip, eliminate the "remote/romantic" nature of the experience, and probably become so cost prohibitive to the present day ferry passenger that it will dramatically reduce the occupancy to a point where the ferry company fails thus defeating the goal of the plan.

Our recommended alternative to a self-sustained "ship" is a vessel that can maintain acceptable comfort and speed, provide creature comforts such as food and beverage service, air-conditioning, upper viewing deck, have the ability to handle all of its passenger sewage for the entire day, and be able to transport the smaller vessels, such as kayaks and zodiacs, etc. as necessary. The ferry vessel would also be totally equipped and responsible for the crewing, maintenance and operation of a smaller tour vessel, which would be moored and full time crewed at the park.

If the park service finds that in order to make a commitment to Alternative C that e a "ship", as described above, must be utilized, then we would rescind our statement of agreeing with Alt. C and recommend Alt. A. or B. with further restrictions and guidelines placed on ferry permit holders. The present day ferry service is a success as evidenced by the growth in visitors. It is a more reliable service because of its 2 vessel operation rather than 1, and can be easily managed in respect to interpretive programs, offering more diverse activities, and sewerage control through planning and instruction by the park service.

In any management plan that the park decides on, it is our opinion that it should not make any decisions that are costly and permanent concerning the side activities for the purpose of distributing the visitors without giving them a trial period. The only true test for discovering what the majority of the visitors are interested in is by trying various activities and seeing what works and what doesn't.

We would also like to make a further comment about Loggerhead Key. Under any scenario, we oppose Loggerhead Key being "fenced off" as proposed in Alternative C. The island has a great deal to offer with it's beaches, snorkeling, diving, history, interpretive and educational benefits and its use in the plan is consistent with the services desire to disperse the visitors.

Thank you for this opportunity to comment on the draft plan.

MR. BRIAN SCHERF: My name is Brian Scherf. I'm at 1060 Tyler Street, Hollywood, Florida. Zip code is 33019. I'm a board member with the Florida Biodiversity Project and I came here to make comments on the General Management Plan for Dry Tortugas National Park and the Florida Marine Sanctuary.

I just wanted to say for as far as Dry Tortugas National Park that I support Alternative E. Our impacts now, we've gone beyond just

impacting species. We've gone beyond just impacting ecosystems. Now, we're threatening the global support systems on the earth here with global warming, acid rain and the greenhouse effect.

I brought a book here on Global Marine Biodiversity and I just wanted to read a paragraph out of it where, "Leading marine scientists have concluded that the entire marine realm from estuaries and coastal waters to the open ocean and deep sea is now at risk and marine biodiversity now is harmed by overexploitation, altering the physical environment, polluting the sea, introducing alien species and adding substances to the atmosphere that increase ultraviolet radiation and alter climate."

I think the Park Service has to go beyond just damage control and get to abiding by the precautionary principle and taking a proactive protectionary management stance. I was reading in the Sanctuary Plan there that groupers, for instance, their average size has decreased from 22 pounds to nine pounds which in itself I think is shocking. I think we should adopt Alternative E, which has the primary emphasis on resource

protection. And one of the primary reasons why we need to have resource protection is to safeguard these baseline areas, because if you don't know what something looks like in its pristine condition, how do you know whether it's damaged?

And I have some specific comments for the Dry Tortugas National Management Plan here. Like I said, I wanted to adopt, have the Park Service adopt Alternative E. First, I'm in complete support with the ecological reserve areas here for both the Marine Sanctuary and the National Park. Also, that we should support the creation of marine research stations to enable research and education necessary to set management policies in the future.

We should also require the National Park Service to install mooring buoys for visitors that frequent the coral reef sites. We should also have a comprehensive inventory and monitoring system adopted. We should also set aside known breeding and nesting areas to prohibit visitor traffic during critical stages. We must also address sewage and water quality issues; this is both on the land at the Fort and

also, with vessels that visit the National Park and the Marine Sanctuary.

We should also have additional staff to man the park. Park staff, as I know, is minimal and cannot meet the needs of enforcement and resource monitoring. We should also have information on park restrictions so that they're printed on the National Park Service Guide Maps, the National Park Service Website and the NOAA Charts to address things, that they state that they have limited sewage facilities, no freshwater, no concessions, et cetera. Also, the National Park Service should adopt incidental business permits as a tool to set limits on the number of visitors that can visit the park at any one time.

Some other additional suggestions are that dive and snorkel education programs be set up to prevent damage to sensitive areas and habitats. Also, that concession staff should be staffed at a ratio of one-to-six for visitors so there's adequate supervision so that visitors won't harm the resource. We should also ban gloves and fins in shallow water to prevent the handling and standing on coral heads. And lastly, commercial operators are responsible to provide restroom facilities on board the vessels and these should be self-contained so that we don't pollute the water. Thank you very much.

FLORIDA
BIODIVERSITY
PROJECT

August 1, 2000

Jeffery Scott
Supervisory Park Planner
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

RE: Dry Tortugas General Management Plan Amendment Comments

Dear Mr. Scott,

The Florida Biodiversity Project (FBP) submits the following comments on the Dry Tortugas National Park Draft General Management Plan Amendment Environmental Impact Statement (DEIS). Overall, the FBP commends NPS for drafting a plan with substantial RNA's which have been a long time in coming to fruition. The FBP supports Alternative E because of the past and ongoing adverse impacts to the Tortugas region, consistency with principles of conservation biology, and the NPS RNA criteria. In addition, we have serious concerns including the need for articulating clear ecological goals and objectives, hiring a marine biologist, designating carrying capacity, and the need to define marine ecological integrity.

I. BACKGROUND

A. Marine Ecological Decline

Biologists generally agree that the rate of species extinction in now 100 to 1000 times as much as it was before the presence of humanity. Not only has the extinction rate soared but the birthrate of new species has declined. Our largest parks, sanctuaries, and nature reserves are not big enough to prevent the extinction and extirpation of species. The principle causes of both extinction and the slowing of evolution is the degradation and destruction of natural ecosystems and overexploitation by humans. Researchers now agree that the Earth is in the midst of the seventh mass extinction event.

Leading marine scientists have concluded that the entire marine realm, from estuaries and coastal waters to open ocean and the deep sea is at risk. No place in the ocean is so remote that is has not been affected by human activity.

There are five major ways that human activities harm marine biodiveristy:

- overexploitation of marine species
- altering the physical environment
- pollution
- introduction of alien species
- global disturbances that alter the atmosphere and climate

The biologically richest stretches of ocean are more disrupted than the richest places on land. For marine ecosystems over exploitation has been the principle problem. On the world's continental shelves it is hard to find places where ship dragging nets haven't dug tracks into the sea floor. For example, in Europe's North Sea and along the Georges Bank and Australia's Queensland Coast, trawlers may scour the bottom four to eight times per year. The Cod fishery has collapsed and the swordfish population is in deep decline. Many of the most charismatic marine species such as whales and sea turtles have been brought to the verge of extinction.

A preliminary United Nations report states that 58% of coral reefs are imperiled by human activity such as global warming, over harvesting, degradation from fishing, and pollution.

Two-thirds of all fish harvested spend at some point in their lives on coastal wetlands, seagrasses, or coral reefs, all of which are declining. Fishing fleets are estimated to be 40% larger than the oceans can sustain. The catch of seafood is declining for about one-third of major commercial fish. These collapsing fisheries will directly impact approximately one billion people.

A root cause of marine decline is over population and the continuing development of technology. There are simply more people to be fed and more money to be made. People have more leisure time and disposable income. Vessels are bigger, faster, and more reliable. GPS units, remote sensing, and electronic fish finders make commercial and recreational fishing more "efficient". Advances in SCUBA gear allow divers to stay down longer at greater depths. Trawl nets, drift nets, traps, long line gear, and more accurate spear guns make it easier to exploit marine species.

The public and government agencies have now finally come to the realization that the oceans cannot inexhaustibly provide seafood, sustain damaging human activities, and absorb endless pollution and trash. In response to marine decline government agencies have designated marine reserves and parks. Unfortunately, the U.S. National Marine Sanctuaries are not regarded by many as true "sanctuaries" since they permit commercial recreational fishing with lines, traps, and nets that imperil marine ecological integrity. Likewise, parks emphasize recreational access over resource protection.

B. The Tortugas Region

The Tortugas region is one of the richest and biologically diverse marine areas and is not only a national but an international treasure. The Dry Tortugas contains the marine equivalent of

the tropical rain forests in that they support high levels of biological diversity, are fragile and easily susceptible to damage from human activities.

The Tortugas contains the healthiest coral reefs with highest coral cover and has some of clearest and cleanest and waters in the Keys. Coral abundance exceeds 30% cover in many areas compared to 10% in the rest of the Florida Keys. Some corals in the Tortugas are estimated to be 400 years old.

The Tortugas is a region of convergence for a multitude of marine species. Over 400 species of reef fish have been identified and many of these species are rare and endemic to the region.. The Tortugas is home to the only breeding ground in the continental U.S. for magnificent frigate birds, sooty terns, brown noddies, and masked boobies.

The Tortugas faces a multitude of threats. Largely because of its beauty and productivity it has been exploited for decades. Fish and lobster populations have been significantly depleted, threatening the ecological integrity and natural dynamics of the ecosystem. The Tortugas exhibits serious "serial overfishing" in which the largest, most desirable, and vulnerable species are depleted first.

For example, the average size of black grouper caught in 1999 is 40% of its historical level (22.5 lbs circa 1930 vs. 9lbs today). The current rate of fishing mortality on the black grouper is now greater than 4 times the level that would be expected to produce maximum sustained yield. "This situation is similar for a broad segment of the economically and ecologically important reef fish stocks in the Florida Keys."

The Tortugas is the most productive nesting area for the green and loggerhead turtles. All these species were once abundant but now all are listed under the Endangered Species Act. Once the green turtle played a major role in the Florida Keys ecosystem but are now effectively ecologically extinct.

The Straits of Florida are one of the most heavily trafficked commercial shipping areas in the world. Approximately 40% of the world shipping commerce passes within 1.5 sailing days of Key West. The anchoring of large freighters is destroying large areas of coral reef habitat. The 6-10 ton anchors of large ships cause extreme damage to corals and other habitats. In addition, the chain warp causes extreme damage to natural resources as it drags across the bottom.

Petroleum discharges with in 50 sq. miles of the Tortugas were greater than 50,000 gallons per year. Oil discharged from ships operating in the Gulf of Mexico is estimated at 2.5 million gallons per year.

Visitation to DRTO has increased 400% of the last 14 years and has increased to 60,000 per year. The population of South Florida is projected to double in the next 50 years to 12 million people. Population growth combined with continued technological innovations will result in more pressure on the resources in the Tortugas.

C. Dry Tortugas National Park

Dry Tortugas NP was first designated as a National Monument in 1935 and was redesignated as a National Park in 1992 effectively increasing the level of legal protection to natural resources. As a unit of the National Park System, the Park must be managed consistent with the purposes of the National Park Service Organic Act. The NPS has an affirmative duty to "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generation." 16 U.S.C. § 1 (emphasis added.).

The Redwood Act reaffirms the Organic Act and states that " the authorization of activities shall be contrued and the protection, management and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established." 16U.S.C. 1a-1 (emphasis added).

The Dry Tortugas National Park Establishing Legislation states "the park shall be managed for the following purposes among others;

1. To protect and interpret a pristine subtropical marine ecosystem including an intact coral reef community.
2. To protect populations of fish and wildlife, including (but not limited to) loggerhead and green seaturtles, sooty terns, frigate birds, and numerous migratory bird species.
3. To protect the pristine natural environment of the Dry Tortugas group of islands.
4. To protect, stabilize, restore, and interpret Fort Jefferson, an outstanding example of nineteenth century masonry fortification.
5. To preserve and protect the submerged cultural resources.
6. In a manner consistent with paragraphs (1) through (5), to provide opportunities for scientific research."

16 U.S.C. § 410xx-1 (emphasis added).

In addition, the Executive Order on Coral Reef Protection states that "federal agencies shall utilize their programs and authorities to protect and enhance the condition of [coral reef] ecosystems and ensure that any actions they authorize . . . will decrease the conditions of such ecosystems. E.O. 13089 (emphasis added).

II. SUBSTANTIVE ISSUES

A. The Management Plan does not identify scientifically justifiable goals and objectives.

While the DEIS states the purpose and need for the Plan it does not identify clear goals and objectives. Criteria for the RNA's are listed later in the DEIS but are not identified as goals and objectives.

A conservation strategy is more likely to succeed if it has clearly defined and scientifically justifiable goals and objectives. Noss (1994) lists five fundamental objectives that are consistent with the overarching goal of maintaining the native biodiversity of a region in perpetuity.

- represent in a system of protected areas, all native ecosystem types across their natural range of variation;
- maintain or restore viable populations of all native species in natural patterns of abundance and distribution;
- sustain ecological and evolutionary processes within their natural ranges of variability;
- build a conservation network that is adaptable and resilient to short-term and long-term environmental change;
- regulate human uses that are consistent with conservation of native biodiversity, and eliminate those that are not.

The above goals are different from the criteria for the NPS RNA's: 1) represents the full range of habitats of the Park; 2) includes previous research and long-term monitoring sites; 3) sufficient size to contain apex predators; 4) large enough to be self sustaining; 5) enforceable and identifiable; 6) considers socioeconomic impacts; 7) considers larger ecosystem

In addition, the NPS should consider the following additional criteria for the RNA:

- protect endangered, threatened, rare, or imperiled species;
- protect small populations;
- protect species with limited vagility;
- protect species with very specific habitat requirements;
- protect areas of high endemism;
- protect areas of productivity;
- product areas of high diversity;
- protect movement and migration corridors.

B. The DEIS does not define or identify indicators for assessing ecological integrity.

The cornerstone of foundation of the Management Plan should be to protect, maintain, or restore ecological integrity in perpetuity. The Plan should define ecological integrity and major indicators. The concept of integrity indicates that important values are associated with an ecosystem and that measure of these values indicate the degree of "health" of an ecosystem

Three major components comprise ecological integrity: 1) biodiversity; ecological processes, and ecological stressors. Biodiversity needs to be measures on the genetic, species, and seascape level and include species richness, exotics, population dynamics, and trophic structure. Ecosystem function should consider water quality, nutrient cycles, benthic processes,

productivity, succession and retrogression. Stressors include human activity (fishing, boating, etc) fragmentation, pollution, extreme weather events, etc.

One of the main justifications of the RNA's is the concept of fishery sustainability and replenishment of over-fished stocks. Unfortunately, sustainability has always been defined from a human perspective. For example, a tree farm can be managed for sustained timber yield but it is not a forest. Sustainability must be reinterpreted to include the nurturing of the structure, function, and composition of marine ecosystems in perpetuity.

As John Robinson of the Wildlife Conservation Society pointed out in 1993:

> *Sustainable use is a powerful approach to conservation . . . but it is not the only one. Many species will be lost unless they are protected and managed with the express goal of their conservation. Sustainable use is very appropriate in certain circumstances, but is not appropriate in all. It will almost always lower biological diversity, whether one considers individual species or entire biological communities, and if sustainable use is our only goal, our world will poorer for it.*

C. NPS should adopt Alternative E as the Proposed Alternative.

The FBP believes the most protective measures of Alternative E is warranted because of past and ongoing resource degradation. Alternative E is more consistent with principles of conservation biology and the NPS's own criteria . The rationale for this recommendation is:

- Because of the substantial impacts to the marine environment in general and the Tortugas area in particular (noted in Section I), this alternative provides more protection (see table below).
- The alternative is consistent with the principles of conservation biology including the precautionary principle (see below). Management should therefore be conservative, erring on the side of minimal risk to ecosystems.
- The alternative is more consistent with the NPS criteria for RNA's in the DEIS.
- The alternative provides a larger area as a baseline / control area for research and to measure impacts in the Tortugas region.
- The alternative comes closer to achieving the recommendations of the Coral Reef Task Force that 20% of reefs be protected as "no-take" areas by 2010.
- This alternative provides a greater contiguous area with the FKNMS proposed ER's.
- The alternative simplifies boundaries and enforcement.
- The alternative will have a greater probability of maintaining an optimally functioning marine ecosystem.
- The alternative recognizes that marine ecosystems are extremely complex, and human understanding of them is rudimentary.
- The alternative recognizes that human activities can be severe and have unpredictable effects on marine ecosystems, and these effects can be irreversible or require centuries for restoration

Table - Comparison of Alternatives C and E.

Criteria	Alternative C	Alternative E
Tolerance for resource degradation	Very low	Extremely low
RNA Size (% of park area)	50%	>90%
Full Range of habitats	20%	20%
Amt. of area contiguous with ER's	less	more
Previous monitoring sites	50%	100%
Large enough to self sustaining	yes	More spawning areas
Enforceable & Identifiable boundary	More complex	Less complex
Protection of sand bottom	Greatly reduces impacts	Nearly eliminates impacts
Seagrass habitat	38%	> 38%
Exploited Reef fish	88%	100%
Birds	Greatly reduces risks	Nearly eliminates risks
Marine mammals	Greatly reduces risks	Nearly eliminates risks
Turtles	Greatly reduces threat	Nearly eliminates threats

From the above table it is clear that Alternative E provides more protection of key habitats than Alternative C. In addition, the proposed action should be consistent with the precautionary principle. A scientific understanding of many processes is unknown and a comprehensive marine inventory of the region is missing. For example, the FKNMS DSEIS notes, "Very little is known about distribution and abundance of highly migratory species in the Tortugas region, or about the region's importance to these species." "In general, the biophysical processess involved in recruitment and surviorship of the larvae and juveniles are often the most poorly understood portion of the life history of reef fishes.". "Because of the remoteness of this region, very little is known about the dolphin and whale species that visit the area."

For the above reasons the NPS should select Alternative E as the proposed action.

D. The RNA should prohibit fishing.

The FBP strongly urges NPS to adopt language that fishing would be explicitly prohibited from the RNA's upon adoption of the Management Plan. First, the Park has already experienced serious adverse impacts of the exploitation of the snapper-grouper-grunt complex from recreational fishing. This is not consistent with a fundamental goal of ecosystem management that we maintain viable populations of all native species in natural patterns of abundance and distribution.

Second, since most of Florida Keys have experienced serious adverse effects from human activity. The Tortugas region provides a unique landscape level baseline or control area in which to gage the impacts of human activities on coral reef ecosystems. This important scientific value must not be compromised.

Any future change in RNA's management should be consistent with:

- Explicit scientifically based goals and objectives of the management plan to assure the maintenance of the Park's marine ecological integrity in perpetuity.
- Scientifically defensible monitoring threshold levels.
- Independent scientific peer review.

E. The NPS should designate scientifically defensible carrying capacity levels for the Park.

The DEIS does not specifically state a scientific methodology for arriving at carrying capacity levels. The FBP believes that carrying capacity levels should be based on resource protection and not recreational demand. The overarching goal should be to assure the marine ecological integrity in perpetuity.

Indicators of ecological integrity should be carefully chosen and management threshold levels scientifically established and carefully monitored. Carrying capacity levels should be strongly liked to monitoring results. Consistent with adaptive management, visitor levels can be modified based upon results of resource monitoring.

Consistent with the precautionary principle initial visitor levels should be kept low. It is important to note that once visitation levels are designated it becomes harder to reduce them in the future as use patterns and economic commitments become established. The rationale, data, and models should be clearly communicated to the public early in the process before interests become polarized.

F. The Park should hire a resource manager.

A serious scientifically based long-term monitoring program cannot be conducted without specialized professional staff. This would be consistent with NPS legal mandates and management principles including the Director's Natural Resource Initiative. Considering the scale, significance, and sensitivity of the Tortugas ecosystem, the resource manager should be an experienced marine biologist.

G. The Research and Monitoring component should be more comprehensive.

The Draft Management Plan discussion of monitoring is inadequate. Resource managers need accurate and comprehensive information in order to make intelligent natural resource decisions. This component should have specific objectives, specific threshold levels, and an implementation schedule.

First, DRTO should undertake periodic comprehensive resource inventories.

Second, a comprehensive monitoring program should be implemented that measures indicators of ecological integrity. "Management" threshold levels should be established at levels more protective than "biological" threshold levels in which a serious or irreversible impact occurs.

Third, the Plan should state what is to be monitored, where, and by what methods. Details should be provided on how remote sensing capabilities could be expanded to collect real-time data. The monitoring program should also be consistent with adaptive management.

The Park should seek cooperative research agreements with universities that have renowned marine research programs. A local laboratory needs to be available to assemble and analyze data, specimens, and conduct experiments.

Additionally, research results and reports should be incorporated into management decisions and be consistent with principles of adaptive management. A database of all research should be developed to aid the resource management staff..

III. CONCLUSION

It is our decision today whether the Tortugas region will continue to be a marvelously diverse oasis of marine life or whether the charismatic species of the future will consist largely of baitfish. The marine conservation battle is not merely protecting recreational opportunities or "wise management and use" of natural resources. It is a battle for life itself – for the continuous flow of evolution.

The impediments to fulfilling the goals and objectives of protecting biodiversity of marine ecosystems are many: philosophical, institutional, political, educational, and technical. Each of these barriers are or will be present in the implementation of a science based management plan for the Park.

As renowned evolutionary biologist E.O Wilson stated "None of this will be easy, but no great goal ever was. Surely, nothing can be more important than to secure the future of the rest of life and thereby to safeguard our own."

The DEIS makes a good start with the concept of using RNA's and integration with the FKNMS Ecological Reserves. The Management Plan needs to be improved to assure it fully protects the ecological integrity of the DRTO in perpetuity. Because of substantial adverse impacts and potential threats to the Tortugas region, the FBP strongly urges the NPS to select the more scientifically and legally defensible Alternative E.

The FBP requests a copy of the Final EIS and a copy of the Record of Decision (ROD) when it is issued. We also request to be placed on Dry Tortugas' National Park "interested parties" list for natural resources issues.

Sincerely,

Brian Scherf

Brian Scherf
Boardmemeber

Comments Regarding the Dry Tortugas National Park:

I have come here today in response to recent articles that I have seen in local newspapers regarding potential changes in the way that visitors may have access to the Dry Tortugas National Park. It appears that there is a proposal which would provide for one and only one concessionaire to ferry people to and from the park. The reason why I am concerned about this is because of the drastically different experiences I have had in recent years with the services provided by the multiple, competitive companies serving the Dry Tortugas and the single concessionaire, noncompetitive company serving the Everglades National Park.

Almost every aspect of dealing with the concessionaire at the Everglades National Park was unpleasant. The lack of competence and courtesy nearly ruined our trip to see one of our nation's greatest sights. The manner in which services such as canoe rentals and sightseeing trips were purchased was inconvenient because of the very limited operating hours of the ticket booth and confusing because data in the brochures was not consistent with the information stated at the booth. The sight seeing trip that we purchased for our family of two adults and two children was expensive and very late in leaving the dock with no explanation. The crew members were rude, and the boat was in poor repair. Anyone on the trip with children was treated with disdain. Renting canoes was difficult because there was considerable confusion as to which canoes were available and where they were located. The employees did not appear to be in the least bit concerned about the fact that they were greatly inconveniencing visitors. We had no choice but to deal with this company. They have no incentive to provide better service.

Our experiences dealing with the companies that serve the Dry Tortugas National Park have been in sharp contrast to the ones stated above. The ticket personnel have always been knowledgeable, friendly and accommodating. The crew members have always been courteous and have gone out of their way to make sure that everyone is safe and comfortable. The boats are very clean and in excellent shape. The food and extra services such as snorkel gear that are provided by these boats are always of high quality. The relative cost of the trip is reasonable. The crew members and other employees demonstrate a high regard for both their customers and the park.

We have a lot of friends and relatives that come to see us here in Key West and we always suggest that they go to see the beautiful and fascinating Dry Tortugas and Fort Jefferson. Without exception, it has been one of the most enjoyable and interesting experiences that they have ever had. It would truly be a shame if visiting the Dry Tortugas became a frustrating and unpleasant experience as our trip in the Everglades was.

Our national parks belong to all of us. It is the responsibility of the National Park Service to protect our parks and to keep them as national treasures. I fully agree with the current efforts to protect the park and its resources. However, once the regulations regarding the use of the park are agreed to, access to the parks needs to be provided for in such a way that the beauty and significance of these areas can be enjoyed and appreciated. Please do not let the indifference of a single, non-competitive, concessionaire spoil the experience of visiting the Dry Tortugas National Park.

June Adams
23 Aster Terrace
Key West, Florida

Dry Tortugas National Park

Draft General Management Plan Amendment / Environmental Impact Statement

Comment Form

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Comments: (Use back if needed)

Alternative E – Keep the Area Pristine – Use relevant Australian Pine, Brazilian Pepper as rafts for invertebrates + fish nurseries

Name: Jay Alexander Date: 14 June 00

Representing (if any group): ~~SE. Fish~~ S.C member + Self

Address: 231 44th Ave NE
SP FL 33703

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.

DRTO Planning
07/27/2000 07:43 AM
MDT

To: Margaret DeLaura/DENVER/NPS
cc:
Subject: Fwd:FW: Save the Dry Torguas

cc:Mail Forwarding Information

Jeffery Scott, Supervisory Park Planner

I just received a letter stating the coral reefs are imperiled at the Dry Tortuguas National Park. My crew and I just got back from a great week there. I have been there 3 times in the past 14 years and can see the deterioration from that short time. This park is in my opinion the best snorkeling in North America and is something the state of Florida can be proud of. I scuba dive and have won awards with my underwater photography which helps qualify that statement. This area needs preserved and I don't see that happening.

I could see that the park rangers are very much undermanned for one thing. Here's why, they used to provide tours of the fort and gave morning talks about the park which educated the visitors about the park. This no longer happens. Instead tour boats from Key West have to provide their own guides and if a private boat like ours wants a tour, we are asked to follow around the boat guide. If the rangers cannot be there to educate the many people who create havoc on these reefs, it will continue to happen. These rangers are trying to do the best with what they have by now having boats to overnight at the fort. I think this is a great idea anyway to protect the park from careless boaters and poachers.

Parks in the Florida Keys that want to preserve the reefs have mooring buoys for boats to tie up to prevent damaging the reef with anchors. In this whole park I found only one buoy and that was at the Windjammer Wreck. Without buoys to moor to the grass and reef bottoms will continue to degrade from anchors of uneducated boaters. To get a good view of this large park boats need to secure to something and Alternative C is at least the first step in preserving this resource.

I have been in the lighthouse on Loggerhead Key twice before when it was run by the Coast Guard. Since it was turned over to the park service five years ago it has deteriorated so much that visitors are no longer allowed. They miss an excellent view of the park from its elevation. This is one less attraction for the park.

The fort itself is also deteriorating badly with passages blocked off and bricks falling into the moat. This was very sad for me to see.

I support Alternative A which creates "no take zones" within the park. In fact I support the whole park being a "no take zone" to protect the wild life above and below the water.

Alternative B which would limit the number of visitors sounds unnecessary to me at this time. Not many visitors get to go to see this park and most Americans don't even know where it is. I have seen very few boats and the traffic from the sea planes and tour boats only let a small number of visitors on a very small portion of the park. Schedules for these vehicles can be coordinated and regulated but there does not seem to be a need yet.

Alternative D discusses the education for snorkelers, divers and other visitors not just for the reef but for the bird rookeries. This education needs to be provided by the park rangers and dive boats that visit the area. Dive boats should be certified by the park as to the training they need to provide their divers and the visits by these boats can then be regulated.

I am very concerned about the protection of this park and its deterioration.

Something needs to be done soon and letters by August 1 is a very short time to get much response. Please contact me at the address below, a reply, or by phone if a written letter is also needed. I can get signatures on this letter from several friends locally if that would help. Thank you.

Concerned citizen and Florida resident
Okie Baughman
Harris Site Activation
W: 321-768-4980
B: 321-634-8337
FAX: 321-768-4817

281 Camellia Ter.
Indian Harbour Beach Fl.
32937

Received: from corpmx1.ess.harris.com ([130.41.65.49]) by ccmail.itd.nps.gov with SMTP
(IMA Internet Exchange 3.13) id 000BB935; Wed, 26 Jul 2000 16:28:55 -0400
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id <PHJG3FBL>; Wed, 26 Jul 2000 16:31:42 -0400
Message-ID: <275399FB18C4D111871300805FBEB72F0A742AE4@corpmx6.ess.harris.com>
From: "Baughman, Okie" <rbaughma@harris.com>
To: "'DRTO_Planning@nps.gov'" <DRTO_Planning@nps.gov>
Subject: FW: Save the Dry Torguas
Date: Wed, 26 Jul 2000 16:31:37 -0400
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2650.21)
Content-Type: text/plain

James A. Bohnsack
11845 S.W. 69th Ct.
Miami, Florida 33156

June 19, 2000

Jeffery Scott
Everglades National Park
40001 ST RD 9336
Homestead, FL 33034

Dear Mr. Scott:

This is a letter of support for the the proposed Research Natural Area (RNA) in the Dry Tortugas National Park. Having first visited the Tortugas in the 1970's, I fully appreciate the importance and uniqueness of its resources for Florida and the nation. I also spent most of my life in southern Florida and have fished in the Florida Keys since the 1950s. I am very familiar with the condition of the resources and the changes that have taken place. The establishment of the proposed no-take ecological reserves is a conservative, scientifically based, and commonsense approach to management. Such reserves are long overdue. The reserves should prohibit all extractive uses to be effective as an ecological tool. It is also critical that non-extractive activities such as diving, wilderness use, ecotourism, education and permitted scientific research be allowed. Public access should be allowed for better public education, understanding and appreciation of our marine resources and the effectiveness of management.

I support the implementation of an entrance fee. It is reasonable and necessary to support park facilities and functions.

I do not support the proposed prohibition of snorkeling in all shallow waters of the RNA is excessive and not supported by any data.

At least two vendors should be permitted to provide ferry service and air service to provide for competition, reduce visitor costs, and give visitors a choice. Competition will eventually provide better public service and support than one vendor can provide. One vendor contracts awarded at John Pennekamp Coral Reef State Park provide examples of the poor quality of service that a single vendor provides.

I fully support the other proposed actions.

Respectfully,

James A. Bohnsack

Author: DRTO Planning at NP-EVER-SFRC
Date: 06/20/2000 9:21 AM
Normal
TO: Margaret DeLaura at NP-DEN1
Subject: Fwd:DRTO comments
---------- Message Contents

_____Forward Header_____
Subject:
Author: "Cameron; William" <WCameron@sheriffleefl.org>
Date: 6/19/00 4:34 PM

I have been a Florida resident for twenty seven years and I have visited the Dry Tortugas numerous times. It is probably one of my favorite places on this planet to visit. I am a boater, diver, and fisherman, and it is for all those reasons that I love the Dry Tortugas. While your plan to restrict areas of the Tortugas seems like a good one to you, I for one think it stinks. Florida has been getting more and more ridiculous about fishing and boating restrictions as it is. I hate to see the National Park Service getting equally as stupid in the name of "preservation". The reason people come to Florida and the Dry Tortugas is the water activities. Restricting them to unrealistic levels is as ridiculous as telling people they can visit the Grand Canyon, but don't look at it of take photos. The Tortugas are restricted enough. Don't make it worse! If you really want to reduce impact to the reefs and grass beds around the Fort, discontinue the commercial sight seeing vendor permits. Then see how many people impact the Park. It is not the few boaters that venture out there that have created the problem. It is the hundreds of visitors a week that are ferried out there on huge head boats and sea planes that impact it.

My vote (if it truly counts) is NO! Leave well enough alone. I am already regulated to death!! The last thing we need is more regulations! As is stands now, we turn good, law abiding citizens into criminals by making so many preservation laws that nobody could possibly know when they are breaking them. Don't add to Florida's idiocy. Leave the park as it is for who it was intended to be for...the people!
Received: from lcso-nt.sheriffleefl.org ([207.30.225.5]) by ccmail.itd.nps.gov with SMTP
(IMA Internet Exchange 3.13) id 003A2CD7; Mon, 19 Jun 2000 16:32:34 -0400
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id <MZGSNCH2>; Mon, 19 Jun 2000 16:34:12 -0400
Message-ID: <CA1C02BEED88D311854000A0C9ADF1321D1FC4@LCSO-NT>
From: "Cameron, William" <WCameron@sheriffleefl.org>
To: "'drto_planning@nps.gov'" <drto_planning@nps.gov>
Subject:
Date: Mon, 19 Jun 2000 16:34:03 -0400
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2650.21)
Content-Type: text/plain

DRTO Planning
07/28/2000 07:33 AM MDT

To: Margaret DeLaura/DENVER/NPS
cc:
Subject: Fwd:Dry Tortugas National Park

cc:Mail Forwarding Information

I would like to let you know my feelings re Dry Tortugas. It would be a shame to let this very special area continue to be damaged by over-visitation, fishing and boat anchors.

I would like to see the entire park a no fishing zone. I realize it goes beyond the recommendations of others, but it would stop a lot of the dropping of anchors.

I would also like to support the idea of anchor buoys to protect the coral reefs.

I have never seen Dry Tortugas, but I would like to someday. I would be glad to support the limitation of visitors at any one time, even if it means I must wait longer to see the park. At least I would have a good experience when my turn came.

Received: from imo-d02.mx.aol.com ([205.188.157.34]) by ccmail.itd.nps.gov with
SMTP
(IMA Internet Exchange 3.13) id 0045DFD5; Thu, 27 Jul 2000 10:08:33 -0400
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by imo-d02.mx.aol.com (mail_out_v27.12.) id z.92.7e3b4c0 (4205)
for <DRTO_Planning@nps.gov>; Thu, 27 Jul 2000 10:10:20 -0400 (EDT)
From: Crittermom@aol.com
Message-ID: <92.7e3b4c0.26b19cca@aol.com>
Date: Thu, 27 Jul 2000 10:10:18 EDT
Subject: Dry Tortugas National Park
To: DRTO_Planning@nps.gov
MIME-Version: 1.0
Content-Type: text/plain; charset="US-ASCII"
Content-Transfer-Encoding: 7bit
X-Mailer: AOL 5.0 for Windows sub 118

Dry Tortugas National Park

Draft General Management Plan Amendment / Environmental Impact Statement

Comment Form

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Comments: (Use back if needed)

I would like to commend you on your management plan amendment and I support your preferred alternative C. I am especially pleased to see the entrance fee and carrying capacity limitations. I would like to → outlook

Name: Fran Decker Date: 6/22/00

Representing (if any group): _____

Address: 697 Copa D'oro
Marathon FL 33050

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.

see the Research Natural Area expanded to include the area outlined in both C and D.

I would like to suggest the installation of a mooring buoy field in the historic preservation area around Garden Key, since this is the only overnight area, and you always have boats here. The buoys dont need to be mandatory, but if used would ~~[illegible]~~ alleviate bottom damage and improve turbidity.

It would be nice if there was an opportunity for someone staying on a private boat to join a tour that goes into the RNA. This would consolidate your visitors to the RNA and allow the concessionaire to pick up additional revenue (space permitting).

MR. H. ROBERT DeHAVEN: My name is H. Robert DeHaven, and my address is 407 Cactus Drive in Key Haven.

I've been attending Sanctuary and Park meetings for at least four to five years, and I was on the Sanctuary Advisory Council for two years, ending December of `99. Over that period of time it became obvious that more and more boats were visiting the Tortugas, both to be in the park and to lobster and to bring passengers out to snorkel and fish and lobster and just plain visit.

It would appear that there's going to be a time, or maybe the time has arrived, when the Tortugas and the park have just about as much traffic as they can bear, and so there has to be a way to handle a sustainable resource.

Right now the Tortugas are furnishing fish and lobster and the various forms that follow the water around from the Tortugas, and they're replenishing the entire Keys, up to north and east of Key West. If we are not careful and we deplete the resources at the Tortugas and in the park district, then the resources won't be sustained in the park district and the Tortugas. It also will suffer in all of the Keys. And so I therefore

support what the park is trying to do.

I would like to, in addition to what the park is trying to do with fewer boats and a fee, I also support a fee to attend the Tortugas, just like you do most places where you go. This will help pay for some of the enforcement, etc., and the cleanup.

I would also like to get a little tougher and have more no-take zones, absolutely no-take zones. I would like to have, personally, sections of the Tortugas and in the park where nobody is allowed to go over. And because it requires enforcement to check if a boat is out there, if a dive boat is out there, if people are out there snorkeling, it's incumbent to have park personnel go out and check to see if they are lobstering, to see if they are fishing, to see if they are legal.

If you had a section where people aren't allowed in, period, that would really maintain that area as being pristine. Other than that, people have a tendency to cheat. They go out there and pretend like they're just looking, but they're not looking, they're cheating. Whenever they see a boat coming out, well, then they get legal. It seems like that would be a better way

to handle it, absolutely no visiting in certain sections.

I guess that basically makes my point. I support both the Sanctuary and the National Park District in what they're trying to accomplish. Thank you.

Dry Tortugas National Park

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Comments: (Use back if needed)

MANY OF THESE RECOMMENDED AREAS WOULD BE EASIER TO MONITOR BY PARK OFFICERS IF NO FISHERMEN LOBSTER HUNTERS, DIVERS WERE ALLOWED. OFFICERS WOULD NOT HAVE TO CHECK EACH INDIVIDUAL BOAT TO ASCERTAIN A VIOLATION. IF YOU ARE THERE YOU ARE VIOLATING

Name: H P DE HAVEN Date: 6-22-00

Representing (if any group): [illegible]

Address: [illegible]

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.

617 354 8581

August 01, 2000

Nedra De Lima

7607 Sheffield Village Lane , ♦ lorton, VA 22079

Supervisory Park Planner Jeffery Scott
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

Dear Jeffery Scott:

I am writing to express my support for the establishment of the 40 square mile no-take Research Natural Area as proposed in the preferred alternative (Alternative C) in the General Management Plan Amendment and Environmental Impact Statement for Dry Tortugas National Park. I do, however, urge you to simplify the boundaries of the proposed Research Natural Area to enhance both enforcement and understanding by visitors of where no-take regulations apply.

The proposed no-take Research Natural Area will help protect one of Florida's last wild ocean places, and some of our nation's most outstanding coral reef habitat. By prohibiting all forms of fishing, the no-take area will help to restore and protect fish populations in the Dry Tortugas area and the remainder of the Florida Keys. The Research Natural Area will also enhance scientific knowledge of the coral reef habitat of the Dry Tortugas.

Thank you for considering my views.

Sincerely,

Nedra De Lima

This letter is representative of 548 faxes that were received urging the National Park Service to simplify the boundaries of the proposed Research Natural Area to enhance both enforcement and understanding by visitors of where no-take regulations apply. Because the other faxes were similar, supporting alternative C but wanting the boundary simplified, they have not been reprinted here.

Dry Tortugas National Park

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Comments: (Use back if needed)

THE DRY TORTUGAS NATIONAL PARK NEEDS TO BE PROTECTED AS A RESEARCH NATURAL AREA (ALTERNATIVE E)
BECAUSE OF THE GREATLY INCREASED PUBLIC USE, TIME IS NOW NEEDED TO EDUCATE
PARK USERS ABOUT ENVIRONMENTAL STAINABILITY & ALSO TIME IS NEED FOR
THE PARK'S RESOURCES TO ACHIEVE THIS STAWABILITY,
A NO-TAKE PARK POLICY IS THE WINNING PLAN FOR THE BIRDS, TURTLES, FISH
& OTHER SPECIES IN THE PARK. THE WATERS ADJACENT TO THE PARK WOULD
THRIVE WITH MORE & LARGER SPECIES THIS COULD BE ACCOMPLISED WITH LESS
MONEY SPENT ON VISITOR MARINE PATROLS. THESE FUNDS COULD BE USED WITHIN
IN PARK & FOR PUBLIC ENVIRONMENTAL EDUCATION. PUBLIC EDUCATION IS THE KEY
FOR LONG TERM PARK PROTECTION. PEOPLE WILL BASICALY KNOW HOW TO ACT IN
A RESPONSIBLE MANNER. SINCE RESOURCE PROTECTION THE GOAL —
PARK USE IS A PRIVILEGE AND NOT A RIGHT.

Sincerely

Name: MIKE FITE Date: 6/19/00

Representing (if any group): _____

Address: P.O. BOX 398

LUTZ FL 33548

I AM A CITIZEN OF THE USA,

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.

MR. D. WAIN GARRISON: I'm Wain Garrison. I'm a resident of the Florida Keys. I've lived here for 23 years. I'm a retired schoolteacher. I taught all of the sciences in Illinois and in Florida. I'm licensed to teach every known science. I'm a bunny hugger. I was president of the Isaac Walton League Club at the time that we put a stop to Sharonburg's plan to develop Port Bougainville on North Key Largo.

I certainly believe in conservation. I first became aware of the need for conservation when I read about the Tragedy of the Commons. The Tragedy of the Commons referred to a problem at the Boston Commons. People kept their cow, milk cow there for milk for the family. After a while, one person decided he would keep two cows. And then another person decided to keep five cows. And presently, there was no longer enough grass there at Boston Commons to support these cows, and then there was no more milk for the families.

What happened was that everyone thought that the Boston Commons belonged to everyone for the using it, but nobody thought that they had the obligation to take care of it.

This, of course, is what happens when we have un-managed, uncontrolled areas. Here in the proposal to increase the areas under control by the National Park Service at the Dry Tortugas, the plan that the Park Service is projecting doesn't go far enough. I do not agree with their proposal to adopt Alternate C. I would like to see Alternate D adopted, which would be more stringent and give better control over these areas.

The research that's been carried on indicates that this is an extremely important area for replenishment of the larvae of all sorts of things; corals, fishes, lobsters and so on. They float along the Gulf Stream, the currents going northward along the entire Florida Keys. And so, in my opinion, it is very, very important to have very strict controls and very close management over this entire area.

I'd like to thank the National Park Service for giving me this opportunity to give my opinion and I appreciate it very much. Thank you.

(D. Wain Garrison, 124 Bayview Drive, Islamorada, Florida, 33036-3308.)

sure that people are using it, using the facility. Thank you.

MS. MARY GLADDING: Mary Gladding. My mailing address is P.O. Box 5325, Key West, Florida 33045.

The only thing my husband and I were questioning was how the user fees were going to work in the park. We commercial fish, and our primary fishing was down at the Fort. And a lot of times we go in there at night or sometimes during the day just to anchor up to sleep.

We don't, like maybe on rare occasions, because we've been going down there so much, we might go up on the Fort to use the, you know, look at the Fort if we have company aboard the boat or anything. But primarily pretty much it's just the two of us.

We were wondering how the user fees were going to work, if we were still, just for anchoring up inside of the harbor, if we were going to be charged a fee for that when everything comes down. That's the only thing we were wondering about, how that was going to work.

And another thing, I was wondering if there was any chance we could get a doggy beach put in

somewhere on the Fort. Other than that, that's the only question I think I was going to ask.

View Current Signatures

To: Pres. Clinton's limits on sport fishing area July 19, 2000

The Honorable William J. Clinton
President of the United States
The White House
1600 Pennsylvania Avenue
Washington, DC 20500

Dear President Clinton,

We, the undersigned, have committed ourselves to supporting the Fishable Waters Act of 2000, which is a voluntary, non-regulatory, partnership oriented, incentive based plan that brings together the fisheries conservation community, state and federal fisheries managers, and the agriculture community. This act was introduced simultaneously in the House and Senate by Rep. John Tanner and Sen. Kit Bond on April 12, 2000.

We also support the letter to you, President Clinton, from a coalition of 35 sport fishing associations, including the American Sportfishing Association and other companies and organizations. This letter, in essence, objects to the full implementation of your executive order on marine protected areas you issued on May 26, 2000. If this order is implemented 168,000 acres of coral reef fishing area will not only be closed to commercial fishing but also to sport fishing with a large percentage of this area in the Florida Keys and Dry Tortugas area.

The amount of fish taken in the Dry Tortugas area by sport fishing is totally insignificant to the reproduction rate of the fish species represented there. Sport fishing has no adverse effects on turtles, birds, water quality; and to protect the coral reefs, a ban on anchoring in these areas could be enforced with reef areas provided with mooring buoys. You are putting us in the same category with the commercial fisherman that does cause significant damage to coral reefs and the fish population. We do not and if size and catch limit controls would be required or catch and release programs initiated the American angler will comply as we always have. We totally believe the American sport fisherman should not be denied his right to fish these areas.

Concerning the increase of visitors to the Dry Tortugas from 18,000 in 1984 to 84,000 in 1999 at least 95% of these represent sightseers only and do not

The undersigned referred to in this letter refer to the petition from the American Sports Fishermen, which has been reproduced starting on page 405 in this document.

fish. After reviewing the General Management Plan Amendment, Dry Tortugas National Park, with the proposed alternatives A, B, C, D, and E, we support alternative B which will effectively protect this area yet allow the American sport fisherman continued access. We also feel that the other coral areas in the Florida Keys remain open to the sport fisherman.

Sincerely,

Don Hedstrom

Cc Jeffery Scott, National Park Service, Homestead Florida
Cc Billy Causey, Florida Keys National Marine Sanctuary, Marathon, Florida

The undersigned referred to in this letter refer to the petition from the American Sports Fishermen, which has been reproduced starting on page 405 in this document.

Page 1

Dry Tortugas National Park

Draft General Management Plan Amendment / Environmental Impact Statement

Comment Form

The purpose of this meeting is to present and solicit comments regarding the *Draft General Management Plan Amendment and Environmental Impact Statement* for Dry Tortugas National Park. Your comments regarding any portion of the document would be helpful and will be considered by the planning team as the plan is finalized in the upcoming months.

Comment sheets can be left with any National Park Service staff at the meeting; or mailed to: Jeffery Scott, Everglades National Park, 40001 State Road 9336, Homestead, FL, 33034; or FAXed to 305-242-7711 (Attn: Jeffery Scott). You may also e-mail comments to: DRTO_Planning@nps.gov. All comments must be received by August 1, 2000.

Comments: (Use back if needed)

The plan appears to be a plan for commercialization of the Garden Park. There would be little need for the plan with fewer visitors. Restrict the number of visitors by limiting island access to these "Fast Cat / Yankee Cats". One visit per day by one boat "only" would be sufficient. (over)

Name: Ed Jones Date: 7/29/2000

Representing (if any group): Self

Address: 16113 Cuttysark
Corpus Christi TX 78418

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___ All submissions from businesses and organizations will be available for public review in their entirety.

JUL-29-00 SAT 18:25 QSO FAX NO. 18774720978 P. 01

Currently the commercial vessels are bringing in too many visitors impacting the island by trash, ~~and~~ noise and boat wake. License only one vessel ~~a~~ a per day. They should also be charging a per person fee that would go to the fort for minimizing visitor impact, such as picking up trash and caring for the turtle nests.

~~Boaters~~,
Boaters, such as ourselves, should also be charged a "per night" fee for anchorage ~~to the fort~~ around the fort. Something like $8/night or $30/year might be appropriate.

Limit number of "overnighters" who can camp on the island. In the past there were only a few. Now it seems the island is a "boy scout" camp. A limit of 10/night would be generous.

Page 3

Dry Tortugas National Park

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Comments: (Use back if needed)

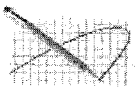
Support the ~~turtle~~ program through ~~funding and a creation of~~ Consider creating a nursery on the island (loggerhead key) for raising ~~the~~ infant turtles (Kemp Ridleys) This would be an added visitor attraction.

Name: Ed Jones Date: 7/29/2000

Representing (if any group): Self

Address: 1613 Cuttysark Corpus Christi, TX

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.



DRTO Planning
07/26/2000 07:48 AM
MDT

To: Margaret DeLaura
cc:
Subject: Fwd:GMP Amendment

We are writing to you in regards to the GMP Amendment for the Dry Tortugas National Park, and would ask you to support the "Alternative C", as an absolute minimum to maintain the pristine nature of this park.

Although we have not visited the park, we have seen the effect of humanity in similar places, notably the British Virgin Islands, and what they have done to correct it. They have increased the mooring buoy capacity by about 200% to avoid damage to the coral reefs from anchoring. Certain areas have been designated as marine parks, and NO anchoring is allowed, only mooring buoys and no overnight stays.

We strongly support the use of mooring buoys in ALL areas of the Dry Tortugas, although you support anchoring in the natural/cultural and historic preservation/adaptive use zones. Anchoring should only be used in emergency.

We strongly support making the public aware of the impact they can have on this delicate environment, and feel that the number of visitors be limited by that fact. This applies particularly to snorkelers, divers, and even fishermen. The Research Natural Area should be increased from 43 to 70% of the park area.

Pat & Carolyn Lamond
Master Gardeners
Osceola County Extension

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<html>
<font size=3>We are writing to you in regards to the GMP Amendment for
the Dry Tortugas National Park, and would ask you to support the
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to 70% of the park area.<br>
<br>
Pat &amp;amp; Carolyn Lamond<br>
Master Gardeners<br>
Osceola County Extension</font></html>

Received: from dfw-smtpout3.email.verio.net ([129.250.36.43]) by
ccmail.itd.nps.gov with SMTP
   (IMA Internet Exchange 3.13) id 00456D8E; Tue, 25 Jul 2000 19:10:51 -0400
Received: from [129.250.38.61] (helo=dfw-mmp1.email.verio.net)
 by dfw-smtpout3.email.verio.net with esmtp (Exim 3.12 #7)
 id 13HDsO-0002hI-00; Tue, 25 Jul 2000 23:12:40 +0000
Received: from [157.238.208.230] (helo=home.magicnet.net)
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MS. DARLENE PRUESS: Darlene Pruess. My address is 2501 Seidenberg Avenue, Key West, Florida 33040.

Some of my initial comments would be -- I don't think it's really specifically addressed in the plan yet -- I am a camper usually. I have been for six years. I come out on one of the ferry boats and I bring a kayak. Weather permitting, I like to kayak across to Loggerhead Key. So I want to make sure that would still be allowed in that special area and hopefully not a fee permit.

Also, I used to go out when there was one ferry and you would just go out three times a week, every other day. That was wonderful. You really felt like you were being dropped off, not bombarded by massive amounts of people. I've noticed in the last few years, the last two in particular, there's more just trash around on the key, cigarettes on the beach, seagulls bothering you when you're having lunch. That didn't used to happen.

Another thing that's a little interesting is having one ferry boat instead of two. It's still basically the same amount of people. But it seems like a little competition would be better, and smaller groups of people.

That's it for now, I think.

(Proceeding concluded at 8:00 p.m.)

KW7

Dry Tortugas National Park

Draft General Management Plan Amendment / Environmental Impact Statement

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Comments: (Use back if needed)

I am thrilled to know that government agencys are working on conservation and protection of our natural resources. Hopefully all the agency's will work together to achieve the common goal. My choice for the Dry Tortugas plan would be (over

Name: Susan Reynolds Date: 6-14-00

Representing (if any group): _____

Address: 1159 38th Ave NE
St Pete FL 33704

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.

the MOST RESTRICTIVE.

Lets help our sea creatures and habitat all we can while we have this excellent opportunity.

Thank you for your energy spent on this action.

Sincerely,

Susan Reynolds

Dry Tortugas National Park

Draft General Management Plan Amendment / Environmental Impact Statement

Comment Form

The purpose of this meeting is to present and solicit comments regarding the *Draft General Management Plan Amendment and Environmental Impact Statement* for Dry Tortugas National Park. Your comments regarding any portion of the document would be helpful and will be considered by the planning team as the plan is finalized in the upcoming months.

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Comments: (Use back if needed)

I believe that the most effective protection of natural resources is called for. Therefore, I would select alternative "E" as the preferred alternative.

Name: Karsten A. Rist Date: 06-12-2000

Representing (if any group): —

Address: 1614 SW 87 Ct
Miami, FL. 33157

Note: Your comments, as well as your name and address, will be available for public review. Private individuals may request that their names and addresses be withheld from the printed record by placing an X here: ___. All submissions from businesses and organizations will be available for public review in their entirety.

Richard K Robinson, MPA, CPA
7903. Westminster Abbey Boulevard, Orlando FL 32835-5957
407-298-9027 Virgingent@aol.com Fax 407-298-9592

July 24, 2000

Jeffery Scott
Supervisory Park Planner
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead Fl 33034

Dear Mr Scott,

It is my understanding that consideration is being given to alternative proposals for the future management of the Dry Tortugas National Park and that consideration would be given to the opinions of the tax paying general populace of the American public. I am a member of the tax paying general populace of the American public and a great admirer and supporter of the American National Park system.

I am not familiar with the alternative proposals that are being considered but I wish to make it known that I believe -

- All fishing in and around the Park should be prohibited.
- Private boats should not be allowed to drop their anchors in or around the Park.
- Access to the Park should be so controlled as to minimalize the damage caused by visitors whether by sea or by land.

Very truly yours,

Richard K Robinson

cc: Stephany Seay

NOTE: Mr. Rodriguez reviewed a 28-page excerpt from the 272-page *Draft General Management Plan Amendment / Environmental Impact Statement* in the belief that the excerpt was the full document. A complete document was overnight mailed to him once this letter was received. No further correspondence was received from him.

1134 S.W. 135th Place
Miami, Florida 33184
June 26th, 2000

Richard G. Ring, Superintendent
Everglades and Dry Tortugas National Parks
Attn: Jeffery Scott
40001 State Road 9336
Homestead, Florida 33034-6733

Re: Public comment on the Draft Management Plan Amendment/EIS

Dear Superintendent Ring:

I find the 28 page Draft Management Plan Amendment to be inadequate, inaccurate, biased,contradictory, discriminatory, lacking in detail, merit, and overall it fails to provide the neccessary justification for amending the Park's General Management Plan. No specific information, documentation or studies have been provided or referenced as evidence of alleged Park problems to be corrected. As such, I support Alternative A which is the "No Action" alternative.

You expressed your concerns over the large increases in Park visitation during your oral presentation at Homestead Sr. High School. Yet you provided us with vague visitation statistics without any details on how those numbers were obtained as visitor registration has never been conducted at the Park. No detail was provided on visitor types (tourists, recreational fishermen, private boaters...etc), peak visitation periods..etc. which would have provided insight to these alleged visitor management issues. No detail is provided on visitation in the Draft either. Yet these mysterious visitor problems are your justification for proposing severe restrictions or closures of recreational activities throughtout the Park!

Three out of the five alternatives presented, to include your Preferred Alternative C, closes fishing to most or all the Park, bans recreational boat anchoring, implements a bureacratic boat permiting system and institutes an Entrance Fee charge. Reduced services with an increase in price! These proposals do a grave disservice to all working americans whose taxes have gone toward the purchase of this Park and continue to provide for its annual operating budget. These proposals also negatively impact the less fortunate in our society who will no longer be able to afford to visit this National Park, which i assume is part of your goal in reducing visitation. We call this economic discrimination.

I believe this Draft plan violates the National Park Service mandate to balance resource protection with visitor enjoyment. This plan is heavily skewed toward resource protection.As I read the plan, I was very disturbed to find many inaccurate and biased statements under the various alternatives. The people involved in the plan preparation were obviously anti-fishing,

anti-boating and just anti-public access. This is very unfortuate as our National Parks were created FOR the people, not FROM the people.

It's quite apparent the main motivation for amending the Park's GMP is as stated on page 12 of the Draft: "Support establishment of ecological reserve adjacent to the Park". I seriously doubt increased visitation or any other factor played a significant role in NPS developing proposals to restrict visitor activities similiar to those proposed by NOAA for their Tortugas Ecological Reserve. What we have here are two federal agencies getting together to close 225 square nautical miles of ocean to most public access. Then as a taxpayer, you want to charge me an Entrance fee to visit a Park where i can't fish or do much else without permits which leads me to think the Justice Dept. should have been prosecuting the National Park Service for antitrust activities instead of Microsoft!

At this point, I would like to comment on specific issues of the Draft Plan:

Increases In Visitation

According to your oral presentation, Park visitation increased from 18,000 in 1994 to 84,000 in 1999 and usage is up 25% so far this year. Unfortuately, you did not elaborate or provide us with an analysis of those numbers. From a visitor management perspective, it would have helped me to understand the impact on fishing pressure for example. Who are all these visitors? Tourists, recreational boaters, recreational fishermen...etc? Are tourists all flocking to see this Park now? Are more or less people fishing in the Park these days? I have so many questions and neither you nor the Draft have any answers.....just proposals to take away our recreational opportunities!

On page 9 of the plan under "Visitor Facilities And Services", it states: "Most visitors would be day users, and because of time contraits, Ft. Jefferson would likely remain the primary destination site." This statement leads me to believe most of the Park visitors are tourists. I don't think many fishermen are going to catch any fish at the Fort.

On page 11 of the plan under "Necessary And Appropriate Commercial Activities", it states: "Without commercial transportation, most visitors would not be able to access or experience Dry Tortugas National Park." Here again, this statement leads me to believe the majority of the Park visitors are tourists, not private boaters or fishermen.

Oh, I would be willing to bet the huge increases in visitation you claim to be experiencing are tourists going over on tour boats and seaplanes to visit and take pictures of Ft. Jefferson, not fishermen. I think you could solve your problem by eliminating commercial boat and seaplane access to the Park!

It is my understanding you are required to respond to public comments/questions obtained from the Draft Plan. Therefore, I would like to have the following questions answered in the Final Plan:

1. As formal registration has never been required at the Park, how did you obtain and develop the visitation statistics that were in your oral presentation? Please provide the name and address of any non-governmental organization you may have used to obtain this information.

2. Since you were somehow able to provide visitation data, please provide a number breakdown between recreational fishermen, recreational boaters, and all other visitors from 1994 to present.

3. What are the peak Park visitation periods? Please provide the number breakdown between recreational fishermen, recreational boaters, and all other visitors for the last peak period which I'll guess as december 1st through the end of April (our big tourist season).

Entrance Fees

Back to your oral presentation, you indicated an entrance fee would be instituted under alternatives C-E for the improvement of services/facilities. Yet on page 9 of the plan under "Visitor Facilities And Services" which would continue to apply under all the alternatives, it states: "Because of physical and operational constraints, and to maintain the near-pristine resources and sense of remoteness important to fulfilling the purpose of the Park, Visitor services and facilities would remain much as they are today. Visitors would need to be self-sufficient and provide their own food, water, equipment and other supplies." So why charge an Entrance Fee unless the real intent of your plan is to implement a user fee as an economic tool for reducing visitation.

A recent federal study conducted at the White Mountain National Forest in New Hampshire concluded User fees significantly discriminate against lower income americans.A copy of this USDA Forest Service report which I obtained through a FOIA is attached for your review. Your user fee is going to significantly reduce visitation to the Park by lower income amercians.

Please address the following questions in the final draft plan:

1. What is the justification for the entrance fee?

2. What will the entrance fee collected be used for? Please provide a list of projects with projected costs.

3. How much will the entrance fee be?

4. What is the cost of implementing an entrance fee? How many rangers will have to diverted from Resource protection duties to collect entrance fees?

5. How will an Entrance Fee impact visitation numbers?

6. How will an Entrance Fee impact visitation by lower income americans, minorities, retirees and disabled citizens living on fixed disability benefits?

Park Fishery

Not once in your oral presentation did you mention over-fishing as a problem in the Park. The Draft Plan also doesn't provide any detail on the number of recreational fishermen, harvest statistics, specific fish species numbers/concerns..etc. So what justifies closing parts or all of the Park to fishing as part of your alternatives C-E? In addition, you bias your readers by entitling the fishing category topic: "Exploited Reef Fish" under Park Fisheries. Then you start off this topic with : "Current levels of exploitation would.." I guess it would have been beyond the motivation of your anti-fishing staff to have stated "Current levels of fishing" or "Current levels of harvesting". You present no data yet you lead unbiased readers to believe we are wiping out all the reef fish. What's a non-fishermen going to think when they read this section? What would a judge think about it? I certainly hope some group pursues litigation on this entirely skewed non-documented plan. I'd love to see you or your staff explain this under cross-examination. I would gladly contribute to the cause. Are there laws or regulations that govern the writing of these Draft Management Plans/EIS?

In fact, your proposal to establish a Research Natural Area so you can conduct research on man-made impacts tells me the National Park Service hasn't done any research in the Park to justify a fishing ban, an anchoring ban or any other reduction in Visitor recreational activities. Your entire Plan and its recommendations are based on biased opinions and unfounded allegations. And please don't tell me you used research or data that was conducted outside Park waters. Research studies conducted outside of currently protected waters such as Dry Tortugas National Park are invalid in more ways than one. Even saying it's all the same ocean would be like saying all the habitat in Everglades National Park and the Big Cypress National Preserve is the same just because the two areas are adjacent to each other. We all know that isn't so. In addition, Commercial fishing and spearfishing are already prohibited in the Park, so the Park fishery has to be in better shape than in surrounding waters where these activites are permitted.

Managing fish and wildlife resources with bag limits and seasons, not closures, restore fish and wildlife populations. History has repeatedly proven this. The Florida Panther is one wildlife example where closure didn't work. With over 50 years of complete protection(no hunting, no off-road vehicles, very limited public access) in Everglades National Park (established in 1947) and the Florida Panther became extinct in the Park anyway.

Properly regulated recreational fishing has never negatively impacted any fish species. Commercial fishing, on the other hand, has indeed hurt many fish populations. Take Seatrout for example. Once commercial gillnetting of Seatrout was banned in Florida several years ago, trout populations have soared. Commercial fishtraps also take large numbers of fish, regardless of species. Yet commercial fishing is already prohibited in the Park. Recreational fishing pressure has to be low for a Park that is 70 miles from the Keyes! On top of that, recreational fishermen typically fish on the weekends whenever they can breakaway from their jobs and families. I seriously doubt recreational fishing is harming fish populations in the Park. Yet your anti-fishing staff can only recommend fishing closures for everybody, again, without any research to back it up.

Please address the following questions in the final plan:

1. What studies have been conducted in Park waters which reveal over-fishing as a problem or that reef fish in the Park are exploited? Please list each report so I am able to request copies under the 1996 Freedom Of Information Act.

2. Please list any other studies or reports that have been conducted on recreational fishing in the Park.

3. What is the justification for closing portions or all of the Park to fishing?

4. Why haven't bag limits, seasons or other fish management alternatives for certain species been considered versus an outright fishing ban?

5. Please list the federal laws and NPS regulations or manuals that are applicable to the preparation of GMP's, amendments to GMP's and EIS's so i may request them through a FOIA.

Private Boating

While it appears little, if any, research has been conducted on the number of or the impact of private boating on the Park, the usual biased comments of your staff allege boaters are having major short and long term adverse impacts on :

- coral reefs (page 16)
- seagrass beds (page 17)
- increased turbidity in shallow waters (page 18)
- bird nesting areas (even though you mention these areas are already off-limits) to include comments such as: "impacts on the adult birds, because these uses often result in

death."(page 21) Note: While you are at it...you might as well accuse us of destroying entire rookeries!!!!

- turtle deaths from boat collisions and propellers (page 21)
- manatees and coastal dolphin deaths from collisions and propellers (page 22)
- turtle and bird nesting areas from noise levels. (page 22)
- water quality from oil/gas spills resulting from recreational boat groundings. (page 23)
- water quality from pollution (trash dumping, waste disposal..etc) from boaters. (page 23). Note: polluting is already illegal in the Park.

I believe you failed to blame recreational boating for causing global warming and the loss of the South Amercian rainforests!!! Your biased comments would once again make the non-boating public believe this Park, which is 70 miles from land, is under invasion from private boating.

Aside from excerpts of the Draft that I have already mentioned which point to low fishing/private boating activity and high tourist visitation, here is another one on page 15 of your Draft under the category "Encounters With Others": "High (for tour visitors) and low (for private boaters)". This tells me there cannot be too many boaters running around the Park if your chances of encountering another boater are LOW. However, it does sound like tour visitors are running into each other! Once again your own comments contradict your other biased anti-boating, anti-fishing and in general, anti-people positions.

Please answer the following questions in your final plan amendment:

1. What documentation or studies conducted in Park waters provide justification for your allegations that recreational boating has damaged coral reefs, seagrass beds, shallow water turbidity, bird deaths, nesting area disturbances? Please provide a list of specific areas damaged so we can verify, provide a count of bird deaths documented, and specific instances of bird nesting relocations.

2. Please provide a listing and count of all the sea turtles, manatees, and coastal dolphins we are accused of killing. Please provide counts by year from 1994-2000 YTD.

3. Please provide the number of recreational boat groundings by year from 1994-2000 YTD.

4. Please provide a listing with dates of all the oil and fuel spills recorded from all your alleged boat groundings.

5. Please provide the number and breakdown by category of the number of citations given by your rangers by year from 1994-2000 YTD to recreational boaters for littering, polluting, violating the off-limits bird nesting areas, causing other bird deaths, speeding, killing any marine

mammals, violating any fishing regulations, causing oil/gas spills or damaging any other resource in the Park.

6. Please provide the number of permits to be made available under the private boat permitting proposal..

Recreational Boat Anchoring

Here again, I believe the number of recreational boaters is low based on the remoteness of the Park coupled and the other factors explained above. Therefore, recreational boat anchoring cannot be the problem you are making it out to be. Even Bill Causey, Superintendent Of The Florida Keys National Marine Sanctuary, in his oral presentation could only bring up the one example of an 8-10 ton anchor that was dropped on a reef by a large commercial vessel as his justifcation for prohibiting anchoring in the proposed Tortugas Ecological Reserve. When was the last time you saw an 8-10 ton anchor on a recreational fishing boat?

Please respond to the following question/comment in the final plan amendment:

1. What is the justification for banning recreational boat anchoring? Please provide the documentation or list of studies within Park waters that justifies this anchoring ban.

2. Please provide a list of Park sites that have been damaged by recreational boat anchors.

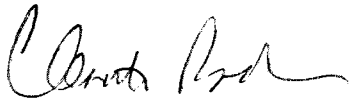
Summary

In summary, this Draft plan/EIS fails to provide the justification for amending the Dry Torgugas National Park and therefore I fully support Alternative A, the "No change" alternative. Also, for the record, I am not representing any group.

As a citizen, taxpayer and military veteran, it concerns me greatly that our government has prepared such a biased, skewed, misleading and one sided report. This is downright wrong! If the anti-fishing, boating and anti-public access positions stated in this plan are truely the positions of the National Park Service, then I (and every South Floridian who enjoys boating and fishing) should be gravely concerned since the National Park Service controls over 65% of South Florida between Biscayne National Park (175,000 acres), Everglades National Park (1.5 million acres) and Big Cypress National Preserve (850,000 acres), not to mention Dry Tortugas. This tells me that one day, all boating and fishing will be banned in these other federal waters because you feel we are "exploiting" these areas as well. Personal WaterCraft and Snowmobiles were recently banned in National Parks and I'm sure that's just the beginning.

I fully support restrictions when warranted, but I can see the overall strategy for the National Park Service going forward as one of anti-public access for the sake of environmental extremism and politics, versus facts. You might as well toss your mandate to balance resource protection with visitor enjoyment. It's a sad day for our National Parks and our country.

Sincerely,



Clemente Rodriguez

Sent Certified Receipt Requested.

cc: Jerry Belson, Regional Director, National Park Service
Susan Cocking, The Miami Herald
Steve Waters, The Sun-Sentinel
Florida Sportsmen Magazine
South Dade Anglers Fishing Club

DO USER FEES EXCLUDE LOW-INCOME PEOPLE FROM RESOURCE-BASED RECREATION?

by

Thomas More
USDA Forest Service
Northeast Research Station
P.O. Box 968
Burlington, VT 05402

and

Thomas Stevens
Department of Resource Economics
University of Massachusetts
Amherst, MA 01003

Paper accepted for publication in the Journal of Leisure Research. Scheduled to appear fall, 2000.

Thomas More is a Social Scientist with the USDA Forest Service, Northeastern Research Station and Thomas Stevens is Professor of Resource Economics at the University of Massachusetts, Amherst. This research was suppported by funds provided by the U.S. Department of Agriculture, Forest Service, Northeastern Research Station. We thank Catherine Howard, Pat Sullivan, Peggy Cialek, Rebecca Oreskes, Thomas Moore, and Greg Wright for their valuable assistances.

* Inquiries should be sent to Thomas More.

Abstract

A mail survey of New Hampshire and Vermont households shows that although user fees are widely accepted, they may substantially reduce participation in resource-based recreation by those earning less than $30,000 per year. For example, 23% of low-income respondents indicated that they had either reduced use or gone elsewhere as a result of recent fee increases, while only 11% of high-income users had made such changes. A conjoint analysis also suggests that low-income respondents are much more responsive to access fees than high-income respondents. And we find that a $5 daily fee for use of public lands would affect about 49% of low-income people as compared to 33% of high-income respondents. We conclude that potential impacts of this magnitude highlight several critical problems in the design of recreation fee programs.

KEYWORDS: Recreation fees, economics, low-income users, public policy

Introduction

Congressional authorization of the current fee demonstration program, which permits public agencies to charge for access to federal lands, has reinvigorated the debate over recreation fees. Although many arguments both for and against fees have been advanced (cf., Harris & Driver 1987; Crompton & Lamb, 1986; Shultz, McAvoy, & Dustin, 1988), few are as compelling or as central to the debate as the idea that fees may exclude low-income users from access to public recreation areas. Those opposed to fees point out that exclusionary pricing raises fundamental questions about the social purposes of public recreation (More, 1999). Those who favor fees admit that exclusionary pricing might be an issue in urban areas, but argue that it is not important in resource-based recreation because: 1) Low-income people are already priced out by high travel and equipment costs (Clawson & Knetsch, 1966; Vaux, 1975), and 2) Everyone, including low-income people, must make choices about how to spend their money, so it is hardly surprising that resource-based recreation ranks relatively low among the priorities of low-income people (a version of the economic efficiency argument [see Rosenthal, Loomis & Peterson, 1984]).

To appreciate the significance of these arguments, it is important to specify the social context within which the fee programs have been initiated. Although the United States has always considered itself to be a middle-class country, the actual historical record reveals a different picture. While income inequality has always been with us, it rose rapidly after the Civil War, peaking in the 1920's (Hurst, 1998). During the 1930's, however, social programs designed to relieve the effects of the Great Depression and the subsequent economic expansion associated with World War II combined to produce a prosperity in the 1950's and 1960's that was so widely shared that it was dubbed the "Golden Era" of the U.S. economy (Cassidy, 1995). The actual year of greatest income equality proved to be 1968 (U.S. Bureau of the Census, 1996). This prosperity began to fade during the 1970's, however, and the period between 1973 and 1993 witnessed massive increases in income inequality. During this time period, income levels for the bottom 40% of American families declined in real terms, while the costs of rent, utilities, and food rose

with inflation. By contrast, the incomes of the top 20% grew so rapidly that, in 1993, they received 48.2% of the country's aggregate income (Mishel & Bernstein, 1993; Cassidy, 1995).

Income inequality has continued to grow throughout the 1990's (U.S. Bureau of the Census, 2000a). Following a major recession early in the decade, the American economy has emerged into what may be its longest-running financial boom. For example, since 1995, the stock market has created more than $5 trillion in new financial wealth (Frank, 1999). Yet over 50% of all Americans own no stock at all ("Economist urges," 1998) and have not participated in these gains. In fact, most of the gains have gone to large stockholders so that economist Edward Wolff (cited in Cassidy, 1999) estimates that 85% of the country's financial wealth is now controlled by the top 10% of the population. By contrast, in 1998 the median household income in the U.S. had risen to $38,885, the family income for married-couple families was $54,276, and for female householders with no husband present the median income was $24,393 (U.S. Bureau of the Census, 2000a). Overall, the simple fact that half the households in the U.S. have annual incomes below $38,885 indicates the extent of income disparity, and some economists believe that it would take 20 years of sustained economic growth to return us to the prosperity of the late 1960's (Marger, 1999).

The growing stress on family incomes over the past 30 years also has impacted political discourse. Many people blamed their declining incomes on big government (and government spending) so steps were taken to reduce public-sector spending. For recreation agencies, declining budgets occurred in the face of burgeoning demand, placing huge pressure on the agencies and making it difficult to sustain recreation opportunities (Morton, 1997), especially given a multibillion dollar backlog of deferred maintenance (General Accounting Office, 1998). Little wonder, then, that agency administrators eagerly turned to fees as a way out and financial self-sufficiency became a dominant park philosophy (LaPage, 1994; Leal & Fretwell, 1997). Yet as fee programs were initiated, public appropriations often declined necessitating further fee increases. While many visitors have been relatively unaffected by these increases, questions remain about the impact of fees on specific subgroups such as low-income people (General Accounting Office, 1998).

These, then, are the major players in the current fee debate: legislators anxious to shrink the size of government or to limit spending increases, agencies eager to supplement their budgets through fee programs, and a public that has decided differences in their ability to pay, coupled with a current ambivalence about taxes and government programs. And it is relative to the varying goals of these groups that we must evaluate fee programs by asking the questions implied in our title: Will fees price low-income users out of state and national parks and forests? How do nonusers feel about fees versus taxes? What alternatives to fee programs exist? In this paper we examine the attitudes of New Hampshire and Vermont residents regarding these issues, focusing explicitly on the relationships between these attitudes and income.

Background and Methods

There can be little doubt that price increases reduce use rates, particularly where demand is elastic. For example, Schroeder and Louviere (1999) found that entry fees for Chicago area sites had a significant impact on site choice, with choice probability declining steadily over the

entire fee range. A $3 fee decreased the site choice probability for their entire sample by nearly 40%. Similarly, Richter and Christensen (1999), using data from a survey of Desolation Wilderness (CA) visitors, found general visitation declined with price increases. Where demand is relatively inelastic, fee increases are less likely to impact total visitation. Thus the U.S. National Park Service expected that overall visitation would not be affected, but the sites most likely to experience decreased demand were lesser known sites and sites used mostly by the surrounding communities (cited in Schroeder & Louviere, 1999).

While total visitation is certainly an issue, our research is primarily concerned with the impact of fees on different income groups. Here, there is much less information. In their review of the Demonstration Program, the General Accounting Office (GAO) concluded that fees have had little impact on overall visitation and that visitor surveys show that they have been generally well received, but noted that "some groups have expressed concerns about gaps in the research. For example, many completed visitor surveys do not address the impact of fees on some types of visitors, such as those with low incomes" (GAO 1998, p. 3). Therefore, the GAO report called for more research on the impact of fees on low-income people.

In one study that examined this issue specifically, Reiling, Chung and Trott (1992) found that increasing camping fees at Maine state parks would have a larger effect on low-income campers as compared to high-income campers. Although low-income campers in Maine camped more than upper-income campers when fees were low, they dropped out of the market quickly as fees rose. In another study, Reiling et al. (1994) found that low-income users of day-use Army Corps of Engineers recreation facilities were more sensitive to fees than upper-income users and consequently high fees would displace a greater proportion of low-income users. The displacement was confirmed by Schneider and Budruk (1999) who found that about one-third of the visitors they surveyed at a southwestern national forest beach area had altered their visitation in response to a fee program. Of these, 62% visited the area less often, and over 50% chose to visit free sites within the forest.

A significant difficulty with many existing fee studies is their reliance on visitor surveys (as opposed to surveys of the general population). Many on-site visitor surveys have found the majority of users favor fees (Leuschner et al., 1987; Williams et al., 1999) particularly when the fees collected are used for improvements at the collection site. For example, in 1997 only 17% of visitors sampled at National Park Service sites said that fees were too high, and 12% actually claimed that fees were too low (Farmer, 1998). Similarly, Williams et al., (1999) found that most users of California's Desolation Wilderness considered fees to be acceptable, although they rated wilderness fees as less acceptable than fees for other forms of forest recreation. As noted above, such studies often argue that low-income people have already been priced out of the market for forest recreation due to high equipment and travel costs (Clawson & Knetsch ,1966; Vaux, 1975). But such reasoning may be overly general. The American working class represents a broad spectrum of the population which is neither poor nor immobile but which may be underrepresented in visitor surveys due to existing fees (More, 1999). Suppose, for example, that you owned a movie theater that charged $35 per ticket. A survey of the few people who came might well reveal that they were satisfied and supported the fee. What you would miss would be the opinions of those who never showed up because of the fee. In the private sector, of course, you would be unlikely to charge $35 per ticket: competition would keep prices in line, and

reference prices--what people are used to paying--would operate similarly (McCarville & Crompton, 1987; McCarville, 1996). In the public sector, however, there generally is no competition to regulate prices and many experiences are unique. For example, a float trip down the Colorado River through the Grand Canyon (a unique experience for which there are not likely to be many reference prices) now costs $100 per person to get on the waiting list and $100 per person to access the river (Hanscom, 2000). And there are even some user groups that support fees simply because they will exclude other users (Winter et al., 1999).

The above considerations point to the necessity of basing public-sector pricing policy on studies of the general population rather than solely relying on on-site "customer" surveys. In theory, general population surveys can capture responses from a broad social and economic spectrum. In practice, unfortunately, obtaining responses from low-income people can be problematic; national forest system planners, for example, report that they often have great difficulty involving low-income people in their planning efforts. To overcome these problems, we conducted a general population mail survey which utilized an unusual stratified sampling technique designed to boost responses by low-income people. We began by dividing both New Hampshire and Vermont into quadrants of nearly equal size. For each quadrant, 1990 census data were used to select the four communities with the lowest median household income. The communities ranged in size from small, rural towns to small cities of nearly 30,000 residents. A random sample of residents in each of these 32 communities was then selected, resulting in an overall sample of 1,000 New Hampshire and Vermont residents. This procedure involved making a methodological tradeoff. With it we were able to increase returns from low-income people, but at the expense of being able to make statewide projections to the population an a whole. While the study results could, in theory, be generalized to the population of residents of low-income New Hampshire and Vermont communities, it may be best to treat the comparisons made in this study as sample specific, i.e., as a randomly-selected sample of low-, middle-, and upper-income people.

The questionnaire was adapted from Dillman's (1978) total design method, and the survey was mailed in January, 1999. There were 138 unusable addresses and 296 respondents (161 from New Hampshire and 135 from Vermont) giving an adjusted response rate of 34%, about average for academic mail surveys of the general population (Mitchell & Carson, 1989). We did not formally re-contact nonrespondents as the sample design precluded making statewide population projections.

Seventy-one percent of respondents were male. The average respondent was 54 years old, had about 14 years of education, and a household income of between $30,000 and $45,000 per year. About 28% of the respondents reported an annual household income of less than $30,000 per year, 54% had incomes between $30,000 and $74,999 per year, and 18% reported incomes exceeding $75,000 per year.

Unfortunately, directly comparable socioeconomic and demographic data for the population of low-income communities in both states are not available, which limits our ability to draw general inferences. However, the median household income for 1998 was $34,592 in Vermont and $40,854 in New Hampshire. And, in 1998, about 31% of the adult (over age 24) residents of New Hampshire and Vermont were between 45 and 64 years old as compared to 41% of our respondents. Based on these figures, we believe our sample, although close to being

representative on some dimensions, was still weighted slightly toward the more educated and affluent, and significantly toward males. Again, it is probably best to treat these results as representing randomly selected low-, middle-, and upper-income people.

For analysis, we divided respondents into three income groups: low (less than $30,000 per year), middle ($30,000 to $74,999 per year), and high (greater than $75,000 per year). On average, low-income respondents were older, had less education, and were more likely to be female as compared with middle- and upper-income respondents (Table 1). These differences, which were statistically significant ($p < 0.05$), are obviously important when analyzing and interpreting the survey results. Consequently, we used two tests to determine statistical significance: The standard "z" test was used to test for differences in population proportions, while regression analysis was used to isolate the effects of income, if any, on respondent's behavior or attitudes while holding age, education, and gender constant.

Results

To determine the impact of user fees on the three income groups, each respondent was asked multiple questions. First, respondents were asked how often they participated in various outdoor activities during the summer and fall of 1998. Compared to the highest income group, low-income respondents participated more frequently in fishing, backpacking, hunting and trips to watch birds and wildlife (Table 2). However, according to the standard test for differences in population proportion, reported participation rates for these activities did not differ statistically by income category. Moreover, when participation rates were regressed against respondent's age, education, gender and income group, income differences were not a statistically significant factor. Hunting trips, for example, showed a statistically significant decrease with age, education and female gender, but income group was not a statistically significant factor ($p < 0.05$) in explaining the variation in hunting trips per respondent.

Next, we asked if entrance, parking or access fees were a major factor influencing decisions about participation in these activities. We also asked about areas visited, frequency of visits and fees paid between May 25 and December 31, 1998. For those in the low- and middle-income groups, entrance, access or parking fees were more likely to be a major factor in activity participation decisions. Only about 11% of the upper-income group said that fees were a major factor in participation decisions, while 16.2% and 18.2% of the middle- and low-income respondents, respectively, said that fees were a major factor. These differences were not statistically significant, however.

Low-income respondents were generally less likely to have visited state parks, state forests, or national forests in either New Hampshire or Vermont during the summer, 1998. Only 34.4% of the lowest income group visited one of these areas, while 51.2% and 53.2% of middle- and upper-income residents visited these areas, respectively. The difference in visitation between the low- and upper-income groups was statistically significant ($p < 0.05$) when considered alone. However, when the effects of gender, age and education were considered, income was not a statistically significant factor explaining this difference.

We also questioned respondents about their plans for participation in winter and spring activities for 1999. As expected, the lowest income group had lower planned participation rates

in several of the activities listed (Table 3) but most differences were not significant. Planned participation rates varied dramatically by income class for both cross-country and downhill skiing, however. And regression analysis showed that the differences between the low- and high-income groups were statistically significant ($p < 0.05$) for downhill but not for cross-country skiing, holding age, gender and education constant.

When asked if an increase in access fees of $5 per visit would influence participation in any of these winter/spring activities, 49.2%, 36.7 %, and 33.3% of the low-, middle-, and upper-income groups said yes, respectively. A logit regression analysis (with the dependent variable defined as 1 if the individual said they would be affected by an increase in fees and 0 otherwise) showed that these differences are statistically significant ($p < 0.05$); older respondents and male respondents were less likely to be affected, while low-income respondents were more likely to be impacted, all else held constant.

Respondents then were asked a series of questions about their attitudes toward changes in fees for access and related services, and about who should pay these fees. When asked if they would favor a policy that maintains present services at parks and forests by increasing fees or a policy that keeps fees at present levels but reduces services, 67% of the mid- and upper-income respondents preferred to maintain services by increasing fees, while 57% of the low-income respondents chose this option. This difference was not statistically significant, however.

The services that respondents felt they could most do without were trails for ATV's, bikes, etc. (58%); late season campground operation (37%); Sunday operation of information areas (27%); educational programs (25%); and some boat access (22%). The services that respondents were most reluctant to give up were restroom maintenance, garbage pickup at both roadside areas and campgrounds, and law enforcement (Table 4).

We then asked respondents to assume that services at state and federal sites in New Hampshire and Vermont would not be reduced, but that more money would have to be raised to cover costs. Respondents were asked how this fund raising should be accomplished. The upper-income group clearly favored increasing access fees, while the lowest income class was much more likely to favor increased reliance on voluntary contributions or state and federal taxes (Table 5). Except for the sales tax option (see Table 5), differences between the lowest and highest income groups with respect to preferences about fundraising policies were statistically significant ($p < 0.05$), while holding effects due to respondents' age, education and gender constant.

When asked who should pay the most to maintain and improve parks and forests in New Hampshire and Vermont, 43 percent of the low-income group said "all taxpayers," while only 27% of the upper-income group gave this response (a statistically significant difference, $p < 0.05$); 45% of upper-income respondents favored payment by campers or consumptive users (hunters, anglers). Seventy-three percent of low-income respondents either agreed or strongly agreed with the statement that "state parks and national forests should be available to everyone regardless of their ability to pay." Sixty-four percent of high-income respondents agreed with this statement, but this difference was not statistically significant ($p > 0.05$).

One potential effect of fee increases is that working-class families might reduce or eliminate visits to state or federal parks and forests. When asked, a majority of low-income respondents (53%) felt that this was an important or very important policy consideration;

however, 58% of the highest-income respondents expressed the same sentiment, suggesting a broad-based recognition of the social importance of these services.

We also asked an open-ended question: "Entrance and access or parking fees to most public outdoor recreation areas in New Hampshire and Vermont have increased over the past five years; how have you responded to this change?" Although most people reported that they had been unaffected by these increases, there were important differences across income categories. Eighty-four percent of the high-income respondents, as compared to 60% of the low-income respondents, said that fee increases had not affected them or that they had "just paid" the increases. More importantly, 23% of the low-income respondents indicated that they had either reduced their use or gone elsewhere, while only 11% of high-income users had made such changes. Both of these differences were statistically significant ($p < 0.05$).

Finally, we presented respondents with four scenarios for use in a conjoint analysis. Option 1 was to stay home, option 2 was to visit a Vermont state park, option 3 was to visit the Green Mountain National Forest (VT), and option 4 was to visit the White Mountain National Forest (NH). For options 2, 3, and 4 there were two levels of garbage pickup (none, full), two types of toilet facilities (pit, flush), three levels of increase in wildlife population (0, 10% and 25%), and three alternative fee levels per visit ($1, $2, $5). These levels were randomly assigned to the options in each survey. Respondents rated each option on a scale of 1 to 5, where 5 represents the option, if any, respondents would definitely choose.

In a conjoint analysis, respondent ratings are assumed to be proxies for individual utility. Suppose, for example, that individual utility associated with forest-based outdoor recreation is expressed by:

$$u^i (p^i, q^i, m, z) \qquad (1)$$

where p^i is the fee associated with recreation option i, q^i is a vector of other attributes associated with option i (wildlife, garbage pickup, type of toilet facility), m is the respondent's income and z is a vector of individual characteristics, like age.

Assuming that utility is related to individual ratings via a transformation function, then:

$$r^i (p^i, q^i, m, z) = \phi [u^i, (p^i, q^i, m, z)] \qquad (2)$$

where i^i is the rating.

Since we assume that individual ratings depend on option attributes and the respondent's socioeconomic characteristics, the following empirical relationship was estimated:

$$\text{Rating} = \alpha_0 + \beta_1 \text{ garbage pickup} + \beta_2 \text{ type of toilet facility} + \beta_3 \text{ increase in wildlife population} + \beta_4 \text{ fee} + \beta_5 \text{ respondent's age} + \beta_6 \text{ dummy variable for Green Mountain National Forest} + \beta_7 \text{ dummy variable for White Mountain National Forest} + \beta_8 \text{ dummy variable for New Hampshire resident.} \qquad (3)$$

where α_0 and β_1 through β_8 are estimated coefficients. Separate models (equation 3) were estimated for each of the three income classes. The results reported in Table 6 (for the low- and high-income classes) indicate that for both groups, ratings increased with garbage pickup, flush toilets, the Green Mountain National Forest option and the White Mountain National Forest option. Ratings decreased with age of the respondent, access fee and residence in New Hampshire.

Of particular importance is that the low-income group was much more responsive to access fees as compared to the high-income group. That is, the access fee, which was not a

statistically significant factor for the high income group was statistically significant ($p < 0.01$) for the low-income group.[1]

It is also important to remember however, that the choices presented represent hypothetical situations; actual behavior may be different. Moreover, the attributes associated with each option do not represent many of the complexities associated with actual decisions. On the other hand, this type of hypothetical analysis provides information about respondent's behavior that cannot be quantified in any other way.

Discussion

Two major points arise from these results. First, there is clearly broad-based attitudinal support for fees. Forty percent of the entire sample preferred fees to other methods of raising funds (Table 5), and even low-income respondents tended to prefer fees to reductions in services.

Second, it is quite clear that fees have a major discriminatory impact on low-income people. One multiple measures and across multiple questions, the effects of income are clear, consistent and significant. For example, a larger percentage of low-income people have altered their behavior because of fees; low-income people were more likely to prefer fundraising via donations as compared to fees, and low-income people were far more likely to believe that all taxpayers should be responsible for financing public lands.

These findings clearly highlight the notion that fees strike low-income people harder than upper-income people. Some high-income respondents also indicated that they too would be, or have been, displaced--ranging from 11% who indicated that increasing fees had changed their participation in the past five years, to 33% who claimed that they would make changes in their planned, future participation. This result compares favorably with those of Schneider and Budruk (1999) cited above. However, participation changes may be easier for upper-income people than for low-income people. Rosenthal, Loomis and Peterson (1984) argue that fees promote efficient resource allocation by sorting out high-value users (those who are willing to pay at a particular level) from low-value users (those who are not). Yet the efficiency approach, which assumes that all value is captured in a willingness-to-pay measure, is not necessarily fair since it fails to account for differences in the ability to pay. There is less flexibility when budgets are stretched tight, and $5 looms much larger for families making less than $30,000 per year than it does for families who earn more than $75,000, all else held constant.

So fees have both broad-based attitudinal support (including support from low-income respondents) and significant exclusionary impact. Are these findings contradictory? We think not, primarily because they have different origins. To us, it seems likely that the attitudinal sentiment arises from the dominant line of the political discourse over the past quarter century: no new taxes, reduced government spending. The exclusionary impact, on the other hand, arises from the distribution of income, a deeply structural variable and one which is likely to be a causal factor in the attitudinal response. That is to say, as the income gap widens, we are likely to see a change in the political discourse; the preferences for funding public parks and recreation expressed in this study are likely to be far more malleable than people's incomes, and there are already indications that the political wind on these subjects is changing (cf., Frank, 1999).

A second potential explanation concerns a lack of specificity in our questionnaire. Many

of our questions about fees and taxes were not specific about the amount of either. It may be that people are quite used to thinking about recreation fees that range from $2 to $5 (and several questions did refer to a $5 fee), while the notion of a tax increase might have sounded vague and somewhat more threatening. Future research comparing these alternatives should probably be specific about both.

Since fees do have a significant negative impact on participation by low-income people, how should public agencies respond? Of the usual justifications given for fees, many are little more than attempts to rationalize excluded users, avoiding any moral issues involved. For example, many managers focus on agency welfare, turning excluded users into little more than an accounting problem. Similarly, a focus on resource protection or economic efficiency can support fee programs with little consideration of which visitors get excluded. The currently popular "customer" orientation can accomplish a similar result. Since low-income people are less likely to participate in many forms of resource-based recreation, they can simply be defined as "not our customers." Each of these strategies is in full play in recreation management and research; what is missing is a sense of public need or mission (More, 2000).

On the other hand, many in both the recreation management and research communities do recognize the problem and have made sincere attempts to mitigate the negative impacts of fees. Crompton and Lamb (1986), for example, recommended charging an appropriate price for a service and then finding ways, such as free days or rebates, to encourage participation by the needy. And some programs offer admission in exchange for voluntary labor. Unfortunately, such conceptions tend to underestimate how complicated life can get for many low-income people. As Rubin (1994) notes, many working-class families have both limited leisure time and inflexible schedules. They may, for example, work two jobs or have jobs on different shifts. Children and the attendant necessity of childcare arrangements complicate matters further. While unemployment may bring significant leisure, many employed working-class or working poor people are unable to take advantage of a "free Tuesday," and agencies are unlikely to offer free access on weekends when the greatest potential for revenue generation exists. Life at the margin gets complicated.

If fees are exclusionary and simple tactics like free days or rebates are ineffective, what alternatives exist? The obvious long-term solution is to establish an active constituency that will speak on behalf of public funding for parks and recreation programs. Most agencies do, in fact, have such constituencies, but clearly their effects have been limited. Perhaps more effective are constituencies for individual parks and programs--"friends groups." Unfortunately, such groups often have only localized effects and cannot contribute to the solution of a general policy problem.

What remains, then, is service reductions. A majority of our sample, including low-income people, preferred fees to service reductions. From the standpoint of excluded users, however, service reductions present the only viable options for maintaining or reducing current fees. Reductions may be possible in some of the park services listed in Table 4; state parks in both New Hampshire and Vermont have eliminated garbage pickup in many areas, for example. However, we probably have reached an era when agencies must begin to consider closing entire areas and/or facilities. There is a natural resistance to such an idea: when areas are closed, nobody gets anything and any existing infrastructure may be a target for vandalism. Even more

important will be an agency's ability to withstand pressure that comes through the political system. Clearly, any decision or service reductions or facility closure needs to be made on a sound, rational basis; we very much need data on the productivity of facilities and the contributions of different services to recreation quality. Only with such data can we make informed, defensible decisions. The alternative--relying on exclusionary fees to maintain services--may undermine the social purpose of public recreation facilities.

Conclusions

User fees, although widely accepted, significantly discriminate against low-income people. Based upon our data, we estimate that a $5 daily fee for the use of public lands will significantly impact about 49% of low-income people. Fewer members of the middle- and upper-income groups will be impacted, and their exclusion is more likely to be discretionary.

Before concluding, two caveats need to be expressed about this study. First, as noted, these results should be treated as sample specific; the nature of the sample precluded making statewide projections. The limited evidence we have suggests our sample was somewhat weighted toward more educated, affluent males. While some of these factors were held constant by the statistical analysis, readers still would be well advised to treat them simply as comparisons of people in different income groups. Second, New Hampshire and Vermont are rural states. This means that the respondents in our study may have readily available substitutes for public lands. The results might have differed if the study had been conducted in an urban state that had fewer substitute sites and where people are more dependent on public lands for access to resource-based recreation.

These caveats aside, visitor exclusion highlights a critical problem in recreation policy--the problem of public purpose (More, 1999). In general, for the public sector to be involved in an activity, there needs to be a public purpose for it--some public need that must be fulfilled, some public goal that must be accomplished. This is certainly true for public lands, and it is this public purpose that must drive policy. The national parks, for example, were founded with the dual (and often conflicting) purposes of protecting the resource and promoting public use and enjoyment (Chase, 1987). Thus, the key question with regard to fees becomes: How do fees enhance or detract from an agency's ability to fulfill its mission? The enhancements are obvious, particularly in the area of maintenance and possibly in the protection of fragile environments as well. For example, with $460,000 returned from the fee demonstration project during the 1998 season, the Mt. Baker-Snoqualmie National Forest was able to hire 24 trail maintenance workers who cleared over 700 miles of trails, improved drainage, and helped to maintain trailhead toilets and bulletin boards (Bates, 1999). Little wonder then that a majority of site managers are pleased with the program, especially when attendance remains relatively constant (Krannich et al., 1999).

Such improvements may be dearly bought, however; while total visitation may have remained constant, there is no indication in such data if the type of visitor is affected. Our data clearly suggest that fees have had a negative impact on participation for nearly half of low-income households and, as the GAO (1998) report notes, it is a bit too soon to begin predicting attendance; while we currently are enjoying a major economic expansion, what will happen when a decline sets in?

A serious, related concern is the effect of fees on minority participation; as Winter et al., (1999) note, there is remarkably little research on the effects of fees on peoples of color. Minority participation was not an issue in the present study because the populations of New Hampshire and Vermont are largely Caucasian--86% and 98%, respectively, in 1998 (U.S. Census Bureau, Online 2000b)--and most minorities were concentrated in the large cities which did not appear in our sample. In the past, however, fees have been used to systematically discriminate against both minorities and low-income users (Caro, 1975),[2] and many minorities face other barriers to participation which fees will only compound (Phillip 1999). The effects of fees on minority participation in outdoor recreation is clearly an area that needs further research.

If low-income people are, in fact, excluded from public parks and recreation areas, then serious policy questions are raised about the very purpose of public recreation. In Vermont, for example, there are 100 plus miles of shoreline along Lake Champlain, most of which is privately owned. Wealthy people have access to the lake in numerous ways: some own waterfront property, others belong to private clubs or marinas. The public sector does own property, much of which serves to preserve access to the lake for the public at large. However, when agencies begin to act like entrepreneurs seeking self-funding through fees, and low-income people are excluded, the public purpose--the very reason for public ownership--is defeated.

Why do we have public beaches, hiking trails, campgrounds or teen centers? For these resources to be legitimately in the public sector, they must be fulfilling a public need; a clear sense of public mission and public purpose is essential to the formation of sound recreation policy (More, 2000). Unfortunately, this point is often lost in current discussions. Many see fees only in terms of cash flows--dollars taken in versus operating costs. And the recreation research literature is often most concerned with the mechanics of setting fees--reference prices, degree of acceptance, revenue optimizing and the like. Ultimately, however, a strong sense of mission and purpose are fundamental to the successful management of public parks and recreation. Our results suggest that fees undercut this mission: they are a major step in the gentrification of recreation resources. When the parks are reserved for the comfortably well-off, will they continue to be publicly necessary?

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TABLE 1
Characteristics of Income Groups

Characteristics	Low Income	Middle Income	High Income
N	69	133	45
Average age	58.6	51.4	51.3
Gender (%male)	62	75	84
Average education (years)	12.79	14.60	16.78

TABLE 2

Reported Participation Rates by Activity and Income Group, Summer and Fall, 1998 [a]

Activity	Low Income	Middle Income	High Income
Picnicking	3.92	4.75	3.93
Fishing	10.81	6.17	7.77
Camping	2.84	1.29	2.93
Backpacking	.82	.35	.17
Mountain biking	1.44	3.27	1.34
Hunting	7.41	5.81	5.48
Trips to watch birds and wildlife	6.52	7.20	3.35

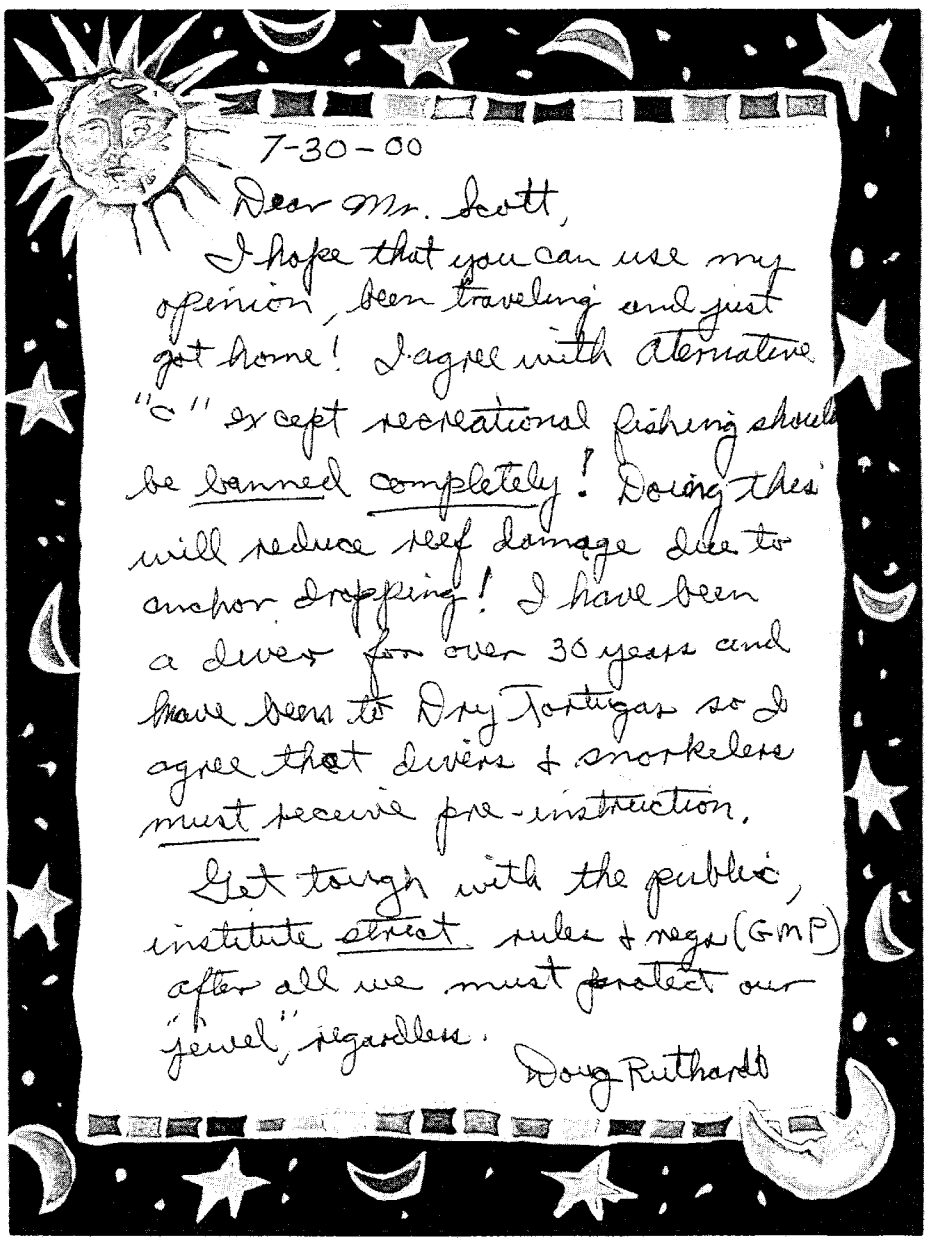
[a] Rate expressed as average number of times participating.

TABLE 6
Regression Results of Rating Model

Variable	Low-Income Group Estimated Coefficient[d]	High-Income Group Estimated Coefficient[d]
Intercept	4.682 (8.23)***	3.934 (6.43)***
Garbage pickup (1 if full, 0 otherwise)	.749 (3.20)***	.057 (.213)
Type of toilet (1 if flush, 0 otherwise)	.534 (2.28)**	.419 (1.58)
Increase in wildlife population (%)	-.009 (.80)	.019 (1.48)
Access fee ($)	-.229 (3.27)***	-.142 (1.74)*
Respondent's age (years)	-.022 (2.88)***	-.018 (1.85)*
Green Mountain (1 if Green Mountain option, 0 otherwise)	.045 (.16)	.028 (0.9)
White Mountain (1 if White Mountain option, 0 otherwise)	.488 (1.74)*	.792 (2.48)**
New Hampshire resident (1 if resident, 0 otherwise)	-.285 (1.20)	-.432 (1.59)
	$\bar{R}^2 = .15$	$\bar{R}^2 = .14$

[d] Absolute t values in parentheses.

*** The difference is significant, $p<0.01$
** The difference is significant, $p<0.05$
* The difference is significant, $p<0.10$



7-30-00

Dear Mr. Scott,

I hope that you can use my opinion, been traveling and just got home! I agree with alternative "C" except recreational fishing should be banned completely! Doing this will reduce reef damage due to anchor dropping! I have been a diver for over 30 years and have been to Dry Tortugas so I agree that divers & snorkelers must receive pre-instruction.

Get tough with the public, institute strict rules & regs (GMP) after all we must protect our "jewel", regardless.

Doug Ruthardt

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A note from...
Jean Smarsh

7/23/00

Dear Sir:

I encourage you to do all you can do to preserve the Dry Tortugas National Park and its environs. If at all possible, I would love to see the whole area designated as an off-limits preserve except for scientific research and other valid related activities. People have enough areas to "recreate" in. Animals have rights, too. Be tough for animals.

July 25, 2000

Valerie Simola
2221 Monroe St. Apt. 4
Hollywood, FL 33020

Dear Mr. Scott,

I write to you as a concerned citizen and firm believer in the protection of our national parks being far more important than the need for greed.

I understand that changes are possibly in the works regarding how Dry Tortugas National Park is to be protected.

As you already know, our environment is already under incredible stress, mostly thanks to individuals who seem to be more interested in exploitation than preservation.

I strongly support keeping 50% of the park as a research natural area where no fishing [illegible] general public are allowed.

[illegible] also strongly support strict limits on the [illegible] people allowed to ~~[illegible]~~ visit the park. [illegible] had the pleasure of visiting [illegible] the park, I have seen [illegible] number of pieces [illegible] that is through

programs on WLRN public television. The ecosystem is so delicate that it seems to me the less interference from us the better. I think 50 visitors a day is a good number. Also because of the delicate nature of the coral reefs, I feel that the park service should provide anchor buoys like the ones used in the Keys. I also think that enforcement should be strict and fines for offenders alot more than $200. Any diving should include an instruction class on how to avoid harming the reefs before anyone can go down.

I also feel that these measures should be worded so that there can be no room for loop-holes and should have no expiration date.

Everything on this planet is alive and whether we choose to acknowledge it or not, it is all interconnected and that includes us. If we don't take aggressive steps to protect what is already here, none of us will make it either.

I have been in South Florida since 1985 and it sickens me to see how much damage has been done and continues to be done. I'm not one of these protesting extremists, but am still very concerned about what is happening here. I try to a

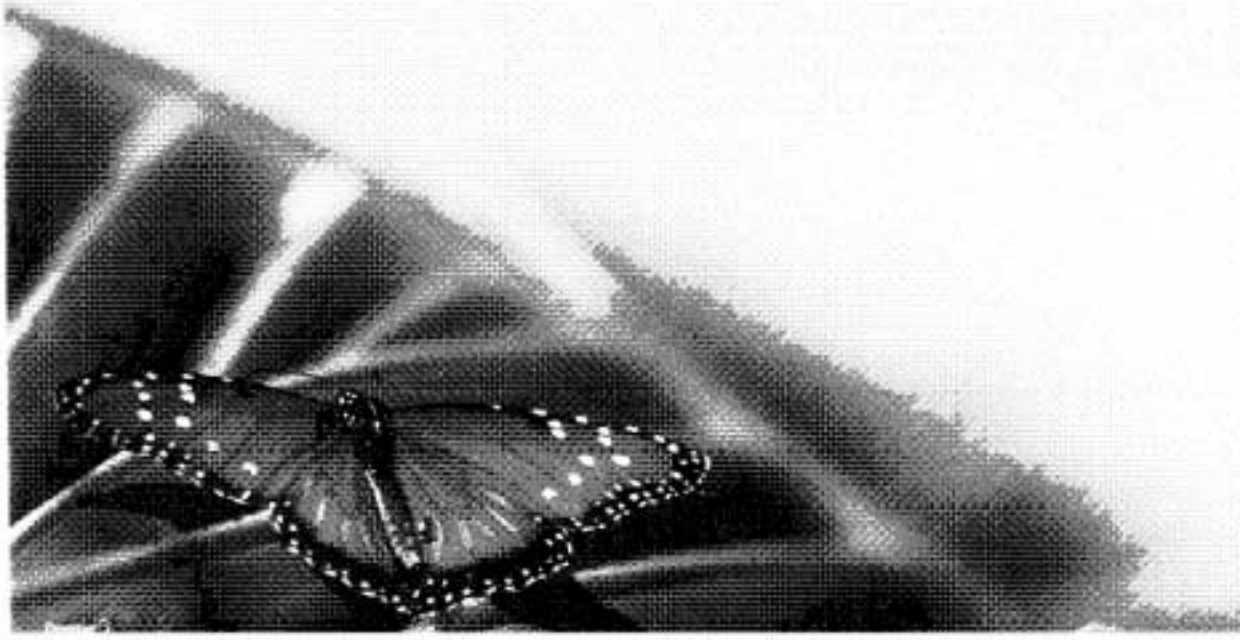
what I can. I trust you will do the very least that you can regarding these matters.

I will leave you with a passage spoken by Chief Seattle of the Oglala Sioux in 1835.

"If all the beasts were gone, men would die from great loneliness of spirit, since whatever happens to the beasts also happens to man. All things are connected. Whatever befalls the earth befalls the sons of the earth."

Sincerely,

Velina Swords



22 JULY 2000
FRANK H TILLOTSON
2494 13 AV N # 46
ST PETERSBURG FL 33713

THE DRY TORTUGAS NATIONAL PARK

EVERY TIME WE TURN AROUND SOME ONE WANTS MONEY.

THE NATIONAL PARKS ARE NOT THE LEAST OF THESE.

HOWEVER THEY ARE THE OPPORTUNITY TO BRING ABOUT

THE SAVING OF FAST DISAPEARING LAND AND SEA BOTTOM

WHERE FUNDS ARE AVAILABLE.

DRY TORTUGAS.

THIS IS AN OPPORTUNITY TO DO MUCH WITH LITTLE.VAST

HELP CAN COME AT LITTLE COST.

FIRST: SIMPLY MAKE IT ILLEGAL TO ANCHOR WITHIN THE PARK LIMITS. COST ? VERY FEW DOLLARS

SECOND. ALLOW ENTRANCE TO THE FORT AND LAND TO BE MADE FROM PARK APPROVED COMMERCIAL FERRYS.

ENFORCE IT.

TOO SEVERE. THIS IS AN EMERGENCY SOLUTION. LATER PARK INSTALLED

ANCHOR BOUYS TIME LIMITED USE AND A CHARGE HIGH ENOUGH TO

MAKE PEOPLE APPRECIATIVE OF THE OPPORTUNITY. IF THEY CAN

OWN A BNOAT THEY CAN PAY TO PARK.AS FOR DIVERS..THEY TAKE NOTHING. AND NO DRIFT FISHING.
IN MY OPINION IT IS MORE IMPORTANT AT THIS TIME TO DO

SOMETHING AND ADJUST LATER.

THANKS FOR LISTENING.

Frank H Tillotson

Please either keep access to a minimum (NO vehicles, nor animals used as vehicles), or, better yet, close off all human access! Wildlife cannot protect themselves from us, nor do they want us around. The only way we can preserve them is by providing human-free habitat. See the attached paper, as well as other materials on my werb site.

Sincerely,

Mike Vandeman

Wildlife Need Habitat Off-Limits to Humans!

Michael J. Vandeman, Ph.D.

October 12, 1997

The Problem

Human beings think that we own, and have the right to dominate, every square inch of the Earth. That, besides being an absurd idea, is the basic reason why we are losing, worldwide, about 100 species per day. Habitat loss is at the top of every list of the primary reasons why species have become extinct or are in danger of becoming extinct.

Outright destruction of habitat (for example, paving it or turning it into farms, golf courses, housing developments, or parks) is not the only way that an area can become untenable (useless) as habitat. Anything that makes it unattractive or unavailable to a given species causes habitat loss. Have you ever wondered why most animals run away when we come near? It certainly isn't because they love having us around! Many animals simply will not tolerate the presence of humans. The grizzly bear and mountain lion are just two examples. The grizzly needs a huge territory, can smell and hear a human being from a great distance, and will avoid going near a road.

Humans are the ants at every other species' picnic. One of the first things that children learn about wild animals is that most of them run (fly, swim, slither, hop) away whenever we get close to them. (A few, such as mosquitoes, like having us around.) Some are more tolerant of us than others, but in any given area, there are at least some that don't like having us around.

Let's take as a premise that we do not want to cause any extinctions. I think that most people agree with that. But what follows, is that we have to set aside adequate habitat for all existing species, and that much of it must be human-free. That is not understood by most people, even most biologists. We claim to believe in the Golden Rule, but we apply it only to fellow humans.

It has been said that "The measure of a culture is how well it treats its least powerful members". By this, our own measure, human society is a failure in its relations with the rest of creation.

In 4 million years of human evolution, there has never been an area off limits to humans -- an area which we deliberately choose not to enter so that the species that live there can flourish unmolested by humans. There are places called "wildlife sanctuaries", where human recreation, hunting, logging, oil drilling, or even mining are usually allowed. There are a few places where only biologists and land managers are allowed (e.g. California's condor sanctuary). There have been places called "sacred", where only priests could go (in other words, they were "sacred" only to ordinary people). But to my knowledge, there has never been any place, however small, from which the human community has voluntarily excluded itself.

There has been a lot of talk in recent years about looking for life on other planets. For its sake, I hope we never find it! Why, after the inconsiderate way we have treated wildlife on this planet, should we be allowed to invade the even more fragile habitats that may be found in other places? While the thought of finding such life is intriguing, I haven't heard anyone suggest that we consider its feelings and wishes, e.g. the likelihood that it would want to be left alone (quite reasonable, considering our history!). How are we going to communicate with intelligent life on other planets, when we can't even communicate with the intelligent life on this planet? Besides, since the laws of physics and chemistry are universal, it is unlikely that any such organisms would be dramatically different from those on Earth.

What scientific evidence do we have that wildlife need to be free of human intrusion? Not much, probably because scientists are people, and like the rest of us are instinctively curious about every thing and every place, and don't care to be excluded from anywhere. For most of us, travel is just entertainment, but scientists probably see their livelihood and success as depending on being able to travel to any part of the globe and "collect" (i.e., kill) any organism they find there. I doubt that there are many scientific studies of the environmental harm done by the pursuit of science.

(As recently as 1979 (Wilkins and Peterson, p. 178), we find statements like "Populations of wild animals can have the annual surplus cropped without harm". Insect field guides, e.g. Powell and Hogue (1979), also recommend collecting insects as "an exciting and satisfying hobby for anyone" (p. 359). Does that mean that collecting grizzlies or tigers is also an acceptable "hobby"?)

However, there is recent research (e.g. Knight and Gutzwiller,

1995) showing that recreation, even activity traditionally thought of as harmless to wildlife, can be harmful, or even deadly: "Traditionally, observing, feeding, and photographing wildlife were considered to be 'nonconsumptive' activities because removal of animals from their natural habitats did not occur.... nonconsumptive wildlife recreation was considered relatively benign in terms of its effects on wildlife; today, however, there is a growing recognition that wildlife-viewing recreation can have serious negative impacts on wildlife" (p. 257). "Activities [involving] nonmotorized travel ... [have] caused the creation of more ... trails in wildlands.... These activities are extensive in nature and have the ability to disrupt wildlife in many ways, particularly by displacing animals from an area" (p. 56). "Recreational disturbance has traditionally been viewed as most detrimental to wildlife during the breeding season. Recently, it has become apparent that disturbance outside of the animal's breeding season may have equally severe effects" (p. 73). "People have an impact on wildlife habitat and all that depends on it, no matter what the activity" (p. 157). "Perhaps the major way that people have influenced wildlife populations is through encroachment into wildlife areas" (p. 160). "Recreationists are, ironically, destroying the very thing they love: the blooming buzzing confusion of nature.... The recreation industry deserves to be listed on the same page with interests that are cutting the last of the old-growth forests, washing fertile topsoils into the sea, and pouring billions of tons of greenhouse gases into the atmosphere" (p.340). (Note: wildlife have a hard time distinguishing between biologists and recreationists!)

In other words, if we are to preserve the other species with which we share the Earth, we need to set aside large, interconnected areas of habitat that are entirely off limits to humans ("pure habitat"). Our idea of what constitutes viable habitat is not important; what matters is how the wildlife who live there think. When a road is built through a habitat area, many species will not cross it, even though they are physically capable of doing so. For example, a bird that prefers dense forest may be afraid to cross such an open area where they may be vulnerable to attack by their predators. The result is a loss of habitat: a portion of their preferred mates, foods, and other resources have become effectively unavailable. This can reduce population sizes, cause inbreeding, impoverish their gene pool, and impair their ability to adapt to changing circumstances (such as global warming). It can lead to local (and eventually, final) extinction. Small, isolated populations can easily be wiped out by a fire or other disaster. Other species are not as flexible as we are. We can survive practically anywhere on Earth, and perhaps other places as well!

What Wildlife Need

Wildlife are not that different from us. Chimpanzees, for example, are genetically 98% identical with us. Therefore, we should expect that they need just what we need: a place to live that contains all necessary resources (food, water, shelter, potential mates, etc.). It is not too hard to tell when animals are dissatisfied -- they vote with their feet; they die, or leave. The key is to look at things from the wildlife's point of view. As simple and obvious as it sounds, it is rarely done. For example, how often do road builders consider how wildlife will get across the road? My cat communicates clearly what he wants: when he wants to go out, he whines and then goes to the door and stares at the doorknob; when he is hungry, he leads me to the refrigerator or his dish. We are proud of our power of empathy, but rarely apply it to wildlife. We don't want to be bothered by wildlife in our homes; wildlife apparently feel the same.

"Pure Habitat"

Go to any library, and try to find a book on human-free habitat. Apparently, there aren't any! There isn't even a subject heading for it in the Library of Congress subject index. I spent two days in the University of California's Biology Library (in Berkeley), a very prestigious collection, without success. The closest subject is probably "wilderness", but wilderness is always considered a place for human recreation. So-called "wildlife sanctuaries" encourage recreation, and often allow hunting, logging, oil drilling, or even mining. The category "animal-human relationships" should contain such a book, but doesn't. The idea is conceivable, because I just did it, but apparently no one has even considered it important enough to write about, since we "own the entire Earth".

I once read Dolores LaChapelle's Sacred Land Sacred Sex (1988), hoping to learn what sacred land is. I didn't find an answer in the book, but I took the fact that sacred land is often restricted to the "priesthood" to imply that sacred land is honored by not going there! So we could say that human-free habitat is "sacred" land, except to priests and scientists (a type of "priest"), who are always allowed to go there. (This is another indication that science desacralizes whatever it touches. Ironically, it is science that has proven the need for sacred land!) Probably the simplest term is "pure [wildlife] habitat", but "wilderness" and "wildlife sanctuary" should be synonymous with it. ("Wildlife" is "all non-human, nondomesticated species", and thus doesn't include us.)

(Note: I am not talking about de facto human-free habitat, that is off-limits simply because it is difficult to get to, such as the

inside of a volcano or the bottom of the ocean. Such areas will all be visited in time, as technology becomes available that makes them accessible. The key is the conscious decision of the human community to restrain itself from going there.)

Why Create Pure Habitat?

Some wildlife are sensitive to the presence of people. In order to preserve them, we need to create areas off-limits to humans.

It's educational. Publicity about areas where people aren't allowed teaches people about what wildlife need, and how to preserve them.

Some animals are more dangerous to people or livestock than humans are willing to accept (e.g. tigers or grizzlies). The only way we can preserve such species is to grant them a place to live where there are no people or livestock. Otherwise, whenever they attack someone, we kill them, as recently happened to a tiger that attacked a zoo employee in India.

The more accessible an area is to people, the less it is respected. "Sacred" land is accorded the highest respect. "Terra incognito" was not even mapped. A map tells people (nonverbally) that it is okay to go there. So do trails. Roads, which are built by bulldozer, "say" that we can do anything we want to the land. Many park trails are now created by bulldozer. Even when bikes aren't allowed there, it is hard to keep them out, because the use of a bulldozer indicates that the land is not important, and that rough treatment won't hurt it. Part of being sacred is the feeling of mystery. Mapping, roads, and other aids to human access destroy much of that feeling of mystery. For example, a map trivializes all areas and reduces them to a few lines and colors on paper. Beauty (except for some "scenic highways") and biodiversity are generally ignored.

Wildlife generally prefer human-free habitat. Since they are so similar to us (98%, in the case of the chimpanzee, and probably a similar large percentage for every other species), we have very little excuse to treat them differently. If we deserve to be unmolested in our homes, so do they.

There are too many species on the Earth, and too little time, to study them all and determine their precise habitat requirements. The only safe course is to assume that they all need at least the habitat that they now occupy, and preferably, access to their traditional territory. Or, as Aldo Leopold said, we need to "save all the pieces".

Obviously, we need to experience wilderness in order to appreciate it. But equally obviously, we need to practice restraint, if we are

to preserve that wilderness. Having areas completely off-limits to humans will remind us of that need to practice restraint. It is a reminder of the importance of humility, like the practice of saying grace before meals.

It is the right thing to do. Why not ask for what we want?

Practical Considerations

Parks, because they already provide some protection, are a good place to start building a network of wildlife sanctuaries. They provide the "seeds" of a "full-function" habitat-and-corridor matrix designed to preserve our biological heritage. But they need to be changed and renamed, because "parks" are, by definition and practice, places for pleasuring humans. Many parks should be allowed to revert to wilderness, and wilderness should be a place that we enter rarely, reverently, and on its own terms.

It is obviously nearly always impractical to maintain an area free of people by force. Probably the best that we can do is to remove all human artifacts, including nearby trails and roads. (This should be done soon, because it will become enormously more expensive, as soon as we run out of oil!) Then a few people may be able to enter the area, but at least it will be at their own risk (no helicopter rescues!). If we aren't going to go there, then we don't need to retain the area on maps; they can be "de-mapped" and replaced with a blank spot and the words "terra incognito".

Roads and other rights-of-way are a particular problem. Due to the fragmenting effect of any such corridor, where it cannot avoid crossing a habitat area, it should, if possible, tunnel under the wildlife area, so that wildlife can travel freely across it.

Where Should Wildlife Sanctuaries Be Located?

Everywhere. In large wilderness areas, there should be large wildlife sanctuaries, but even in cities, and back yards, where there is less viable habitat available, some of it should still be set aside for the exclusive use of wildlife, because (a) it is fair, and (b) it would serve to remind us to always keep wildlife in mind, just as indoor shrines in Japanese homes (and photos on our fireplace mantels) serve as a constant cue to remember gods and deceased relatives. After all, most human habitations are located on land that was also attractive to wildlife (e.g., near a source of drinking water). (Remember, we are 98% identical ....) And cities form significant barriers to wildlife travel.

Having pure habitat nearby is very educational. I am experimenting with setting aside a 20 x 20 foot area in my back yard as pure

habitat. It gives me a good opportunity to learn how to cope with my feelings of curiosity about what is going on there, desire to "improve" it as habitat, the need for a way to maintain its pristinity in perpetuity, etc. Creating travel corridors is a major difficulty. However, recently I have heard that some San Francisco residents are tearing down their backyard fences in order to make it easier for wildlife to travel across the city.

Difficulties

What will wildlife and wildlands "managers" do for a living? Not all wildlife habitat will be closed to humans. They can manage the remainder. For those that will be closed, they can remove all human artifacts and invasive non-native species, restore the area to its "wild" condition, and educate the public about what they are doing.

Roads, as we discussed, fragment habitat. How can it be prevented? Probably most major roads should be replaced by rail lines, which are much narrower in relation to their carrying capacity, and present much less of a barrier to wildlife. For example, the time between trains is much greater than the interval between motor vehicles on a road. Besides, we will soon be running out of oil, and won't be able to justify keeping so many lane miles of roadway open for the dwindling number of cars and trucks.

Many people may have to move. But compared to wildlife, people can pretty well take care of themselves. Wildlife, if we are to preserve them, must be given priority. They cannot protect themselves from us.

"People will not appreciate what they can't see and use". This is an obvious myth. Many people appreciate and work to protect areas that they may never experience directly. I don't need to visit every wilderness area in the world, to know that they need to be protected. I don't need to see every Alameda whipsnake to want to save the entire species. Why cater to, and hence promote, selfishness? Besides, we need to protect many areas (e.g. Antarctica and the bottom of the ocean) long before we are able to bring people there to learn to appreciate them directly. The relationship between the number of visitors, and the degree of protection given the area, is not linear!

We have an instinct to explore; if an area is closed to us, that is exactly where we want to go! There are many areas of life where we

need to practice restraint, and where we all benefit from it -- for

example, in our relations with our family, friends, and community. Margulis and Sagan (1986) argue convincingly that cooperation (e.g.

between eukaryotic cells and their symbiotic mitochondria), just as much as competition, has been responsible for our successful evolution. If we compete with other species, we will surely "win" - - and then doom ourselves to extinction, just like a symbiont that destroys its host. We don't have to indulge all of our "instincts"; in fact, we are better off if we don't!

We still need access to wilderness in order to learn to appreciate it, but since we aren't closing all wilderness to people, that need

can still be satisfied. In fact, all children should be taken to see wilderness soon after they are born, because it is the only place they can see how things are supposed to be in this world! If they grow up around nothing but concrete, then concrete may become their ideal!

How Pure Habitat Benefits Us

It preserves species that are an essential part of our own ecosystems, and on whom we are dependent for essential (e.g. foods) or desired (e.g. a variety of foods) products and services. It

provides a source of individuals to repopulate or revitalize depleted local populations (assuming that connecting wildlife corridors are maintained).

Knowing that wildlife are safe and healthy gives us a feeling of safety and security (like the canary in the mine), as well as the satisfaction we get from cherishing others (satisfying our "maternal/paternal" instincts?). We must carry a heavy load of guilt when we learn that our lifestyle is causing the suffering, death, or even extinction of our fellow Earthlings (e.g. from clearcutting tropical forests)!

Wildlife, even if we don't utilize it directly, can teach us by giving us an independent view of reality and examples of different values (assuming that we listen).

For the sake of the environment, for our own health and happiness, and for our children, we need to move toward a more sustainable lifestyle. The primary obstacle is our reliance on technology. Coincidentally, the primary threat to wildlife is also technology -

- e.g. tools that make wildlife habitat more accessible, such as maps, GPS sensors, satellites, bulldozers, 4-wheel-drive vehicles, mountain bikes, rafts, climbing equipment, night-vision goggles, etc. Banning the use of such technologies in order to protect wildlife can at the same time help us move toward a more

sustainable future.

Perhaps the greatest benefit of all, is distracting us from our selfish, petty concerns, and giving us something more meaningful to work on. Remember "We Are the World"? People from all over the world united to come to the aid of a third party: the world's starving children. While working together, they were able to forget their own needs, and focus wholly on rescuing children who were in trouble. Well, wildlife are in even more trouble! We all (according to E.O. Wilson) instinctively love nature. Why not focus on this common value, work together to rescue the large proportion of the world's wildlife that are in serious danger (according to the IUCN, one fourth of the world's animals are threatened with extinction), and put aside our relatively petty squabbles -- e.g. those causing wars all over the world?

Human groups often fight over things so subtle that outsiders have trouble understanding what all the fuss is about. For example, Canadians have long been bickering over which language to speak, while their forests are being clearcut and their water contaminated with mercury! Language and culture are important, but not in comparison to what wildlife have to endure, including extinction!

Conclusion

The existence of life on the Earth is probably inevitable, given the laws of chemistry and physics and the range of conditions and elements available here. However, at the same time, the life of any given individual is exceedingly fragile. A hair's breadth separates the living state from the dead. In fact, there is apparently no difference between living and inanimate matter.

The proof is a seed. Take, for example, one of the seeds that germinated after being in an Egyptian pyramid for 3000 years. What was that seed doing for 3000 years? Obviously, nothing! If it did anything, it would consume energy, and use up its store of nutrients. Therefore, it was "alive" (viable), but undetectably so. (Similarly, there are frogs that yearly survive being frozen solid! Viruses and prions are two other examples of dead matter that engages in processes usually associated only with being alive.) In other words, life is simply a process, like the flowing of water, that can stop and start. (Or perhaps we should say that we are all dead, but sometimes undergo processes that are usually associated with, and called, "being alive".) And it also follows that we are essentially indistinguishable from inanimate matter.

As I discussed earlier, we are also essentially indistinguishable from other organisms. Every lever by which we have attempted to

separate ourselves from other species has, in the end, failed. So how should we treat them? We have no rational basis for treating them any different from ourselves. We need a place to live that is satisfactory to us, and wildlife need, and deserve, the same.

Are we big (generous) enough to give other species what they want and need, and share the Earth with them? Do we really have a choice?!

References:

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===

I am working on creating wildlife habitat that is off-limits to humans ("pure habitat"). Want to help? (I spent the previous 8 years fighting auto dependence and road construction.)

http://home.pacbell.net/mjvande

Author: DRTO Planning at NP-EVER-SFRC
Date: 06/19/2000 10:29 AM
Normal
TO: Margaret DeLaura at NP-DEN1
Subject: Fwd:Planning Comment
---------- Message Contents

_____Forward Header_____
Subject: Planning Comment
Author: ryoung <ryoung@alpha.utampa.edu>
Date: 6/17/00 8:43 PM

If you are serious about protecting your park, the Dry Tortugas, you should not allow any visitors unless they travel by private sail boat and tie up to only to mornings.

From your documents it looks like 90% of your visitors come by commercial high speed vessels. Stopping all commercial visits will reduce your visitors to 10%. Of the 10% around 1/2 are sail boats. Sail boats move slow thus less likely to damage sea life plus your number of visitors will be reduced to 5% of current level.

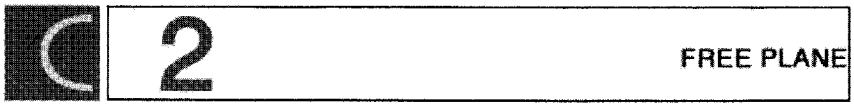
Also would restrict all sail boats to mornings. Anchors can damage reefs.

What do you think? If you are serious about protecting the park, you must agree I have proposed the proper solution.

What do you think?

Roy Young
1449 52 nd Ave. ne
Saint Petersburg, Fla. 33703
727 526 3461

Received: from TIA.utampa.edu ([209.241.177.253]) by ccmail.itd.nps.gov with SMTP
(IMA Internet Exchange 3.13) id 0039ACCF; Sat, 17 Jun 2000 20:44:29 -0400
Received: from alpha.utampa.edu (host76.utampa.edu [216.202.81.76]) by TIA.utampa.edu with SMTP (Microsoft Exchange Internet Mail Service Version 5.5.2448.0)
id MPHPN6J0; Sat, 17 Jun 2000 20:45:39 -0400
Message-ID: <394C1B19.3D4CAFB9@alpha.utampa.edu>
Date: Sat, 17 Jun 2000 20:43:05 -0400
From: ryoung <ryoung@alpha.utampa.edu>
Organization: ut
X-Mailer: Mozilla 4.72 [en] (Win95; I)
X-Accept-Language: en
MIME-Version: 1.0
To: DRTO_Planning@nps.gov
Subject: Planning Comment
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit



American Sports Fisherman-let us fish the Dry Tortugas

View Current Signatures - Sign the Petition

To: Pres. Clinton's limits on sport fishing areas

The Honorable William J. Clinton
President of the United States
The White House
1600 Pennsylvania Avenue
Washington, DC 20500

Dear President Clinton,

We, the undersigned, have committed ourselves to supporting the Fishable Waters Act of 2000, which is a voluntary, non-regulatory, partnership oriented, incentive based plan that brings together the fisheries conservation community, state and federal fisheries managers, and the agriculture community. This act was introduced simultaneously in the House and Senate by Rep. John Tanner and Sen. Kit Bond on April 12, 2000.

We also support the letter to you, President Clinton, from a coalition of 35 sport fishing associations, including the American Sportfishing Association and other companies and organizations. This letter, in essence, objects to the full implementation of your executive order on marine protected areas you issued on May 26, 2000. If this order is implemented 168,000 acres of coral reef fishing area will not only be closed to commercial fishing but also to sport fishing with a large percentage of this area in the Florida Keys and Dry Tortugas area.

The amount of fish taken in the Dry Tortugas area by sport fishing is totally insignificant to the reproduction rate of the fish species represented there. Sport fishing has no adverse effects on turtles, birds, water quality; and to protect the coral reefs, a ban on anchoring in these areas could be enforced with reef areas provided with mooring buoys. We totally believe the American sport fisherman should not be denied his right to fish these areas.

After reviewing the General Management Plan Amendment, Dry Tortugas National Park, with the proposed alternatives A, B, C, D, and E, we support alternative B which will effectively protect these areas yet allow the American sport fisherman continued access.

Sincerely,

This petition was received from Don Hedstrom; see page 348.

American Sports Fisherman-let us fish the Dry Tortugas

We endorse the American Sports Fisherman-let us fish the Dry Tortugas Petition to Pres. Clinton's limits on sport fishing areas.

Read the American Sports Fisherman-let us fish the Dry Tortugas Petition

Sign the American Sports Fisherman-let us fish the Dry Tortu

Use the Reload button in your web browser to see new signatures

	Name	Address, zip code
14.	Penn A Outlaw, Jr	Bonita Springs, FL 34135
13.	robert f polk	107 lemon rd ne, lake placid, fl. 33852
12.	Ernest Penrod	Lake Placid, FL 33852
11.	Robert Polk	Lake Placid, FL 33852
10.	Shawntel Alexander	Bloomington, IN 47404
9.	Don Hedstrom	Naples, FL
8.	Mike Alexander	Bloomington, IN 47404
7.	Susan Gilliland	Bloomington, IN 47404
6.	Ken Phillips	
5.	Dexter Pea	
4.	Sibyl Carmichael	
3.	Trae Spires	
2.	Robert Alexander	Lake Placid, FL 33852
1.	Margaret Alexander	Lake Placid, FL 33852

View Signatures : 14-1

The American Sports Fisherman-let us fish the Dry Tortugas Petition to Pres. Clinton's limits on sport fishing areas was created by all people who fish & boat for sport and written by Don Hedstrom. The petition is hosted here at www.PetitionOnline.com as a public service. There is no express or implied endorsement of this petition by Artifice, Inc. or our sponsors. The petition scripts are created by Mike Wheeler at Artifice, Inc. Technical questions can be addressed to "support@PetitionOnline.com".

PETITION TO PRES. CLINTON ON FISHING LIMITS IN THE DRY TORTUGAS

NAME	ADDRESS
Steve Gretencord	2910 Gordfield Ave Terre Haute IN 4780
Donald Long	8389 N. Carolene St. Terre Haute In. 47805
Tom Green	5490 East Deer Drive Terre Haute Ind. 47802
Taylor Douglas	507 Locust St Terre Haute IN 47804
Johnnie Cotper	3667 Prop. Blvd Terre Haute In. 47805
Ann Cagno	2120 N 14TH ST. T.H. 47804
Chris Meyerholtz	3537 West St. Rd. 48 Shelburn IN 47879
Kevin Robinson	3622 WABASH AVE TERRE HAUTE, IN 47803
Grega Tuqua	7660 E. VERMONT T. H. IN 47802
Jesse N Miller	1364 Poplar ST Terre Haute IN 47807
David Steward	2090 S Co Rd 450 W Terre Haute IN 47840
JOHN L. Hensley	3841 N. 26th St Terre Haute In 47805
Steve Lutz	RR 5 Box 179 Linton IN 47441
Howard Smith	7014 S State Rd 63 Terre Haute IN 47802
KEN WHITTON	10673 N. 33rd Street Casey, IL. 62420
Jerry Hooper	427 Lee West Terre Haute IN 47885
Jason Neese	3160 N 16th ST Terre Haute IN 47805
Duwayne Miller	11609 N Co Rd 600 E Lewis, IN 4785
TAYLOR DOUGLAS III	3308 E GOLDENROD AVE. T.H., IN 47805
Brian Ketner	RR1 Box 159 Rosedale 47874
JAMES SHELTON	5320 N. 14th ST Terre Haute, IN 47805
JASON L HEDDEN	315 S 14th St TERRE HAUTE, IN 47807
Dexter Pea	2567 N Cherokee Dr. Vincennes, IN 4759

PETITION TO PRES. CLINTON ON FISHING LIMITS IN THE DRY TORTUGAS

NAME	ADDRESS
Greg Hedstrom	Vincennes, In. 47591
[illegible]	" " "
Brett Knotts	Carlisle In 47838
JARIT MEADE	VINCENNES, IN 47591
PAUL CARJE	" "
[illegible]	" "
[illegible]	" "
[illegible]	" "
[illegible]	" "
[illegible]	" "
TOM QUARTERMAN	" "
[illegible]	" "

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
[illegible]	30 SW [illegible] 47441
[illegible]	30 SW F St Lawton 47441
Frank [illegible] 008	2020 TARPON RD. NAPLES 34102
Maureen A. Lewis	1983 CLARK CT S 34112

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
Richard L Tucker	2584 Ponce de Leon Dr. Naples Florida 34105
Ralph V [illegible]	626 SE 34th Terr Cape Coral FL 33904
[illegible]	6690 Beach Resort Dr. Naples FL 34114
[illegible]	(649 0346) 282 1st Ave North Naples FL 34102
J Braden	(249-5464) 3880 Estey Ave Naples FL 34104

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
[illegible]	Naples, FL
David H. Bak	Naples, Fla
Kevin Dean	Naples, Fla
Kelle Carlson	Naples, Fl
Jon Delahoussaye	Naples, FL
Ron Williams	Naples, FLA
Harold [illegible]	NAPLES, FLA
Scott Ogden	Naples Fla
Paul [illegible]	Naples FLA
Karen Holbiner	Naples, FL
[illegible]	Naples, Fl
Thomas [illegible]	Naples Fla
Virginia [illegible]	Naples Fl
Richard Cameron	Naples Fl
BRIAN LINHARD	NAPLES FL
Larry Barth	Naples Fl.
[illegible]	Naples Fl
William [illegible]	Naples Fla
Robin Deml	Naples
Peggy Brable	Naples
Michael DeLoo	Naples
Derek Rambler	NAPLES
Bruce Trackmack	NAPLES
Michael [illegible]	Naples, Fl
Mike Barham	Naples Fla
A. Richards	Naples, FL
[illegible] (Stanley Tinter)	Marco Island
[illegible] (Michael J. Fialha)	Naples, FL
[illegible] [illegible]	Naples Fl
[illegible]	Naples Fl.
[illegible]	Naples FL
[illegible] C [illegible]	Naples Fl.
[illegible]	Naples, Fl.
[illegible]	NAPLES, FL
Scott E. Olsen	Naples, Fl

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
Brenda Bryan	761 11th St SW Naples Fla 34117
[illegible]	190 SANTA BARBARA DR. FL. 34104
[illegible]	510 9th ST N.W. NAPLES, FL 34120
Ellen Smith	510 9th ST NW, Naples, FL 34120
[illegible]	5725 GAGE LANE NAPLES, FL 34113
Bruce Bryan	761 11TH STREET SW NAPLES, FL 34117
[illegible]	435 NORTH Rd, NAPLES, FL.
[illegible]	6735 Stonecastle Dr Naples FL 34109
[illegible]	190 Pebble Beach Blvd #403 Naples FL 34104
Frank Dumpert	5746 KRISTINE NAPLES, FL 34105
[illegible]	1370 Chesapeake Ave. Naples FL 34102
[illegible]	09 Cobble Dr. Naples FL 34104
[illegible]	6660 40th Ave S.W Naples FL 34116
[illegible]	112 Bibb SPRINGS DR NAPLES 34113
[illegible]	1309 Naples Lake Dr Naples FL 34104
[illegible]	2295 Palm St Naples FL 34112
[illegible]	264 Cape Sable Dr, Naples 34104

NAME	ADDRESS
RON MONTGOMERY	9517 GULFSHORE #203 NAPLES
Henley SHOTwell	1925 7TH ST S. Naples, FL. 34102
Tim Packard	1100 Frank Whiteman Blv. Naples FLA
Jerry VANDEWIELE	2335 9TH ST N #203 NAPLES FL 34103
	6819 DAHOY CT Naples FL 34104

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
Ron Maynard	13219 Marquette Blvd Ft. Myers FL 33905
Paul [illegible]	225-102 Ave N Naples Fl. 34108
JEFFREY P. STINER	1261 13th Ave N. NAPLES FL. 34102
TOM A. TOMLINSON	4246 MOHAWK PL. NAPLES, FL. 34102
Bruce [illegible]	132 Cape Coral Dr Naples Fl 34114
JAMES D COOPER	6371 PELICAN BAY BLVD #7 NAPLES FL 34108
BUTTON, RANDALL	391 PALM AVE NAPLES FL 34108
E Todd Puckett	510 [illegible] Rd Naples FL
Robert Wiseman	11404 Bonita Beach Rd 34135
JOSE VAZQUEZ	5199 CORTINA Ct Naples, Fl 34103
DON BARBER	27790 RIVERWALK WAY BONITA SPGS 34134
Don Sawyer	784 Anderson Dr Naples, FL 34103
John K. Wendel	741 11TH ST. N.W. NAPLES FL 34120
KEITH KIPP	3252 Regatta Rd. Naples Fl 34103
DARRIN M PHILLIPS	641 JACANA CIR NAPLES, FL 34105
B. Drummond	3530 LAKEMONT DR. BONITA SPRINGS FLA
Roy Ramsey	951 Barcarmil Way Naples Fl 34110
Capt. [illegible]	8463 Hollow Brook Circle Naples FL 34119
Capt. Steven Carlson	1966 [illegible] LN. Naples FL. 34119
Mark E. [illegible]	508 IBIS Way Naples, FL 34110
[illegible]	741 [illegible] Ct Naples FL 34103
[illegible]	1525 [illegible] Dr. Naples FL 34103
[illegible]	2171 Pine Ridge Ste 8 34109
[illegible]	2484 10th St N Naples 34103
[illegible]	2285 50 ST. S.W. NAPLES 34116
[illegible]	202 [illegible] West Bonita Springs 34135
Russell M. [illegible]	668 104th Ave N. Naples FL
[illegible]	116 Capri Blvd Naples, FL 34113
[illegible]	176 HERON AVE FL 34108
[illegible]	2900 GULF SHORE BLVD N Unit 405 Naples FL 34103
[illegible]	2250 ARBOUR WALK CIRCLE #1714 NAPLES FL 34109
Douglas [illegible]	3201 66 St. S.W. Naples FL 34105
Michael [illegible]	631 29th St. SW Naples, Fl 34117
[illegible]	5675 Cedar Tree Ln Naples FL 34116
Tom Anzicek	3401 Gulfshore Blvd Naples FL 34103
[illegible]	191 [illegible] Naples FL 34102
[illegible]	1075 WISCONSIN DR. NAPLES, FLA 34103
ROBERT MORGAN	1060 29th Ave N. NAPLES FL 34103

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
[illegible signature]	Marco Island
[illegible signature]	Marco Island
Terry [illegible]	6721 Golden Gate Pkwy Naples, FL 34105
Rich [illegible]	4830 Barcelona Circle
Robert Fiermonti	226 St Andrews Blv Naples FL.
David Zientarski	1033 E. Erie Ave Lorain OH
[illegible signature]	Marco Island
[illegible signature]	6960 Golden Gate Pkwy.
Tony Lopez	5597 Wendy Way.
Hugh M. DeJarnette	Naples, FL
[illegible] Bordonaro	Naples FLA.
Troy Pruitt	Naples Fl.
Rick Varela	9735 SW 73 St Miami Fl 33173
Jose Herrera	3201 W Flagler St 305 6498870
Ronnie Bowling	1649 Kent Dr. Naples, Fl. 34112
Terry Anderson	285 Benson St Naples 34113
Steve Throesch	2381 22nd Ave NE Naples 34120
Jeffrey Throesch	2780 17th Ave. SW Naples 34117
Deborah Alkire	2910 2nd Ave NE Naples 34120
Brian K. Fult	2937 Poplar St. Naples Fl 34112
Ed Napier	2937 Poplar St. Naples Fl 34112

PETITION TO PRESIDENT CLINTON ON FISHING RESTRICTIONS

NAME	ADDRESS
Andrew J Poe	1010 E. Vincennes St Linton IN 47441
Medina R. Russell-Poe	1010 E. Vincennes St. Linton, IN 47441
[illegible]	2705 [illegible] Dr FL
Keith Goddard	1930 17th St SW

I care about protecting the living marine resources of the Dry Tortugas and the long term health of the Florida Keys reef track, and that you support the establishment of the Tortugas Ecological Reserve and the Dry Tortugas National Park's Research Natural Area.

I urge the establishment of a no-take Research Natural Area inside the Dry Tortugas National Park to complement the Florida Keys National Marine Sanctuary's proposed Tortugas Ecological Reserve.

- No-take regulations are necessary for effective conservation. No fishing, collecting, or other "taking" of marine life should be allowed – a permanent restriction that is necessary for resource protection both within the Sanctuary and the National Park.

The following are additional points you can also consider

- The Tortugas region of the Florida Keys is a world-class marine area with stunningly beautiful coral reefs, sea grass meadows, and mangrove-fringed islands;
- The Tortugas are threatened by increased visitation to the Dry Tortugas National Park and increased fishing pressure from both commercial and recreational fishers;
- The Tortugas Ecological Reserve will preserve essential habitats and biodiversity, and help restore reefs and fisheries throughout the Keys;
- The Tortugas are one of the most important spawning areas for reef fish in the southeastern United States. Thirteen of 15 commercially targeted reef fish in the Keys are overfished;
- The Tortugas Ecological Reserve is expected to provide tangible, long-term benefits to commercial and recreational fishermen. In the future they should see more and larger fish outside the reserve.
- Elsewhere in the world no-take reserves have proven extremely successful in protecting and helping to restore marine ecosystems.

DRTO Planning
08/04/2000 08:46 AM MDT

To: Margaret DeLaura/DENVER/NPS
cc:
Subject: Fwd:Support a Protective Management Plan for Dry Tortugas Na

cc:Mail Forwarding Information

Jeffery Scott, Supervisory Park Planner
Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, FL 33034

Dear Mr. Scott:

I would like to submit comments on the General Management Plan for Dry Tortugas National Park.

I am writing in support of a plan that is at least as protective as Alternative C. I strongly support the creation of a Ressearch Natural Area, which would cover 43% of the park. I also support setting limitations on the number of park visitors allowed in each area of the park at any one time.

Further, I urge you to provide anchor buoys for private boats, since boat anchors and their chains damage the delicate coral reefs. And would also recommend that all divers, snorkelers and other visitors receive explicit instruction about how to avoid harming the fragile coral reefs.

Thank you for the opportunity to submit comments. I look forward to your written response.

Sincerely,

Sheila Penney
556 County Highway 125
Gloversville NY 12078
upsnys_elca_amst1@hotmail.com

Received: from SunProd04.nmpinc.com ([198.31.4.48]) by ccmail.itd.nps.gov with SMTP
(IMA Internet Exchange 3.13) id 00486FB6; Fri, 4 Aug 2000 08:53:38 -0400
Received: (from w-npca@localhost)
by SunProd04.nmpinc.com (8.9.1/8.9.1) id IAA02083;
Fri, 4 Aug 2000 08:50:02 -0400 (EDT)
Date: Fri, 4 Aug 2000 08:50:02 -0400 (EDT)
Message-Id: <200008041250.IAA02083@SunProd04.nmpinc.com>
To: DRTO_Planning@nps.gov, sseay@npca.org
From: upsnys_elca_amst1@hotmail.com
Subject: Support a Protective Management Plan for Dry Tortugas National Park

Author: Jeffery Scott at NP-EVER-SFRC
Date: 06/29/2000 8:44 AM
Normal
TO: Margaret DeLaura at NP-DEN1
Subject: Fwd:Yes to Tortugas
---------- Message Contents

Margaret,
This is the "form letter" email that I referred to in my earlier message. About 1400 copies received so far.

J.

_____Forward Header_____
Subject: Yes to Tortugas
Author: echnida@aol.com
Date: 6/29/00 8:19 AM

Mr. Jeffery Scott
Community Planner, National Park Service, Everglades National Park
4001 State Road 9336
Homestead, FL 33034
United States of America

Dear Jeffery Scott,

I write to urge you to support the establishment of the proposed Tortugas Marine Reserve in the waters under your jurisdiction. As a conservationist, I believe it is imperative that we act quickly to protect the wildlife and habitats of this highly diverse and productive region. I am especially pleased that the proposed reserve will help improve fisheries sustainability as well as conserve an irreplaceable ocean wilderness.

As you know, coral reefs worldwide are in significant decline. And in the Tortugas, increased visitation, fishing, and anchor damage are already taking a toll. By establishing the Tortugas Reserve, you will be taking a major step to ensure the survival of the populations, habitats, and ecosystem functions of the most pristine region of one of Earth's largest coral reef systems.

Specifically, I ask that you implement regulations that will ban all harvesting (including catch and release fishing) of marine life and prohibit anchoring within the Tortugas North and Tortugas South Reserve boundaries (or, for the National Park Service, within the proposed Research Natural Area). I also urge you to take the necessary steps to expand the jurisdiction of the Florida Keys National Marine Sanctuary to encompass the entire Reserve (except for the waters of the national park).

Please do all that you can to ensure that the Tortugas Reserve becomes a bright beacon for the effective protection of our coral reefs and other living marine resources.

Sincerely,

Mr. William N Childers
2121 N. Ocean Blvd. 1106-
Boca Raton, FL 33431
Received: from SunProd15.client-mail.com ([38.180.53.23]) by ccmail.itd.nps.gov with SMTP
(IMA Internet Exchange 3.13) id 003D3114; Thu, 29 Jun 2000 08:18:36 -0400
Received: (from w-wwfcan@localhost)
by SunProd15.client-mail.com (8.9.1b+Sun/8.9.1) id IAA19703
for jeffery_scott@nps.gov; Thu, 29 Jun 2000 08:19:00 -0400 (EDT)
Date: Thu, 29 Jun 2000 08:19:00 -0400 (EDT)
Message-Id: <200006291219.IAA19703@SunProd15.client-mail.com>
Errors-to: canadmin@worldwildlife.org
From: echnida@aol.com
Subject: Yes to Tortugas
Errors-to: canadmin@worldwildlife.org
From: echnida@aol.com
Subject: Yes to Tortugas

APPENDIX A: PARK'S ENABLING LEGISLATION, PUBLIC LAW 102-525

Public Law 102-525
102d Congress

TITLE II—DRY TORTUGAS NATIONAL PARK

Florida.

SEC. 201. ESTABLISHMENT OF DRY TORTUGAS NATIONAL PARK.

16 USC 410xx.

(a) IN GENERAL.—In order to preserve and protect for the education, inspiration, and enjoyment of present and future generations nationally significant natural, historic, scenic, marine, and scientific values in South Florida, there is hereby established the Dry Tortugas National Park (hereinafter in this title referred to as the "park").

(b) AREA INCLUDED.—The park shall consist of the lands, waters, and interests therein generally depicted on the map entitled "Boundary Map, Fort Jefferson National Monument", numbered 364–90,001, and dated April 1980 (which is the map referenced by section 201 of Public Law 96–287). The map shall be on file and available for public inspection in the offices of the National Park Service, Department of the Interior.

16 USC 431 note.

(c) ABOLITION OF MONUMENT.—The Fort Jefferson National Monument is hereby abolished.

16 USC 410xx-1.

SEC. 202. ADMINISTRATION.

(a) IN GENERAL.—The Secretary shall administer the park in accordance with this title and with the provisions of law generally applicable to units of the national park system, including the Act entitled "An Act to establish a National Park Service, and for other purposes", approved August 25, 1916 (39 Stat. 535; 16 U.S.C. 1, 2, 3, and 4).

(b) MANAGEMENT PURPOSES.—The park shall be managed for the following purposes, among others:

(1) To protect and interpret a pristine subtropical marine ecosystem, including an intact coral reef community.

(2) To protect populations of fish and wildlife, including (but not limited to) loggerhead and green sea turtles, sooty terns, frigate birds, and numerous migratory bird species.

(3) To protect the pristine natural environment of the Dry Tortugas group of islands.

(4) To protect, stabilize, restore, and interpret Fort Jefferson, an outstanding example of nineteenth century masonry fortification.

(5) To preserve and protect submerged cultural resources.

(6) In a manner consistent with paragraphs (1) through (5), to provide opportunities for scientific research.

16 USC 410xx-2.

SEC. 203. LAND ACQUISITION AND TRANSFER OF PROPERTY.

(a) IN GENERAL.—Within the boundaries of the park the Secretary may acquire lands and interests in land by donation or exchange. For the purposes of acquiring property by exchange with the State of Florida, the Secretary may, notwithstanding any other provision of law, exchange those Federal lands which were deleted from the park by the boundary modifications enacted by section 201 of the Act of June 28, 1980 (Public Law 96–287), and which are directly adjacent to lands owned by the State of Florida outside of the park, for lands owned by the State of Florida within the park boundary.

(b) UNITED STATES COAST GUARD LANDS.—When all or any substantial portion of lands under the administration of the United States Coast Guard located within the park boundaries, including Loggerhead Key, have been determined by the United States Coast Guard to be excess to its needs, such lands shall be transferred directly to the jurisdiction of the Secretary for the purposes of this title. The United States Coast Guard may reserve the right in such transfer to maintain and utilize the existing lighthouse on Loggerhead Key in a manner consistent with the purposes of the United States Coast Guard and the purposes of this title.

(c) ADMINISTRATIVE SITE.—The Secretary is authorized to lease or to acquire, by purchase, donation, or exchange, and to operate incidental administrative and support facilities in Key West, Florida, for park administration and to further the purposes of this title.

SEC. 204. AUTHORIZATION OF APPROPRIATIONS.

16 USC 410xx-3.

There are hereby authorized to be appropriated such sums as may be necessary to carry out the purposes of this title. Any funds available for the purposes of the monument shall be available for the purposes of the park, and authorizations of funds for the monument shall be available for the park.

APPENDIX B: COLLECTIVE MISSION AND MISSION GOALS OF THE NPS SOUTH FLORIDA UNITS

MISSION

The mission of the National Park Service, within the context of the South Florida ecosystem, is to integrate and achieve the collective purposes for which the parks and the agency were created and to promote and facilitate the Park Service partnership and technical assistance programs.

To achieve this mission, the park units will actively coordinate their plans, decisions, and operations. NPS staff will jointly participate in the South Florida Ecosystem Restoration Working Group, in the Governor's Commission for a Sustainable South Florida, and in other related ecosystem restoration efforts. The focus of this participation is in natural ecosystem management, cultural resource protection, and the promotion of public understanding and appreciation of the NPS park units as part of the South Florida ecosystem.

SIGNIFICANCE

The combined significance of the four South Florida NPS units is based on the following factors:

· All the parks depend on freshwater quality and flows that are determined by a complex regional water management system.
· The parks are adjacent to and directly affected by two of the fastest growing urban areas in the nation.
· The parks are subject to more external, adverse impacts on their ecosystems than any other units in the national park system.
· The fundamental resources of the four parks are indicators of the integrity of the South Florida ecosystem.

MISSION GOALS

The following collective South Florida park mission goals state the conditions that should exist when the goals have been attained. These statements form the basis for future park planning and management for all the parks.

I. Natural and cultural resources and associated values within the South Florida national parks are protected, restored, and maintained in good condition and are managed within the broad context of the South Florida ecosystem.

· Water is free of introduced agricultural nutrients and urban-related pollutants.
· Water levels reflect quantities resulting from natural rainfall.
· Water is distributed according to pre-engineered drainage patterns.
· The timing of water deliveries corresponds to natural cycles.
· The diversity, abundance, and behavior of native South Florida plants and animals in both terrestrial and marine environments (including coral reefs and sea grass beds) are characteristic of pre-engineered drainage conditions.
· Invasive, exotic species have been eradicated.
· Hydrology, fire, and other natural processes are managed to perpetuate a healthy, viable, and dynamic ecosystem.
· Threatened and endangered species are removed from state and federal listings due to management recovery efforts.
· Archeological, historical, and other significant cultural sites are identified, evaluated, and protected.

II. South Florida national parks contribute to knowledge about natural and cultural resources, natural ecosystem management, and associated values; decisions about ecosystem management, natural resources, and public use are based on adequate scholarly and scientific information.

· Parks are leaders in the South Florida community in developing and refining ecosystem management techniques.
· Necessary and appropriate scientific research is funded and accomplished.
· Monitoring programs designed to evaluate the effectiveness and efficiency of ongoing programs are in place.
· The parks are acknowledged as significant contributors to the knowledge and understanding of the history and prehistory of South Florida.

III. The public understands and supports the need to restore, preserve, and protect the South Florida ecosystem for this and future generations.

· South Florida parks provide opportunities for visitors to find a sense of remoteness, peace, and refuge in a place of natural beauty.
· An integrated information and education program for the South Florida parks is in place. The program is multicultural, works effectively with the mass media to convey key issues at local and national levels, and ensures that the various publics understand the environmental issues and restoration efforts occurring in the South Florida ecosystem.
· Park interpretive messages explain the differences and commonalties between the National Park Service's mission and mission goals and those used by other regional parks and agencies. Interpretive messages are objective and respectful of differing missions and management policies.
· National, state, and local officials and decision makers understand, support, and appreciate the positive value that the proper management of South Florida natural and cultural systems has on the quality of human life.
· Visitors are provided access to representative areas of the four South Florida's parks in a manner that is consistent with the protection of park resources.
· Visitors to South Florida parks are aware of the variety of experiences available, as well as those attainable in other regional parks and preserves.

IV. The economic and social benefits of the South Florida parks are recognized and play a prominent role in state, local, and private sector economic decision making.

· Local and regional economies depend on ecosystem resources, such a potable water.
· The economic impact of visitor spending on local and regional economies is clearly documented and conveyed to state, local, and private sector decision makers.
· The role and impact of NPS employee spending on the local and regional economies are clearly documented and conveyed to state, local, and private sector decision makers.

V. Strong partnerships exist among the South Florida parks and local, regional, national, and tribal governments, as well as with nongovernmental organizations, to support the restoration and protection of natural and cultural resources, along with the stewardship of the South Florida ecosystem.

· The National Park Service has an active leadership role in managing South Florida's natural ecosystem through active participation in and partnerships with the South Florida Ecosystem Restoration Working Group, the Governor's Commission for a Sustainable South Florida, and other related ecosystem restoration efforts.
· In its partnerships the National Park Service brings expertise in natural ecosystem management and in promoting public understanding and appreciation of the South Florida ecosystem.
· Federally recognized South Florida American Indian tribes and staff from the South Florida parks cooperate with mutual respect, open lines of communication, and an understanding of respective cultures.

· Federal, state, local, and tribal land use and water management agencies recognize the mutual interests and responsibilities of all levels of government to protect the South Florida ecosystem. Protection is reflected in their land use and management plans and documents.
· The four units promote and administer NPS historical and recreational assistance programs.
· Appropriate facilities are available to support park programs and partnerships.

VI. South Florida national parks are responsive, efficient, safe, accountable, and productive. They use current management practices, systems, and technologies to accomplish their collective mission.

· Management activities are outcome-based and accountable; reliable mechanisms are in place to track the progress of ongoing programs
· All park resource management programs meet professional standards; staff professionals receive training and opportunities for development within their fields.
· Equipment, staff, and expertise are shared among the parks and park partners to maximize the effective use of these resources.
· Employees have the tools to successfully accomplish their roles and functions.
· Park staffs take personal responsibility and are accountable for furthering their programs.
· Park staffs are valued for the expertise they add to their park.
· Park resource managers are connected to resource professionals in other parks, as well as to partners and associates outside the parks.

APPENDIX C: EXECUTIVE ORDERS 13089 "CORAL REEF PROTECTION"AND 13158 "MARINE PROTECTED AREAS"

EXECUTIVE ORDER 13089

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release . . . . . June 11, 1998

EXECUTIVE ORDER 13089

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CORAL REEF PROTECTION

By the authority vested in me as President by the Constitution and the laws of the United States of America and in furtherance of the purposes of the Clean Water Act of 1977, as amended (33 U.S.C. 1251, et seq.), Coastal Zone Management Act (16 U.S.C. 1451, et seq.), Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, et seq.), National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321, et seq.), National Marine Sanctuaries Act, (16 U.S.C. 1431, et seq.), National Park Service Organic Act (16 U.S.C. 1, et seq.), National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-ee), and other pertinent statutes, to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment, it is hereby ordered as follows:

Section 1. Definitions. (a) "U.S. coral reef ecosystems" means those species, habitats, and other natural resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., Federal, State, territorial, or commonwealth waters), including reef systems in the south Atlantic, Caribbean, Gulf of Mexico, and Pacific Ocean. (b) "U.S. Coral Reef Initiative" is an existing partnership between Federal agencies and State, territorial, commonwealth, and local governments, nongovernmental organizations, and commercial interests to design and implement additional management, education, monitoring, research, and restoration efforts to conserve coral reef ecosystems for the use and enjoyment of future generations. The existing U.S. Islands Coral Reef Initiative strategy covers approximately 95 percent of U.S. coral reef ecosystems and is a key element of the overall U.S. Coral Reef Initiative. (c) "International Coral Reef Initiative" is an existing partnership, founded by the United States in 1994, of governments, intergovernmental organizations, multilateral development banks, nongovernmental organizations, scientists, and the private sector whose purpose is to mobilize governments and other interested parties whose coordinated, vigorous, and effective actions are required to address the threats to the world's coral reefs.

Sec. 2. Policy. (a) All Federal agencies whose actions may affect U.S. coral reef ecosystems shall: (a) identify their actions that may affect U.S. coral reef ecosystems; (b) utilize their programs and authorities to protect and enhance the conditions of such

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ecosystems; and (c) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

(b) Exceptions to this section may be allowed under terms prescribed by the heads of Federal agencies:

(1) during time of war or national emergency;

(2) when necessary for reasons of national security, as determined by the President;

(3) during emergencies posing an unacceptable threat to human health or safety or to the marine environment and admitting of no other feasible solution; or

(4) in any case that constitutes a danger to human life or a real threat to vessels, aircraft, platforms, or other man-made structures at sea, such as cases of force majeure caused by stress of weather or other act of God.

Sec. 3. Federal Agency Responsibilities. In furtherance of section 2 of this order, Federal agencies whose actions affect U.S. coral reef ecosystems, shall, subject to the availability of appropriations, provide for implementation of measures needed to research, monitor, manage, and restore affected ecosystems, including, but not limited to, measures reducing impacts from pollution, sedimentation, and fishing. To the extent not inconsistent with statutory responsibilities and procedures, these measures shall be developed in cooperation with the U.S. Coral Reef Task Force and fishery management councils and in consultation with affected States, territorial, commonwealth, tribal, and local government agencies, nongovernmental organizations, the scientific community, and commercial interests.

Sec. 4. U.S. Coral Reef Task Force. The Secretary of the Interior and the Secretary of Commerce, through the Administrator of the National Oceanic and Atmospheric Administration, shall co-chair a U.S. Coral Reef Task Force ("Task Force"), whose members shall include, but not be limited to, the Administrator of the Environmental Protection Agency, the Attorney General, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Defense, the Secretary of State, the Secretary of Transportation, the Director of the National Science Foundation, the Administrator of the Agency for International Development, and the Administrator of the National Aeronautics and Space Administration. The Task Force shall oversee implementation of the policy and Federal agency responsibilities set forth in this order, and shall guide and support activities under the U.S. Coral Reef Initiative ("CRI"). All Federal agencies whose actions may affect U.S. coral reef ecosystems shall review their participation in the CRI and the strategies developed under it, including strategies and plans of State, territorial, commonwealth, and local governments, and, to the extent feasible, shall enhance Federal participation and support of such strategies and plans. The Task Force shall work in cooperation with State, territorial, commonwealth, and local government agencies, nongovernmental organizations, the scientific community, and commercial interests.

Sec. 5. Duties of the U.S. Coral Reef Task Force. (a) Coral Reef Mapping and

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Monitoring. The Task Force, in cooperation with State, territory, commonwealth, and local government partners, shall coordinate a comprehensive program to map and monitor U.S. coral reefs. Such programs shall include, but not be limited to, territories and commonwealths, special marine protected areas such as National Marine Sanctuaries, National Estuarine Research Reserves, National Parks, National Wildlife Refuges, and other entities having significant coral reef resources. To the extent feasible, remote sensing capabilities shall be developed and applied to this program and local communities should be engaged in the design and conduct of programs.

(b) Research. The Task Force shall develop and implement, with the scientific community, research aimed at identifying the major causes and consequences of degradation of coral reef ecosystems. This research shall include fundamental scientific research to provide a sound framework for the restoration and conservation of coral reef ecosystems worldwide. To the extent feasible, existing and planned environmental monitoring and mapping programs should be linked with scientific research activities. This Executive order shall not interfere with the normal conduct of scientific studies on coral reef ecosystems.

(c) Conservation, Mitigation, and Restoration. The Task Force, in cooperation with State, territorial, commonwealth, and local government agencies, nongovernmental organizations, the scientific community and commercial interests, shall develop, recommend, and seek or secure implementation of measures necessary to reduce and mitigate coral reef ecosystem degradation and to restore damaged coral reefs. These measures shall include solutions to problems such as land-based sources of water pollution, sedimentation, detrimental alteration of salinity or temperature, over-fishing, over-use, collection of coral reef species, and direct destruction caused by activities such as recreational and commercial vessel traffic and treasure salvage. In developing these measures, the Task Force shall review existing legislation to determine whether additional legislation is necessary to complement the policy objectives of this order and shall recommend such legislation if appropriate. The Task Force shall further evaluate existing navigational aids, including charts, maps, day markers, and beacons to determine if the designation of the location of specific coral reefs should be enhanced through the use, revision, or improvement of such aids.

(d) International Cooperation. The Secretary of State and the Administrator of the Agency for International Development, in cooperation with other members of the Coral Reef Task Force and drawing upon their expertise, shall assess the U.S. role in international trade and protection of coral reef species and implement appropriate strategies and actions to promote conservation and sustainable use of coral reef resources worldwide. Such actions shall include expanded collaboration with other International Coral Reef Initiative ("ICRI") partners, especially governments, to implement the ICRI through its Framework for Action and the Global Coral Reef Monitoring Network at regional, national, and local levels.

Sec. 6. This order does not create any right or benefit, substantive or procedural, enforceable in law or equity by a party against the United States, its agencies, its officers, or any person.

WILLIAM J. CLINTON

THE WHITE HOUSE,
June 11, 1998.

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release May 26, 2000

EXECUTIVE ORDER 13158

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MARINE PROTECTED AREAS

By the authority vested in me as President by the Constitution and the laws of the United States of America and in furtherance of the purposes of the National Marine Sanctuaries Act (16 U.S.C. 1431 et seq.), National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-ee), National Park Service Organic Act (16 U.S.C. 1 et seq.), National Historic Preservation Act (16 U.S.C. 470 et seq.), Wilderness Act (16 U.S.C. 1131 et seq.), Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.), Coastal Zone Management Act (16 U.S.C. 1451 et seq.), Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), Marine Mammal Protection Act (16 U.S.C. 1362 et seq.), Clean Water Act of 1977 (33 U.S.C. 1251 et seq.), National Environmental Policy Act, as amended (42 U.S.C. 4321 et seq.), Outer Continental Shelf Lands Act (42 U.S.C. 1331 et seq.), and other pertinent statutes, it is ordered as follows:

Section 1. Purpose. This Executive Order will help protect the significant natural and cultural resources within the marine environment for the benefit of present and future generations by strengthening and expanding the Nation's system of marine protected areas (MPAs). An expanded and strengthened comprehensive system of marine protected areas throughout the marine environment would enhance the conservation of our Nation's natural and cultural marine heritage and the ecologically and economically sustainable use of the marine environment for future generations. To this end, the purpose of this order is to, consistent with domestic and international law: (a) strengthen the management, protection, and conservation of existing marine protected areas and establish new or expanded MPAs; (b) develop a scientifically based, comprehensive national system of MPAs representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources; and (c) avoid causing harm to MPAs through federally conducted, approved, or funded activities.

Sec. 2. Definitions. For the purposes of this order: (a) "Marine protected area" means any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.

(b) "Marine environment" means those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands thereunder, over which the United States exercises jurisdiction, consistent with international law.

(c) The term "United States" includes the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.

Sec. 3. MPA Establishment, Protection, and Management. Each

Federal agency whose authorities provide for the establishment or management of MPAs shall take appropriate actions to enhance or expand protection of existing MPAs and establish or recommend, as appropriate, new MPAs. Agencies implementing this section shall consult with the agencies identified in subsection 4(a) of this order, consistent with existing requirements.

Sec. 4. National System of MPAs. (a) To the extent permitted by law and subject to the availability of appro-priations, the Department of Commerce and the Department of the Interior, in consultation with the Department of Defense, the Department of State, the United States Agency for International Development, the Department of Transportation, the Environmental Protection Agency, the National Science Foundation, and other pertinent Federal agencies shall develop a national system of MPAs. They shall coordinate and share information, tools, and strategies, and provide guidance to enable and encourage the use of the following in the exercise of each agency's respective authorities to further enhance and expand protection of existing MPAs and to establish or recommend new MPAs, as appropriate:

(1) science-based identification and prioritization of natural and cultural resources for additional protection;

(2) integrated assessments of ecological linkages among MPAs, including ecological reserves in which consumptive uses of resources are prohibited, to provide synergistic benefits;

(3) a biological assessment of the minimum area where consumptive uses would be prohibited that is necessary to preserve representative habitats in different geographic areas of the marine environment;

(4) an assessment of threats and gaps in levels of protection currently afforded to natural and cultural resources, as appropriate;

(5) practical, science-based criteria and protocols for monitoring and evaluating the effectiveness of MPAs;

(6) identification of emerging threats and user conflicts affecting MPAs and appropriate, practical, and equitable management solutions, including effective enforcement strategies, to eliminate or reduce such threats and conflicts;

(7) assessment of the economic effects of the preferred management solutions; and

(8) identification of opportunities to improve linkages with, and technical assistance to, international marine protected area programs.

(b) In carrying out the requirements of section 4 of this order, the Department of Commerce and the Department of the Interior shall consult with those States that contain portions of the marine environment, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands, tribes, Regional Fishery Management Councils, and other entities, as appropriate, to promote coordination of Federal, State, territorial, and tribal actions to establish and manage MPAs.

(c) In carrying out the requirements of this section, the Department of Commerce and the Department of the Interior shall seek the expert advice and recommendations of non-Federal scientists, resource managers, and other interested persons and organizations through a

Marine Protected Area Federal Advisory Committee. The Committee shall be established by the Department of Commerce.

(d) The Secretary of Commerce and the Secretary of the Interior shall establish and jointly manage a website for information on MPAs and Federal agency reports required by this order. They shall also publish and maintain a list of MPAs that meet the definition of MPA for the purposes of this order.

(e) The Department of Commerce's National Oceanic and Atmospheric Administration shall establish a Marine Protected Area Center to carry out, in cooperation with the Department of the Interior, the requirements of subsection 4(a) of this order, coordinate the website established pursuant to subsection 4(d) of this order, and partner with governmental and nongovernmental entities to conduct necessary research, analysis, and exploration. The goal of the MPA Center shall be, in cooperation with the Department of the Interior, to develop a framework for a national system of MPAs, and to provide Federal, State, territorial, tribal, and local governments with the information, technologies, and strategies to support the system. This national system framework and the work of the MPA Center is intended to support, not interfere with, agencies' independent exercise of their own existing authorities.

(f) To better protect beaches, coasts, and the marine environment from pollution, the Environmental Protection Agency (EPA), relying upon existing Clean Water Act authorities, shall expeditiously propose new science-based regulations, as necessary, to ensure appropriate levels of protection for the marine environment. Such regulations may include the identification of areas that warrant additional pollution protections and the enhancement of marine water quality standards. The EPA shall consult with the Federal agencies identified in subsection 4(a) of this order, States, territories, tribes, and the public in the development of such new regulations.

Sec. 5. Agency Responsibilities. Each Federal agency whose actions affect the natural or cultural resources that are protected by an MPA shall identify such actions. To the extent permitted by law and to the maximum extent practicable, each Federal agency, in taking such actions, shall avoid harm to the natural and cultural resources that are protected by an MPA. In implementing this section, each Federal agency shall refer to the MPAs identified under subsection 4(d) of this order.

Sec. 6. Accountability. Each Federal agency that is required to take actions under this order shall prepare and make public annually a concise description of actions taken by it in the previous year to implement the order, including a description of written comments by any person or organization stating that the agency has not complied with this order and a response to such comments by the agency.

Sec. 7. International Law. Federal agencies taking actions pursuant to this Executive Order must act in accordance with international law and with Presidential Proclamation 5928 of December 27, 1988, on the Territorial Sea of the United States of America, Presidential Proclamation 5030 of March 10, 1983, on the Exclusive Economic Zone of the United States of America, and Presidential Proclamation 7219 of September 2, 1999, on the Contiguous Zone of the United States.

Sec. 8. General. (a) Nothing in this order shall be construed as altering existing authorities regarding the establishment of Federal MPAs in areas of the marine environment subject to the jurisdiction and control of States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, the

Commonwealth of the Northern Mariana Islands, and Indian tribes.

(b) This order does not diminish, affect, or abrogate Indian treaty rights or United States trust responsibilities to Indian tribes.

(c) This order does not create any right or benefit, substantive or procedural, enforceable in law or equity by a party against the United States, its agencies, its officers, or any person.

WILLIAM J. CLINTON

THE WHITE HOUSE,
May 26, 2000.

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APPENDIX D. MORE DETAILS ON COMMERCIAL SERVICES

The Omnibus Park Management Act of 1998 was passed by Congress and signed into law November 13, 1998. Section IV of the Omnibus Act, which deals directly with NPS concessions, is called the National Park Service Concessions Management Improvement Act of 1998. This legislation supercedes the Concessions Policy Act, which has guided NPS management of commercial services for the last 30 years. The new legislation incorporates much of the philosophy of the old law including "development … shall be limited to those accommodations, facilities, and services that are necessary and appropriate for public use and enjoyment of the unit of the National Park System in which they are located and are consistent to the highest practicable degree with the preservation and conservation of the resources and values of the unit." In addition, the secretary of the interior should "exercise his authority in a manner consistent with a reasonable opportunity for the concessioner to realize a profit." Thus, only economically feasible concession operations should be introduced.

The new law also makes some significant changes. Large (more than $500,000 annual revenues) concessioners are no longer given a right of preference in renewal of contracts. The term of new contracts will normally be 5 to 10 years, with 20-year contracts only issued in special financial situations with approval from the NPS director. Concession permits will be discontinued, and a short-form contract will be used in its place. All franchise fees stay with the Park Service to be used for concession-related or resource protection projects. The park that collects the fees retains 80%, and 20% is used servicewide. Another important provision of the new law is how commercial use authorizations (formerly called **incidental business permits or IBPs**) are managed. The total number of such commercial use authorizations for any activity deemed appropriate might be limited to protect resources or improve visitor experiences.

By law (36 CFR 5.3), a written instrument must authorize all commercial services in national parks. The National Park Service has several authorization tools to choose from to manage commercial services in parks. When a service is offered inside a park that uses parklands and/or facilities, it is usually authorized by a concessions contract. When on a regular basis a commercial activity begins and ends outside the park but uses the park during the activity, the typical instrument used is commercial use authorization (CUA). When a commercial activity that will only occur once is proposed in a park, a special use permit is typically issued. Other instruments, such as commercial filming permits and right-of-way agreements, are used to authorize those associated activities. The Park Service also has cooperative agreements with several nonprofit organizations to sell interpretive books and materials in many visitor centers.

APPENDIX E: RATIONALE FOR SELECTION OF ALTERNATIVE C AS THE PARK SERVICE'S PROPOSED ACTION

This section provides a summary of the reasons and rationale for the National Park Service's selection of alternative C as the preferred alternative. The contents of the *Final General Management Plan Amendment / Environmental Impact Statement* describe the conditions and impacts that would result from the implementation of each alternative. These impacts, both beneficial and negative, were the basis for making the preferred alternative selection. This section will not redescribe the content of the document but will summarize how the important elements of the alternatives were traded off to arrive at the preferred alternative.

SUMMARY

Each of the alternatives that include a research natural area achieves the objectives for establishing a research natural area. Alternative C does this with the minimum amount of area removed from recreational activity, including fishing, but gains the greatest increment of resource protection. In enlarging the research natural area visitor activity, diversity, and opportunity is significantly reduced in the park. However, managing the remainder of the park as a natural/cultural zone, as in alternative C, does not remove management options in the future. If specific resource and visitor experience conditions are not maintained, park managers have a full range of management tools available to stop impacts, including designated mooring buoys, permits, reservations, guided tours, and site closures.

PROCESS FOR SELECTING THE PREFERRED ALTERNATIVE

The purpose of a general management plan is to guide management actions that will support and fulfill the purposes of the park, which are to

- protect and interpret a pristine subtropical marine ecosystem, including an intact coral reef community
- proactively manage populations of fish and wildlife, including loggerhead and green sea turtles, sooty terns, frigate birds, numerous migratory bird species, and other sensitive species
- safeguard the pristine natural environment of the Dry Tortugas group of islands
- protect, stabilize, restore, and interpret Fort Jefferson, an outstanding example of 19th century masonry fortification
- preserve and protect submerged cultural resources
- provide opportunities for public enjoyment and scientific research in ways consistent with the park purpose

In addition to its purpose, parks within the national park system are managed within the framework of existing laws and policies. Often, however, there is more than one possible course of action that would result in managing within this framework. Such is the case with planning for the future of Dry Tortugas National Park. Five different alternatives are considered in this document, each with a different course of action and different future conditions. Selecting among them required considering all of the relevant facts and information and reasonably weighing the benefits and advantages of each alternative against the advantages of the other alternatives.

The overarching laws and policies that guide management of national parks focus management decisions on five key factors and base every decision on at least one of the following:

preventing the loss of resources
maintaining and improving the condition of resources
providing visitor services, and educational and recreational opportunities
protecting public health safety and welfare
improving operational efficiency and sustainability
protecting employee health safety and welfare

Decisions in the general management plan planning process involve a broad view of the park and its resources and involve a clear evaluation of gains and benefits in resource protection, visitor experience, health and safety, and park operations that are presented by each alternative. The process for selecting a preferred alternative for the Dry Tortugas *General Management Plan Amendment* required defining the key decision factors (from the list above) in a manner that was germane to the key issues of Dry Tortugas and describing for each factor the advantages that each alternative presented. For this process the factors were described as

Maximizing the protection of resources — This included the condition of marine and terrestrial natural resources resulting from implementation of an alternative — the condition of submerged cultural resources; the type and amount of education for resource protection, the amount of monitoring and directing of visitor use; biodiversity and marine populations; surveying, monitoring, and research activity; and the relationship to Florida Keys National Marine Sanctuary's management strategies.

Maximizing the diversity of visitor experiences — This included opportunities for independent and guided travel to and within the park — the level of visitation accommodated and the range of activities available; the degree of challenge and adventure, solitude, and staff encounters; the opportunities for education, interpretation, and information; and the overall quality and diversity of the visitor experience.

Maximized operational efficiency — This included efficiency and effectiveness in operations for resource protection, concessions management, interpretation/education/ information, and maintenance.

Following is a summary of the advantages of each alternative.

Maximizing the protection of resources

Alternative A would provide the least protection of resources because of impacts from increased visitation, low potential for biodiversity, accomplishing few surveys and monitoring, a low level of research, random educational contact, and few patrols to monitor visitor activities.

Alternative B would provide minor additional protection because there is a better ability to limit visitor numbers, surveys would be completed, resources would be regularly monitored, mooring buoys could direct visitors to less sensitive areas, and patrols would monitor private boaters.

Alternatives C and D would offer greater protection because they establish the minimal are necessary for an effective research natural area, provide greater biodiversity, increase restrictions and controls on visitor behavior, and provide higher levels of research and monitoring.

Alternative E would offer the greatest protection because it establishes a maximum area of research natural area, provides for greater biodiversity, creates maximum restriction and controls on visitor behavior, and establishes higher level of research and monitoring (similar to alternatives C and D). However, the addition of the research natural area does not necessarily constitute significant resource advantages because the preferred configuration provides the necessary range and size of habitats to accomplish zone goals.

Maximizing the diversity of visitor experiences

Alternative A would be the least preferred because degraded resources would result from greater visitor use; also there would be poor control of crowding, poor control of safety and public health; and low-quality visitor experience.

Alternative B would be better, with less crowding, better control, better standards for service, and slightly improved resources for visitors to experience.

Alternative E would be better. It would provide for a more managed and structured experience and limited self-selection of activities by visitors, especially private boaters; there would be fewer options for activities, but there would be better support services, the best means to control crowding, and a greater guarantee of a quality, low-density visitor experience.

Alternatives C and D would be the best with more certainty of intrapark travel, much better control of crowding, better diversity in the opportunities for visitor experiences, more freedom to experience a remote marine environment for private boaters than in a completely managed and structured tour, and a high improvement of resources encountered by visitors.

Maximizing operational efficiency

Alternative A would be least preferred because of understaffing and no control of visitor numbers — too many people doing too many things in too many places.

Alternative B would be better because there would be some limitation on number of visitors and increased staff; there might be mitigation of some public use with better control of visitor numbers and more staff.

Alternatives C and D would be additionally better with improved control of visitors, a better match between use and staff, and more concessioner involvement in park operations and visitor management.

Alternative E would be the most attractive because it would offer the best control of visitors, require less day marker management for the research natural area delineation, match appropriate staff levels with visitation, and provide more concessioner involvement in park operations and visitor management.

Additionally, a separate evaluation was conducted for configuring boundaries of the research natural area. To select an appropriate size and configuration, several factors were applied to the alternatives. Is or does the alternative

1. Represent the full-range of habitats in Dry Tortugas National Park?
2. Have a research natural area zone that is large enough to be self-sustaining — does it contain at least 20% of each of the park's benthic habitats?
3. Have a research natural area zone large enough to maintain apex predators?
4. Consider the larger ecosystem — uplands, shallows, sea grass, and coral?
5. Allow activities that do not detract from research values of the area?

The following tables present the comparison of the alternatives against these factors.

TABLE F-1. REPRESENTATION[2] IN EACH PROPOSAL OF COMMUNITY AND HABITAT TYPES AS MAPPED BY DAVIS (1979)

Note: In the following tables, the figures have been recalculated to reflect the change in the boundary for alternative C, the proposed action. The figures for alternatives D and E have not been recalculated.

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Total Area of Park included in Proposal	46%	41%	99.5%
Community Type			
Sea Grass (27%)[1]	44%	71%	99.6%
Bank Barrier/ Fringing Reef (<1%)[1]	15%	0%	100%
Patch Reefs (<1%)[1]	70%	34%	99.5%
Algal Communities (<1%)[1]	48%	<1%	100%
Staghorn Reefs (1.8%)[1]	77%	12.4%	91%
Octocoral Hardbottom (16%)[1]	33%	36%	99.9%
Sedimentary Habitats (54%)[1]	49%	30%	99.6%
Land (<1%)[1]	49%[a]	4%	76%[a]

[1] The figures represent the percentage of community and habitat types in all of Dry Tortugas National Park as mapped by Davis (1979).
[2] These data address the criterion requiring that a research natural area represent the full range of habitats. The objective in this evaluation was for 20% or greater representation.
[a] These figures do not take into account the small historic preservation/adaptive use zone on Loggerhead Key. This zone is approximately 10 acres and would be excluded from research natural area designation.

TABLE F-2. THE PERCENTAGE AND (NUMBER) OF LONG-TERM MONITORING SITES[2] INCLUDED IN EACH PROPOSAL

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Coral (5)[1]	80%(4)	20%(1)	100%(5)
Water Quality (5)	80%(4)	20%(1)	100%(5)
NOAA Reef Fish (9)	44%(4)	11%(1)	100%(9)
Reef Fish (12)	67%(8)	33%(4)	100%(12)
Sea Grass (9)	67%(6)	33%(3)	89%(8)
USGS (9)	56%(5)	22%(2)	100%(9)
Lobster (57)	33%(19)	7%(4)	96%(55)
TOTAL(49 (excluding lobster))	**63%(31)**	**24%(12)**	**98%(48)**

[1] These figures represent the total number of monitoring locations by subject of interest in the entire park.
[2] These data address the criterion requiring that a research natural area include previous research and long-term monitoring sites. The objective for this evaluation was 50% or greater.

TABLE F-3. THE PRESENCE OR ABSENCE OF SPAWNING AGGREGATION AREAS[1] IN EACH PROPOSAL

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Snapper	Partial	Yes	Yes
Grouper	No	No	Yes

[1] These data address the criterion suggesting that a research natural area include fish spawning aggregation areas. The objective for this evaluation was for full inclusion of both areas.

TABLE F-4. REPRESENTATION[2] IN EACH PROPOSAL OF WATER DEPTHS AS MAPPED BY FDEP/FMRI.

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Total Area of Park included in Proposal	46%	41%	99.5%
Bathymetry			
0 – 3 Feet (1%)[1]	26%	6%	96%
3 – 6 Feet (3%)[1]	46%	33%	98%
6 – 12 Feet (7%)[1]	29%	41%	98%
12 – 18 Feet (6%)[1]	35%	45%	99.7%
18 – 30 Feet (12%)[1]	35%	36%	99.0%
30 – 60 Feet (52%)[1]	55%	50%	99.6%
60 – 100 Feet (17%)[1]	37%	22%	100%

[1] The figures represent the percentage of water depths in the park as mapped by FDEP/FMRI.
[2] These data are used as a surrogate to address criteria suggesting that a research natural area be large enough to be self-sustaining, encompass a wide variety of essential contiguous habitat, and maximize biodiversity. The objective for this evaluation was 20% or greater representation.

The water depths are shown graphically on figure C1, which also has an overlay of the proposed action (alternative C).

Figure C-1 Bathymetric Analysis map

back of map

TABLE F-5. INCLUSION[1] IN EACH PROPOSAL OF AREAS THAT BEST REPRESENT THE PARK'S BENTHIC COMMUNITIES (Jaap pers. com., Fourqueran pers. com., Wheaton pers. com., and Jaap et al. 1998)

	Research Natural Area, Alternative C (Proposed Action	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Community Type			
Bank Barrier/Fringing Reef			
Bird Key Reef (Long Key Reef) – 1	Yes[2]	No	Yes
Patch Reefs			
Loggerhead Reef – 2	Yes	No	Yes
Little Africa – 3	Yes	No	Yes
Texas Rock – 4	Yes	Yes	Yes
Algal Communities			
E of White Shoal – 5	Yes	No	Yes
SSE of Fort Jefferson Harbor – 6	No	No	Yes
Staghorn Reefs			
NE edge of White Shoal – 7	Yes	No	Yes
Octocoral Hardbottom			
Area west of Pulaski Shoal Light –	No	No	Yes
Sea Grass			
Site A – 9	Yes	Yes[2]	Yes
Site B – 10	Yes	Yes	Yes
Coral Species at Risk			
***Acropora palmata* thicket – 11**	No	No	Yes

[1] These data address the criterion requiring that a research natural area represent the full range of habitats.
[2] These locations are either on or just inside the proposed research natural area boundary and may not be sufficiently buffered from activities outside the research natural area. The objective for this evaluation was full inclusion of sites.

TABLE F-6. MEASURES OF DISTANCE FROM A LAW ENFORCEMENT STATION AND MEASURES OF BOUNDARY COMPLEXITY[5]

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Distance[1] to centroid[2]	2.4	4.5	1.5
Distance[1] to farthest corner	6.7	8.2	8.3
Number of new boundaries[3]	3 [a]	2	3 [b]
Uses lines of latitude and longitude	Some [4]	Yes	Some [4 c]
Total acreage of the proposal	29,773	26,721	64,453

[1] Distance is measured in statute miles from Garden Key. To convert statute miles into nautical miles multiply by 0.8684. To convert nautical miles into statute miles multiply by 1.1516.
[2] Levels of poaching in Caribbean marine reserves are significant and correlated with distance from a law enforcement station. Therefore it seems reasonable to consider the location of a given proposal relative to Garden Key (currently the center of law enforcement activity at the park). The "centroid" is defined as the center of mass of an object having constant density.

[3] As a possible measure of complexity related to enforcement we might consider the number of additional "new boundaries" or line segments that are required by each configuration.
[4] These proposed configurations make use of some line segments that are not whole minutes of latitude and longitude. However, the effect this may have on the enforcement or identity of an area has not been determined.
[5] These data address the criterion suggesting that a research natural area be enforceable and identifiable.
[a] Two of the new boundary segments in this proposed configuration are straight lines, while the while the third coincides with the anchoring zone described as a circle 1 nautical mile in radius centered on the Garden Key Harbor Light.
[b] Two of the new boundary segments in this proposed configuration are straight lines, while the third proposes to follow a bathymetric contour and other navigation-related benthic features.
[c] Although this alternative makes use of some line segments that are not whole minutes of latitude and longitude, with the exception of the excluded area around Garden Key, the boundaries of the proposed research natural area are coincidental with that of the park, thereby significantly reducing complexity and improving identity.

The distances are shown graphically on figure C-2, which also has an overlay of the proposed action (alternative C).

TABLE F-7. LENGTH AND PERCENT OF SHARED BOUNDARY WITH THE SANCTUARY'S ECOLOGICAL RESERVE AS A MEASURE OF COMPATIBILITY AND CONNECTIVITY WITH THE TORTUGAS ECOLOGICAL RESERVE OUTSIDE THE PARK BOUNDARY[2]

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Length[1] and percent of shared boundary	8.8(70%)	12.5(100%)	12.5(100%)

[1] Length is measured in statute miles.
[2] These data address the criterion suggesting that a research natural area consider the larger ecosystem and be compatible with the Florida Keys National Marine Sanctuary's Tortugas Ecological Reserve.

TABLE F-6A. MEASURES OF DISTANCE FROM A LAW ENFORCEMENT STATION AND MEASURES OF BOUNDARY COMPLEXITY[5]

	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
Distance[1] to centroid[2]	2.6 (Better)	4.5 (Good)	1.5 (Best)
Distance[1] to farthest corner	6.7 (Best)	8.2 (Good)	8.3 (Good)
Number of new boundaries[3]	3 [a] (Better)	2 (Better)	3 [b] (Best)
Uses lines of latitude and longitude	Some [4] (Better)	Yes (Better)	Some [4 c] (Best)
Total acreage of the proposal	29,773 (Better)	26,721 (Best)	64,453 (Good)

[1] Distance is measured in statute miles from Garden Key. To convert statute miles into nautical miles multiply by 0.8684. To convert nautical miles into statute miles multiply by 1.1516.
[2] Levels of poaching in Caribbean marine reserves are significant and correlated with distance from a law enforcement station. Therefore it seems reasonable to consider the location of a given proposal relative to Garden Key (currently the center of law enforcement activity at the park). The "centroid" is defined as the center of mass of an object having constant density.
[3] As a possible measure of complexity related to enforcement we might consider the number of additional "new boundaries" or line segments that are required by each configuration.
[4] These proposed configurations make use of some line segments that are not whole minutes of latitude and longitude. However, the effect this may have on the enforcement or identity of an area has not been determined.

Figure C-2

back of figure

[5] These data address the criterion suggesting that a research natural area be enforceable and identifiable.
[a] Two of the new boundary segments in this proposed configuration are straight lines, while the third coincides with the anchoring zone described as a circle of 1 nautical mile in radius centered on the Garden Key Harbor Light.
[b] Two of the new boundary segments in this proposed configuration are straight lines, while the third proposes to follow a bathymetric contour and other navigation-related benthic features.
[c] Although this alternative makes use of some line segments that are not whole minutes of latitude and longitude, with the exception of the excluded area around Garden Key, the boundaries of the proposed research natural area are coincidental with that of the park, thereby significantly reducing complexity and improving identity.

TABLE F-8: APPROXIMATE PERCENTAGE OF FISHING ZONE [1] INCLUDED IN PROPOSED RESEARCH NATURAL AREA INSIDE THE PARK

Number of Fishing Trips 1981–84	Fishing Zone	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
3 (0.75%)	1	100	100	100
93 (16%)	2	100	23	100
10 (2%)	3	0	0	100
24 (4%)	4	90	100	100
369 (63%)	5	70	25	97
30 (5%)	6	0	0	100
12 (2%)	7	0	65	100
43 (7%)	8	0	18	100
1 (0.25%)	9	0	0	100
TOTAL TRIPS = 585				

[1] These data address the criterion suggesting that a research natural area consider impacts on visitor activities and commercial services (e.g., recreational fishing). Alternatives that impact recreational fishing opportunities the least in zones 2, 5, and 8 were considered more favorable.

TABLE F-9. SUMMARY OF HOW EACH PROPOSAL SATISFIES THE CRITERIA FOR IDENTIFYING RESEARCH NATURAL AREAS

Research Natural Area Criteria	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
I. Represent the Full Range of Habitats at the Park			
A. Does the research natural area contain the full range of habitats? (table F-1)	Yes	No	Yes
B. Does the research natural area contain at least 20% of each habitat type? (table F-1)	Most	No	Yes
C. Does the research natural area include areas that best represent each benthic community? (table F-5)	Most	Very Few	All
D. Does the research natural area provide protection for species at risk? (table F-11)	Yes	No	Yes

Research Natural Area Criteria	Research Natural Area, Alternative C (Proposed Action)	Research Natural Area, Alternative D	Research Natural Area, Alternative E
II. Include Previous Research and Long-term Monitoring Sites			
A. Does the research natural area include the full range of monitoring sites? (table F-2)	Yes	Yes	Yes
B. Does the research natural area include at least 50% of long-term monitoring sites? (table F-2)	Most	No	All
III. Sufficient Size to Contain Apex Predators			
A. Does the research natural area provide apex predator protection? (table F-10)	Suitable	Marginal	Suitable
IV. Large Enough to be Self-Sustaining			
A. Does the research natural area include known spawning aggregation areas? (table F-3)	Partial	One	Both
B. Does the research natural area include the full range of bathymetry? (table F-4)	Yes	Yes	Yes
C. Does the research natural area include at least 20% of each bathymetry class? (table F-4)	Yes	Most	Yes
V. Enforceable and Identifiable			
A. Does the research natural area location encourage compliance and facilitate enforcement? (tables F-6 and F-6A)	Best	Good	Better
B. How complex is the research natural area boundary? (tables F-6 and F-6A)	Better	Better	Best
C. How large is the research natural area? (tables F-6 and F-6A)	Better	Best	Good
VI. Considers Socioeconomic Impacts			
A. What is the impact of the research natural area on recreational fishing? (table F-8)	Medium	Low	High
VII. Considers Larger Ecosystem			
A. Is the research natural area contiguous with the sanctuary's ecological reserve? (table F-7)	Partial	Full	Full

TABLE F-10. APEX PREDATOR ANALYSIS IN DRY TORTUGAS REGION

Data based on fish density (numbers of fish seen/Bohnsack-Ault 1994–98 visual census sample) and mean size (cm). Density represents a measure of population stability and resiliency; adult average size represents a measure of yield potential. Data cited from Schmidt et al. 1999. "Site Characterization for the Tortugas Region: Physical Oceanography and Recruitment." 1999 Report prepared for the Florida Keys National Marine Sanctuary and the National Park Service by Lee, T. N., E. Johns, D. Wilson, and E. Williams.

Apex Predators by Density & Size	Alternative C (Proposed Action) (6 sites)	Alternative D (1-site)	Alternative E (8 sites)
Black Grouper-Density-Pre-recruit	0-(0.2)	-0-	0-(0.2)
Black Grouper- Size-(Exploited)	56-60, 66-75 cm (2 of 6 sites)	-0-	56-60, 66-75 cm (3 of 8 sites)
Red Grouper-Density-pre-recruit	0-(0.304-0.625)	-0-	0-(0.304-0.625)
Red Grouper (size-Exploited)	0-(1-55)	-0-	0-(65-70 cm)
All Grouper combined/Density/ Pre-recruits	0-(0.6-0.9)	-0-	0-(0.6-0.9)
All Large Grouper Combined/Density/ Exploited	0-(0.2-0.3)	-0-	0-(0.2-0.3)
Yellow-tail Snapper Density-Pre-recruit	0-16	0-16	0-16
Yellowtail Snapper Size (Exploited)	0-(36-50 cm)	36-50	0-(36-50)
Gray Snapper Density-Pre-recruits	0-(1-5)	1-5	0-(1-5)
Gray Snapper Size-Exploited	34-38 (3 of 6 sites)	31-34	(31-34-(34-38) (5 of 8 sites)
Mutton Snapper Density-Pre-recruits	None collected	None collected	None collected
Mutton Snapper Size-(Exploited)	0-(50-60)(3 of 6 sites)	-0-	0-(50-60) (3 of 8 sites)
	(29 sites)	(6 sites)	(56 sites)
Spiny Lobster Density-	0-5, 39-66	0-5, 39-66	0-5, 66-231
Spiny Lobster Size	75/84-145/154	75/84-110/119	75/84-154/162

TABLE F-11. DRAFT LIST OF MARINE FISH/CORAL REEF FISH STOCKS AT RISK IN THE PARK

COMMON NAME	SCIENTIFIC NAME	PARK LOCATION	SURVEY, SOURCE	PROTECTION CRITERIA
Goldentail moray	*Muraena milaris*	Park	Rydene & Kimmel, 1990-94	Rare, not currently protected
Spotted eagle ray	*Aetobatus narinari*	Pulaski shoal, Loggerhead Reef	Longley & Hildebrand, 1941;Schmidt 1976	Threatened, state protected
Mottled cusk-eel	*Lepophidium* sp. *(jennae)*	White Shoal	Longley & Hildebrand, 1941; Robbins et al 1986	Rare, not currently protected
Lined Seahouse	*Hippocamous erectus (punctulatus?)*	Park – shallow grass beds, Suthwest channel	Longley & Hildebrand, 1941	Proposed IUCN status "vulnerable"
Nassau grouper	*Epinephelus striatus*	White Shoal, Long Key Reef	Longley & Hildebrand, 1941 and many others	Depleted, fed-state protected; Proposed IUCN, AFS threatened sp.
Jewfish	*E. itajara*	Windjammer wreck, Texas Rock, Long Key reef	Longley & Hildebrand, 1941 and many others	Depleted, fed-state protected; Proposed for IUCN, AFS threatened sp. lists
Speckled hind	*E. drummondhayi*	Park	Bohnsack et al. 1994	Depleted, proposed for IUCN, AFS threatened sp. lists.
Mutton hamlet	*E. afer*	Park	Longley & Hildebrand, 1941	Rare, not currently protected

COMMON NAME	SCIENTIFIC NAME	PARK LOCATION	SURVEY, SOURCE	PROTECTION CRITERIA
Coney	*E. fulvus*	Park-A 60' channel	Longley & Hildebrand, 1941	Depleted, proposed AFS threatened sp. list.
Yellowmouth grouper	*Mycteroperca interstitialis*	Park-East Key	Longley & Hildebrand, 1941;Bohensack et al. 1994	Rare (park); Depleted, TERA
Yellowfin grouper	*M. venosa*	Loggerhead Key	Longley & Hildebrand, 1941;Bohensack et al. 1994	Depleted, not currently protected
Scamp	*M. phenax*	Park	Rydene & Kimmel, 1990-94;	Rare (park), not currently protected
Gag	*M. microlepsis*	Loggerhead Key/Bird Key reef flats	Longley & Hildebrand, 1941 and others	Proposed as "vulnerable" by IUCN.
Orangeback bass	*S. annualaris*	Park	Rydene & Kimmel, (1990-94)	Rare (<100' depth) (park), not currently protected
Blue hamlet	*Hypoplectrus gemma*	White shoal, Loggerheard K. Windjammer, Long Key	Longley & Hildebrand, 1941 and others	Proposed AFS threatened sp. List
Greater soapfish	*Rypticus saponaceous*	"Windjammer"	Jordan & Thompson, 1905; Schmidt (1976)	Rare, not currently protected
Royal gramma	*Gramma loreto*	White shoal	Schmidt (1976)	Rare, One individual observed Not previously reported in Fla (Humann,1994)
Night sergeant	*Abududuf taurus*	Loggerhead Key, Garden Key	Longley & Hildebrand, 1941	Rare, not currently protected
Hogfish	*Lachnolaimus maximus*	White shoal, Long Key	Longley & Hildebrand, 1941 and many others	Depleted, proposed foe IUCN "vulnerable" sp. List..
Dwarf wrasse	*Doratonotus megalepsis*	Turtle grass/Loggerhead key	Longley & Hildebrand, 1941, Rydene & Kimmel, 1990-94	Rare, currently not protected
Lancer dragonet	*Diplogrammus pauciradiatus*	Loggerhead Bank	Longley & Hildebrand, 1941	Rare one specimen collected, not protected
Swordtail jawfish	*Lonchopisthus micrognathus*	Loggerhead reef	Longley & Hildebrand, 1941	Rare, currently not protected
Mottled jawfish	*Opistognathus maxillosus*	Loggerhead reef	Longley & Hildebrand, 1941	Rare, currently not protected
Freckled stargazer	*Gnathsgnus egregius*	Loggerhead reef	Longley & Hildebrand, 1941	Rare, not currently protected
Saddle stargazer	*Platygillellus rubrocinctus*	Park	Longley & Hildebrand, 1941	Rare, currently not protected
Roughhead blenny	*Acanthemblemaria aspera*	Park	Longley & Hildebrand, 1941	First reported as common, now rare, not protected
Spinyhead blenny	*A. spinosa*	Park	Rydene & Kimmel (1990-94) Hildebrand unable to confirm identity	Rare, not currently protected
Glass blenny	*Coraliozetus diaphana*	Tortugas atoll	Longley & Hildebrand, 1941	Rare, currently not protected
Wrasse blenny	*Hemiemblemaria simulus*	Tortugas atoll	Longley & Hildebrand, 1941, Rydene & Kimmel, (1990-94)	Rare, currently not protected
Mutton snapper	*Lutjanus analis*	White shoal, Long Key	Longley & Hildebrand, 1941, and others	Depleted, proposed IUCN "vulnerable" sp.
Rainbow parrotfish	*Scarus guacamaia*	Park	Longley & Hildebrand, 1941; Rydene & Kimmel, 1990-94	Rare, proposed IUCN "vulnerable" sp. list.
Key blenny	*Starksia starcki*	Park	Longley & Hildebrand, 1941, Jones & Thompson, 1978	Rare, proposed AFS threatened sp. list.
Checkered blenny	*S. ocellata*	Bird Key reef	Longley & Hildebrand, 1941	Rare, not currently protected
Hairy blenny	*Labrisomus nuchipinnis*	Loggerhead key, Garden Key	Longley & Hildebrand, 1941	Reported rare by Longley & Hildebrand, 1941
Downy blenny	*L. kalisherae*	Bird Key reef	Longley & Hildebrand, 1941	Currently reported rare in Park
Longfin blenny	*L. haitiensis*	Bird Key flats	Longley & Hildebrand, 1941	Rarely collected, not protected
Bluethroat Pikeblenny	*Chaenopsis ocellatus*	Bird Key flats	Longley & Hildebrand, 1941	Rare, not currently protected
Diamond blenny	*Malacoctenus boehlkei*	Park	Rydene & Kimmel, 1990-94	Rare, not currently protected. Humann 1994 reports not in Florida.
Barfin blenny	*M. versicolor*	Bird key flats,	Longley & Hildebrand, 1941;	Rare, not currently

COMMON NAME	SCIENTIFIC NAME	PARK LOCATION	SURVEY, SOURCE	PROTECTION CRITERIA
		Loggerhead reef	Rydene & Kimmel, 1990-94	protected. Humann 1994 reports not in Florida.
Barred blenny	*Hypleurochilus bermudensis*	Park-Logerhead Reef	Longley & Hildebrand, 1941; Bohnsack & McClellan, 1998	Rare, not currently protected
Sharpnose goby	*Gobiosoma evelyane*	Park	Rydene & Kimmel, 1990-94	Rare, currently not protected, previously not reported in Florida (Humann, 1994)
Cleaning goby	*Gobiosoma genie*	Park	Rydene & Kimmel, 1990-94	Rare, currently not protected, previously not reported in Florida (Humann, 1994)
Leopard goby	*Gobiosoma saucrum*	Park	Rydene & Kimmel, 1990-94	Rare, not currently protected
Notchtongue goby	*Bathygobius curacao*	Bird Key reef	Longley & Hildebrand, 1941	Rare, not currently protected
Sponge goby	*Evermannichthys spongicola*	Park-sponge habitat	Longley & Hildebrand, 1941	Rare, not currently protected
Marked goby	*Gobionellus stigmaticus*	Loggerhead Key shoreline	Longley & Hildebrand, 1941	Rare, not currently protected
Rusty goby	*Priolepsis hipoliti*	Park	Rydene & Kimmel, 1990-94	Rare, not currently protected
Banner goby	*Microgobius microlepsis*	Bird Key flats/Bush Key flats	Longley & Hildebrand, 1941; Schmidt (1976)	Rare, not currently protected
Pugnose wormfish	*Cerdale floridana*	Bird key reef	Longley & Hildebrand, 1941	Rare, not currently protected
Spotted whiff	*Citharichthys macrops*	Loggerhead bank	Longley & Hildebrand, 1941	Rare, 1 specimen reported
Marbled puffer	*Spheroides dorsalis*	60' channels adjacent to Garden Key, Bird/Bush Keys	Longley & Hildebrand, 1941	Rare, currently not protected
Honeycomb cowfish	*Lactophys polygonia*	Park	Rydene & Kimmel. 1990-94; Robbins et al. 1986	Rare, not currently protected; not reported in Gulf of Mexico

APPENDIX F: DETAILS OF NATURAL RESOURCE DATA GATHERED AND PROJECTED

Note: Because the area added to the research natural area zone under alternative C in the final document is only 3% different than in the draft document, a minimal difference, the following figures were not recalculated for the final document. The following figure, B5, was also not reconfigured to show the new proposed boundary. The new proposed boundary is shown on the Alternative C map.

Table A2: (a) Description of reef type classification. **(b)** Total area (in m^2) of underwater (benthic) habitats within the park; areas are given by depth category (less than and greater than 3 m) and for the total area. **(c)** Proportion of benthic habitat areas contained within a research natural area zone for alternatives C and D.

(a)

Reef Type	Description
Patch Reef	Small diffuse reefs consisting mainly of large boulder corals, which are often surrounded by a halo of barren sand caused by grazing on surrounding sea grass.
Reef Flat	Shallow to medium depth reefs consisting mainly of coral outcroppings, sand patches, and scattered sea grass beds.
Fore Reef	Areas of extensive coral growth that include spur-and-groove formations characterized by a wide depth range.
Deep Reef	Reefs at depths greater than 22 meters.

(b)

Benthic Habitat	Area <=3 m in depth	Area >3 m in depth	Total Area
Hardbottom	157,382	0	157,382
Sand	1,213,788	115,872,419	117,086,208
Sea grass	9,941,308	34,440,246	44,381,554
Patch Reefs	637,419	28,086,108	28,723,527
Reef Flat	9,125,964	36,758,816	45,884,779
Fore Reefs	427,995	11,036,247	11,464,242
Deep Reefs	0	1,497,517	1,497,517
Total	**21,503,856**	**227,691,353**	**249,195,209**

(c)

	Alternative C			Alternative D		
Benthic Habitat	**≤3 m**	**>3 m**	**Total**	**≤3 m**	**>3 m**	**Total**
Hardbottom	100.0	NA	100.0	0.0	NA	0.0
Sand	78.7	40.0	40.4	2.9	20.1	20.0
Sea Grass	43.0	20.6	25.6	26.0	41.4	37.8
Coral Reefs	41.5	41.3	41.3	25.5	36.0	34.8

Figure B5: Diagram showing the spatial extents and boundaries of NPS research natural areas and the Florida Keys National Marine Sanctuary's ecological reserves (ERs) for three proposed management alternatives and one nonalternative scenario: (a) alternative C without the sanctuary's ecological reserves (not considered in the document); (b) alternative C with the sanctuary's ecological reserves; (c) alternative D; and (d) alternative E. Alternatives A and B have no research natural area zone.

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APPENDIX G: LETTERS FROM THE U.S. FISH AND WILDLIFE SERVICE ON RARE, THREATENED, AND ENDANGERED SPECIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecosystem Office
P.O. Box 2676
Vero Beach, Florida 32961-2676

August 6, 1999

Margaret L. DeLaura
Community Planner
National Park Service
Denver Service Center
P.O. Box 25287
Denver, CO 80225-0287

Dear Ms. DeLaura:

Thank you for the June 28, 1999 letter to the U.S. Fish and Wildlife Service (Service) on behalf of Dry Tortugas National Park (Park) requesting information on federally listed species and designated critical habitat. Your office requested the information for an environmental impact statement which is being prepared for the Park's general management plan amendment in Monroe County. The Park is located in waters of the Gulf of Mexico, approximately 70 miles west of Key West, Monroe County, Florida.

The Service has reviewed the information submitted and examined the information available to us on the presence of threatened and endangered species in the vicinity of the site. We have provided for your consideration a list of species that are protected as threatened or endangered under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), in Monroe County. Five species of sea turtles may be found in the waters of the Park, and the loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles nest on Park islands. Additionally, the West Indian manatee (*Trichechus manatus*) and a number of bird species utilize the islands and waters within the Park. There is no designated critical habitat within Park boundaries.

We have also provided you with a list of species that we would consider during our review of any proposal associated with this project. This list represents species that the Service is required to protect and conserve under other authorities, such as the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*) and the Migratory Bird Treaty Act (16 U.S.C. 701 *et seq.*). We are providing this list as technical assistance only.

Since the enclosed lists do not include species protected by the State, we recommend you contact the Florida Fish and Wildlife Conservation Commission (FWCC) to identify those species potentially present in the vicinity. The local office of the FWCC may be reached at 2796 Overseas Highway, Suite 213, Marathon, FL 33050; telephone (305)289-2365.

Thank you for the opportunity to provide this information. If you have any questions, please contact Ms. Jeanette Gallihugh at our Florida Keys Suboffice, P.O. Box 430510, Big Pine Key, FL 33043; telephone (305)872-5563.

Sincerely,

FOR James J. Slack
Project Leader
South Florida Field Office

enclosures

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES AND CANDIDATES FOR FEDERAL LISTING IN MONROE COUNTY, FLORIDA

Mammals (except whales)		
Florida panther	*Felis concolor coryi*	E
Mountain lion	*Felis concolor*	T (S/A)
Key deer	*Odocoileus virginianus clavium*	E
Key Largo cotton mouse	*Peromyscus gossypinus allapaticola*	E
Key Largo woodrat	*Neotoma floridana smalli*	E
Lower Keys marsh rabbit	*Sylvilagus palustris hefneri*	E
Silver rice rat	*Oryzomys palustris natator* (= *O. argentatus*)	E, CH
West Indian manatee	*Trichechus manatus*	E, CH
Birds		
Audubon's crested caracara	*Polyborus plancus audubonii*	T
Bald eagle	*Haliaeetus leucocephalus*	T
Cape Sable seaside sparrow	*Ammodramus (=Ammospiza) maritimus mirabilis*	E, CH
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E
Piping plover	*Charadrius melodus*	T
Red-cockaded woodpecker	*Picoides (= Dendrocopos) borealis*	E
Roseate tern	*Sterna dougallii dougallii*	T
Wood stork	*Mycteria americana*	E
Reptiles		
American crocodile	*Crocodylus acutus*	E, CH
American alligator	*Alligator mississippiensis*	T (S/A)
Atlantic salt marsh snake	*Nerodia clarkii (=fasciata) taeniata*	T
Eastern indigo snake	*Drymarchon corais couperi*	T
Green sea turtle	*Chelonia mydas* (incl. *agassizi*)	E
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Kemp's (=Atlantic) ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*	T
Invertebrates		
Schaus swallowtail butterfly	*Heraclides (= Papilio) aristodemus ponceanus*	E
Stock Island tree snail	*Orthalicus reses* (not incl. *nesodryas*)	T
Plants		
Garber's spurge	*Chamaesyce(=Euphorbia) garberi*	T
Key tree-cactus	*Pilosocereus (= Cereus) robinii*	E

E=Endangered; T=Threatened; C=Candidate; T (S/A)=Threatened due to Similar Appearance; XN=Experimental population; CH = Critical Habitat has been designated for this species in this county

South Florida Field Office revised 1/8/99

MIGRATORY BIRDS OCCURRING IN SOUTH FLORIDA

ORDER GAVIIFORMES
FAMILY GAVIIDAE
Gavia stellata, Red-throated Loon
Gavia immer, Common Loon
Gavia pacifica, Pacific Loon

ORDER PODICIPEDIFORMES
FAMILY PODICIPEDIDAE
Tachybaptus dominicus, Least Grebe
Podilymbus podiceps, Pied-billed Grebe
Podiceps auritus, Horned Grebe
Podiceps nigricollis, Eared Grebe

ORDER PROCELLARIIFORMES
FAMILY PROCELLARIIDAE
Calonectris diomedea, Cory's Shearwater
Puffinus gravis, Greater Shearwater
Puffinus griseus, Sooty Shearwater
Puffinus puffinus, Manx Shearwater
Puffinus lherminieri, Audubon's Shearwater

FAMILY HYDROBATIDAE
Oceanites oceanicus, Wilson's Storm-Petrel
Oceanodroma leucorhoa, Leach's Storm-Petrel
Oceanodroma castro, Band-rumped Storm-Petrel

ORDER PELECANIFORMES
FAMLY PHAETHONTIDAE
Phaethon lepturus, White-tailed Tropicbird
Phaethon aethereus, Red-billed Tropicbird

FAMILY SULIDAE
Sula dactylatra, Masked Booby
Sula leucogaster, Brown Booby
Sula sula, Red-footed Booby
Sula bassanus, Northern Gannet

FAMILY PELECANIDAE
Pelecanus erythrorhynchos, American White Pelican
Pelecanus occidentalis, Brown Pelican

FAMILY PHALACROCORACIDAE
Phalacrocorax carbo, Great Cormorant
Phalacrocorax auritus, Double-crested Cormorant

FAMILY ANHINGIDAE
Anhinga anhinga, Anhinga

FAMILY FREGATIDAE
Fregata magnificens, Magnificent Frigatebird

ORDER CICONIIFORMES
FAMILY ARDEIDAE
Botaurus lentiginosus, American Bittern
Ixobrychus exilis, Least Bittern
Ardea herodias, Great Blue Heron
Casmerodius albus, Great Egret
Egretta thula, Snowy Egret
Egretta caerulea, Little Blue Heron
Egretta tricolor, Tricolored Heron
Egretta rufescens, Reddish Egret
Bubulcus ibis, Cattle Egret
Butorides striatus, Green-backed Heron
Nycticorax nycticorax, Black-crowned Night Heron
Nycticorax violaceus, Yellow-crowned Night Heron

FAMILY THRESKIORNITHIDAE
Eudocimus albus, White Ibis
Eudocimus ruber, Scarlet Ibis
Plegadis falcinellus, Glossy Ibis
Plegadis chihi, White-faced Ibis
Ajaia ajaja, Roseate Spoonbill

FAMILY CICONIIDAE
Mycteria americana, Wood Stork

ORDER PHOENICOPTERIFORMES
FAMILY PHOENICOPTERIDAE
Phoenicopterus ruber, Greater Flamingo

ORDER ANSERIFORMES
FAMILY ANATIDAE
Dendrocygna bicolor, Fulvous Whistling-Duck
Dendrocygna autumnalis, Black-bellied Whistling-Duck
Anser albifrons, Greater White-fronted Goose
Chen caerulescens, Snow Goose
Branta bernicla, Brant
Branta canadensis, Canada Goose
Aix sponsa, Wood Duck
Anas crecca, Green-winged Teal
Anas rubripes, American Black Duck
Anas fulvigula, Mottled Duck
Anas platyrhynchos, Mallard
Anas bahamensis, White-cheeked Pintail
Anas acuta, Northern Pintail
Anas discors, Blue-winged Teal
Anas cyanoptera, Cinnamon Teal
Anas clypeata, Northern Shoveler
Anas strepera, Gadwall
Anas penelope, Eurasian Wigeon
Anas americana, American Wigeon
Aythya valisineria, Canvasback
Aythya americana, Redhead
Aythya collaris, Ring-necked Duck
Aythia marila, Greater Scaup
Aythya affinis, Lesser Scaup
Somateria mollissima, Common Eider
Somateria spectabilis, King Eider
Histrionicus histrionicus, Harlequin Duck
Clangula hyemalis, Oldsquaw
Melanitta nigra, Black Scoter
Melanitta perspicillata, Surf Scoter
Melanitta fusca, White-winged Scoter
Bucephala clangula, Common Goldeneye

Bucephala albeola, Bufflehead
Lophodytes cucullatus, Hooded Merganser
Mergus merganser, Common Merganser
Mergus serrator, Red-breasted Merganser
Oxyura jamaicensis, Ruddy Duck
Oxyura dominica, Masked Duck

ORDER FALCONIFORMES
FAMILY CATHARTIDAE
Coragyps atratus, Black Vulture
Cathartes aura, Turkey Vulture

FAMILY ACCIPITRIDAE
Pandion haliaetus, Osprey
Elanoides forficatus, American Swallow-tailed Kite
Elanus caeruleus, Black-shouldered Kite
Rhostrhamus sociabilis, Snail Kite
Ictinia mississippiensis, Mississippi Kite
Haliaeetus leucocephalus, Bald Eagle
Circus cyaneus, Northern Harrier
Accipiter striatus, Sharp-shinned Hawk
Accipiter cooperii, Cooper's Hawk
Buteo lineatus, Red-shouldered Hawk
Buteo platypterus, Broad-winged Hawk
Buteo brachyurus, Short-tailed Hawk
Buteo swainsoni, Swainson's Hawk
Buteo jamaicensis, Red-tailed Hawk

FAMILY FALCONIDAE
Polyborus plancus, Crested Caracara
Falco sparverius, American Kestrel
Falco columbarius, Merlin
Falco peregrinus, Peregrine Falcon

ORDER GRUIFORMES
FAMILY RALLIDAE
Coturnicops noveboracensis, Yellow Rail
Laterallus jamaicensis, Black Rail
Rallus longirostris, Clapper Rail
Rallus elegans, King Rail
Rallus limicola, Virginia Rail
Porzana carolina, Sora
Porphyrula martinica, Purple Gallinule
Gallinula chloropus, Common Moorhen
Fulica americana, American Coot

FAMILY ARAMIDAE
Aramus guarauna, Limpkin

FAMILY GRUIDAE
Grus canadensis, Sandhill Crane

ORDER CHARADRIIFORMES
FAMILY CHARADRIIDAE
Pluvialis squatarola, Black-bellied Plover
Pluvialis dominica, Lesser Golden-Plover
Charadrius alexandrinus, Snowy Plover
Charadrius wilsonia, Wilson's Plover
Charadrius semipalmatus, Semipalmated Plover
Charadrius melodus, Piping Plover
Charadrius vociferus, Killdeer
Charadrius montanus, Mountain Plover

FAMILY HAEMATOPODIDAE
Haematopus palliatus, American Oystercatcher

FAMILY RECURVIROSTRIDAE
Himantopus mexicanus, Black-necked Stilt
Recurvirostra americana, American Avocet

FAMILY SCOLOPACIIDAE
Tringa melanoleuca, Greater Yellowlegs
Tringa flavipes, Lesser Yellowlegs
Tringa solitaria, Solitary Sandpiper
Catoptrophorus semipalmatus, Willet
Actitus macularia, Spotted Sandpiper
Bartramia longicauda, Upland Sandpiper
Numenius phaeopus, Whimbrel
Numenius americanus, Long-billed Curlew
Limosa limosa, Black-tailed Godwit
Limosa haemastica, Hudsonian Godwit
Limosa fedoa, Marbled Godwit
Arenaria interpres, Ruddy Turnstone
Aphriza virgata, Surfbird
Calidris canutus, Red Knot
Calidris alba, Sanderling
Calidris pusilla, Semipalmated Sandpiper
Calidris mauri, Western Sandpiper
Calidris minutilla, Least Sandpiper
Calidris fuscicollis, White-rumped Sandpiper
Calidris bairdii, Baird's Sandpiper
Calidris melanotos, Pectoral Sandpiper
Calidris acuminata, Sharp-tailed Sandpiper
Calidris maritima, Purple Sandpiper
Calidris alpina, Dunlin
Calidris ferruginea, Curlew Sandpiper
Calidris himantopus, Stilt Sandpiper
Tryngites subruficollis, Buff-breasted Sandpiper
Philomachus pugnax, Ruff
Limnodromus griseus, Short-billed Dowitcher
Limnodromus scolopaceus, Long-billed Dowitcher
Gallinago gallinago, Common Snipe
Scolopax minor, American Woodcock
Phalaropus tricolor, Wilson's Phalarope
Phalaropus lobatus, Red-necked Phalarope
Phalaropus fulicaria, Red Phalarope

FAMILY LARIDAE
Stercorarius pomarinus, Pomarine Jaeger
Stercorarius parasiticus, Parasitic Jaeger
Stercorarius longicaudus, Long-tailed Jaeger
Larus atricilla, Laughing Gull
Larus pipixcan, Franklin's Gull
Larus minutus, Little Gull
Larus ridibundus, Common Black-headed Gull
Larus philadelphia, Bonaparte's Gull

Larus delawarensis, Ring-billed Gull
Larus argentatus, Herring Gull
Larus thayeri, Thayer's Gull
Larus fuscus, Lesser Black-backed Gull
Larus hyperboreus, Glaucous Gull
Larus marinus, Great Black-backed Gull
Rissa tridactyla, Black-legged Kittiwake
Xema sabini, Sabine's Gull
Sterna nilotica, Gull-billed Tern
Sterna caspia, Caspian Tern
Sterna maxima, Royal Tern
Sterna sandvicensis, Sandwich Tern
Sterna dougallii, Roseate Tern
Sterna hirundo, Common Tern
Sterna paradisaea, Arctic Tern
Sterna forsteri, Forster's Tern
Sterna antillarum, Least Tern
Sterna anaethetus, Bridled Tern
Sterna fuscata, Sooty Tern
Chlidonias niger, Black Tern
Anous stolidus, Brown Noddy
Anous minutus, Black Noddy
Rynchops niger, Black Skimmer

FAMILY ALCIDAE
Alle alle, Dovekie
Alca torda, Razorbill

ORDER COLUMBIFORMES
FAMILY COLUMBIDAE
Columba squamosa, Scaly-naped Pigeon
Columba leucocephala, White-crowned Pigeon
Columba fasciata, Band-tailed Pigeon
Zenaida asiatica, White-winged Dove
Zenaida aurita, Zenaida Dove
Zenaida macroura, Mourning Dove
Columbina passerina, Common Ground-Dove
Geotrygon chrysia, Key West Quail-Dove
Geotrygon montana, Ruddy Quail-Dove

ORDER CUCULIFORMES
FAMILY CUCULIDAE
Coccyzus erythropthalmus, Black-billed Cuckoo
Coccyzus americanus, Yellow-billed Cuckoo
Coccyzus minor, Mangrove Cuckoo
Crotophaga ani, Smooth-billed Ani
Crotophaga sulcirostris, Groove-billed Ani

ORDER STRIGIFORMES
FAMILY TYTONIDAE
Tyto alba, Common Barn-Owl

FAMILY STRIGIDAE
Otus asio, Eastern Screech-Owl
Bubo virginianus, Great Horned Owl
Athene cunicularia, Burrowing Owl
Strix varia, Barred Owl
Asio otus, Long-eared Owl
Asio flammeus, Short-eared Owl
Aegolius acadicus, Northern Saw-whet Owl

ORDER CAPRIMULGIFORMES
FAMILY CAPRIMULGIDAE
Chordeiles acutipennis, Lesser Nighthawk
Chordeiles minor, Common Nighthawk
Chordeiles gundlacchii, Antillean Nighthawk
Caprimulgus carolinensis, Chuck-will's-widow
Caprimulgus vociferus, Whip-poor-will

ORDER APODIFORMES
FAMILY APODIDAE
Chaetura pelagica, Chimney Swift
Tachornis phoenicobia, Antillean Palm Swift

FAMILY TROCHILIDAE
Amazilia yucatanensis, Buff-bellied Hummingbird
Calliphlox evelynae, Bahama Woodstar
Archilochus colubris, Ruby-throated Hummingbird
Archilochus alexandri, Black-chinned Hummingbird
Selasphorus rufus, Rufous Hummingbird

ORDER CORACIIFORMES
FAMILY ALCEDINIDAE
Ceryle alcyon, Belted Kingfisher

ORDER PICIFORMES
FAMILY PICIDAE
Melanerpes erythrocephalus, Red-headed Woodpecker
Melanerpes carolinus, Red-bellied Woodpecker
Sphyrapicus varius, Yellow-bellied Sapsucker
Picoides pubescens, Downy woodpecker
Picoides villosus, Hairy woodpecker
Picoides borealis, Red-cockaded woodpecker
Colaptes auratus, Northern Flicker
Dryocopus pileatus, Pileated Woodpecker
Campephilus principalis, Ivory-billed Woodpecker

ORDER PASSERIFORMES
FAMILY TYRANNIDAE
Contopus borealis, Olive-sided flycatcher
Contopus virens, Eastern Wood-Pewee
Empidonax flaviventris, Yellow-bellied Flycatcher
Empidonax virescens, Acadian Flycatcher
Empidonax alnorum, Alder Flycatcher
Empidonax traillii, Willow Flycatcher
Empidonax minimus, Least Flycatcher
Sayornis nigricans, Black Phoebe
Sayornis phoebe, Eastern Phoebe
Sayornis saya, Say's Phoebe
Pyrocephalus rubinus, Vermilion Flycatcher
Myiarchus cinerascens, Ash-throated Flycatcher
Myiarchus crinitus, Great Crested Flycatcher
Myiarchus tyrannulus, Brown-crested Flycatcher
Tyrannus vociferans, Cassin's Kingbird

Tyrannus verticalis, Western Kingbird
Tyrannus tyrannus, Eastern Kingbird
Tyrannus dominicensis, Gray Kingbird
Tyrannus caudifasciatus, Loggerhead Kingbird
Tyrannus forficatus, Scissor-tailed Flycatcher
Tyrannus savana, Fork-tailed Flycatcher

FAMILY ALAUDIDAE
Eremophila alpestris, Horned Lark

FAMILY HIRUNDINIDAE
Progne subis, Purple Martin
Tachycineta bicolor, Tree Swallow
Tachycineta cyaneoviridis, Bahama Swallow
Stelgidopteryx serripennis, Northern Rough-winged Swallow
Riparia riparia, Bank Swallow
Hirundo pyrrhonota, Cliff Swallow
Hirundo fulva, Cave Swallow
Hirundo rustica, Barn Swallow

FAMILY CORVIDAE
Cyanocitta cristata, Blue Jay
Aphelocoma coerulescens, Scrub Jay
Corvus brachyrhynchos, American Crow
Corvus ossifragus, Fish Crow

FAMILY PARIDAE
Parus carolinensis, Carolina Chickadee
Parus bicolor, Tufted Titmouse

FAMILY SITTIDAE
Sitta canadensis, Red-breasted Nuthatch
Sitta pusilla, Brown-headed Nuthatch

FAMILY CERTHIIDAE
Certhia americana, Brown Creeper

FAMILY TROGLODYTIDAE
Thryothorus ludovicianus, Carolina Wren
Troglodytes aedon, House Wren
Troglodytes troglodytes, Winter Wren
Cistothorus platensis, Sedge Wren
Cistothorus palustris, Marsh Wren

FAMILY MUSCICAPIDAE
SUBFAMILY SYLVIINAE
Regulus satrapa, Golden-crowned Kinglet
Regulus calendula, Ruby-crowned Kinglet
Polioptila caerulea, Blue-gray Gnatcatcher

SUBFAMILY TURDINAE
Oenanthe oenanthe, Northern Wheatear
Sialis sialis, Eastern Bluebird
Catharus fuscescens, Veery
Catharus minimus, Gray-cheeked Thrush
Catharus ustulatus, Swainson's Thrush
Catharus guttatus, Hermit Thrush
Hylocichla mustelina, Wood Thrush
Turdus migratorius, American Robin
Ixoreus naevius, Varied Thrush

FAMILY MIMIDAE
Dumetella carolinensis, Gray Catbird
Mimus polyglottos, Northern Mockingbird
Toxostoma rufum, Brown Thrasher

FAMILY MOTACILLIDAE
Anthus spragueii, Sprague's Pipit

FAMILY BOMBYCILLIDAE
Bombycilla cedrorum, Cedar Waxwing

FAMILY LANIIDAE
Lanius ludovicianus, Loggerhead Shrike

FAMILY VIREONIDAE
Vireo griseus, White-eyed Vireo
Vireo bellii, Bells' Vireo
Vireo solitarius, Solitary Vireo
Vireo flavifrons, Yellow-throated Vireo
Vireo gilvus, Warbling Vireo
Vireo philadelphicus, Philadelphia Vireo
Vireo olivaceus, Red-eyed Vireo
Vireo altiloquus, Black-whiskered Vireo

FAMILY EMBERIZIDAE
SUBFAMILY PARULINAE
Vermivora bachmanii, Bachman's Warbler
Vermivora pinus, Blue-winged Warbler
Vermivora chrysoptera, Golden-winged Warbler
Vermivora peregrina, Tennessee Warbler
Vermivora celata, Orange-crowned Warbler
Vermivora ruficapilla, Nashville Warbler
Parula americana, Northern Parula
Dendroica petechia, Yellow Warbler
Dendroica pensylvanica, Chestnut-sided Warbler
Dendroica magnolia, Magnolia Warbler
Dendroica tigrina, Cape May Warbler
Dendroica caerulescens, Black-throated Blue Warbler
Dendroica coronata, Yellow-rumped Warbler
Dendroica nigrescens, Black-throated Gray Warbler
Dendroica townsendi, Townsend's Warbler
Dendroica virens, Black-throated Green Warbler
Dendroica fusca, Blackburnian Warbler
Dendroica dominica, Yellow-throated Warbler
Dendroica pinus, Pine Warbler
Dendroica kirtlandii, Kirtland's Warbler
Dendroica discolor, Prairie Warbler
Dendroica palmarum, Palm Warbler
Dendroica castanea, Bay-breasted Warbler
Dendroica striata, Blackpoll Warbler
Dendroica cerulea, Cerulean Warbler
Mniotilta varia, Black-and-White Warbler
Setophaga ruticilla, American Redstart
Protonotaria citrea, Prothonotary Warbler
Helmitheros vermivorus, Worm-eating Warbler
Limnothlypis swainsonii, Swainson's Warbler
Seiurus aurocapillus, Ovenbird
Seiurus noveboracensis, Northern Waterthrush
Seiurus motacilla, Louisiana Waterthrush

Oporornis formosus, Kentucky Warbler
Oporornis agilis, Connecticut Warbler
Oporornis philadelphia, Mourning Warbler
Geothlypis trichas, Common Yellowthroat
Wilsonia citrina, Hooded Warbler
Wilsonia pusilla, Wilson's Warbler
Wilsonia canadensis, Canada Warbler
Icteria virens, Yellow-breasted Chat

SUBFAMILY THRAUPINAE
Spindalis zena, Stripe-headed Tanager
Piranga rubra, Summer Tanager
Piranga olivacea, Scarlet Tanager
Piranga ludoviciana, Western Tanager

SUBFAMILY CARDINALINAE
Cardinalis cardinalis, Northern Cardinal
Pheucticus ludovicianus, Rose-breasted Grosbeak
Pheucticus melanocephalus, Black-headed Grosbeak
Guiraca caerulea, Blue Grosbeak
Passerina amoena, Lazuli Bunting
Passerina cyanea, Indigo Bunting
Passerina ciris, Painted Bunting
Spiza americana, Dickcissel

SUBFAMILY EMBERIZINAE
Pipilo erythrophthalmus, Rufous-sided Towhee
Tiaris bicolor, Black-faced Grassquit
Aimophila aestivalis, Bachman's Sparrow
Spizella passerina, Chipping Sparrow
Spizella pallida, Clay-colored Sparrow
Spizella pusilla, Field Sparrow
Pooecetes gramineus, Vesper Sparrow
Chondestes grammacus, Lark Sparrow
Calamospiza melanocorys, Lark Bunting
Passerculus sandwichensis, Savannah Sparrow
Ammodramus savannarum, Grasshopper Sparrow
Ammodramus henslowii, Henslow's Sparrow
Ammodramus leconteii, Le Conte's Sparrow
Ammodramus caudacutus, Sharp-tailed Sparrow
Ammodramus maritimus, Seaside Sparrow
Melospiza melodia, Song Sparrow
Melospiza lincolnii, Lincoln's Sparrow
Melospiza georgiana, Swamp Sparrow
Zonotrichia albicollis, White-throated Sparrow
Zonotrichia leucophrys, White-crowned Sparrow
Zonotrichia querula, Harris' Sparrow
Junco hyemalis, Dark-eyed Junco
Calcarius lapponicus, Lapland Longspur

SUBFAMILY ICTERINAE
Dolichonyx oryzivorus, Bobolink
Agelaius phoeniceus, Red-winged Blackbird
Sturnella magna, Eastern Meadowlark
Sturnella neglecta, Western Meadowlark
Xanthocephalus xanthocephalus, Yellow-headed Blackbird
Euphagus carolinus, Rusty Blackbird
Euphagus cyanocephalus, Brewer's Blackbird
Quiscalus major, Boat-tailed Grackle
Quiscalus quiscula, Common Grackle
Molothrus bonariensis, Shiny Cowbird
Molothrus aeneus, Bronzed Cowbird
Molothrus ater, Brown-headed Cowbird
Icterus spurius, Orchard Oriole
Icterus galbula, Northern Oriole

FAMILY FRINGILLIDAE
SUBFAMILY CARDUELINAE
Carpodacus purpureus, Purple Finch
Carduelis pinus, Pine Siskin
Carduelis tristis, American Goldfinch

Florida Fish and Wildlife Conservation Commission

November 16, 1999

OFFICE OF ENVIRONMENTAL SERVICES
BRADLEY J. HARTMAN, DIRECTOR
620 South Meridian Street
Tallahassee, FL 32399-1600
www.state.fl.us/fwc
(850)488-6661
FAX (850)922-5679
TDD (850)488-9542

Ms. Margaret L. DeLaura
Community Planner
National Park Service
P.O. Box 25287
Denver Colorado 80225-0287

RE: EVER 05 02
Dry Tortugas National Park
General Management Plan/EIS

Dear Ms. DeLaura:

Thank you for your request regarding a list of endangered, threatened and species of special concern that occurs within or adjacent to the Dry Tortugas National Park. Enclosed is a list of species with their state and federal status that may be found in or adjacent to Dry Tortugas area. Aside for the listed species, the sooty tern and the magnificent frigate birds are known to nest in the Dry Tortugas.

If you have any questions or need further information you can contact me in writing at 2796 Overseas Highway Suite 213, Marathon FL 33050 or by phone at (305)289-2365.

Sincerely,

Rowena P. Garcia

Enclosure

ENV 8-4-1

Table 1. Status of and major threats to endangered and potentially endangered vertebrates and invertebrates in the Florida Keys.

Taxon / Common Name	Scientific Name	State Status	Federal Status
Fish			
Common snook	*Centropomus undecimalis*	SSC	
Amphibians and reptiles			
Atlantic loggerhead turtle	*Caretta caretta caretta*	T	T
Atlantic green turtle	*Chelonia mydas mydas*	E	E
Leatherback turtle	*Dermochelys coriacea*	E	E
Atlantic hawksbill turtle	*Eretmochelys imbricata imbricata*	E	E
Florida Keys mole skink	*Eumeces egregius egregius*	SSC	
Key mud turtle	*Kinosternon bauri bauri*	E	
Atlantic ridley turtle	*Lepidochelys kempi*	E	E
Birds			
Roseate spoonbill	*Ajaia ajaja*	SSC	
Southeastern snowy plover	*Charadrius alexandrinus tenuirostric*	T	
Piping plover	*Charadrius melodus*	T	UR1
White-crowned pigeon	*Columba leucocephala*	T	
Little blue heron	*Egretta coerulea*	SSC	
Reddish egret	*Egretta rufescens*	SSC	
Snowy egret	*Egretta thula*	SSC	
Tricolored heron	*Egretta tricolor*	SSC	
Southeastern American kestrel	*Falco sparverius paulus*	T	
Arctic peregrine falcon	*Falco peregrinus tundrius*	E	T
Bald eagle	*Haliaeetus leucocephalus*	T	E
Wood stork	*Mycteria americana*	E	E

Brown pelican	*Pelecanus occidentalis*	SSC	
Least tern	*Sterna antillarum*	T	
Roseate tern	*Sterna dougallii*	T	
Black skimmer	*Rynchops niger*	SSC	
Osprey	*Pandion haliaetus*	SSC	
White ibis	*Eudocimus albus*	SSC	
Mammals			
West Indian manatee	*Trichechus manatus latirostris*	E	E
Finback whale	*Balaenoptera physalus*	E	E
Humpback whale	*Megaptera novaeangliae*	E	E
Invertebrates[c]			
Pillar coral	*Dendrogyra cylindrus*	E	E

[a]E = endangered; T = threatened; T(S/A) = threatened due to similarity of appearance; SSC = species of special concern; UR1 = under review for federal listing with substantial evidence indicating at least some degree of biological vulnerability and/or threat; = under review for federal listing but substantial evidence of biological vulnerability and/or threat is lacking. Note: an asterisk indicates that the listing only is applicable to the Lower Keys.
[c]Excludes corals.

APPENDIX H: SUBMERGED CULTURAL RESOURCES STRATEGY

This submerged cultural resources strategy reflects basic tenets fundamental to submerged cultural resources management. It has been developed to specifically elaborate NPS policies and guidelines regarding all cultural resources for application to Dry Tortugas National Park submerged resources, which are the majority of park cultural resources. Sound management of submerged lands in the National Park Service requires adequate scholarly and scientific knowledge about resources. This strategy was developed from a scientific perspective reflecting the tradition of scholarly research identified in the park's enabling legislation and its application in the development of NPS management decisions (as mandated in the Omnibus Act of 1998). Incorporated into this strategy is the perspective that effective management of submerged lands requires concurrent consideration of natural and cultural resources for inventory, monitoring, research, interpretation, education, and protection activities conducted within the park.

I. Cultural Resource Inventory Program

Although there is a small potential for inundated prehistoric terrestrial sites, most of the submerged sites within Dry Tortugas National Park (DRTO) are historic. The current park boundary contains more than 275 historically documented maritime casualties, (shipwrecks, groundings and strandings), some from as early as the sixteenth century, and human activity there has left an equally long material record. Many other maritime casualties lie immediately to the west of the current park boundary on Tortugas Banks. Archeological sites of Dry Tortugas National Park and the Tortugas Banks share a common ecosystem and maritime history that provide the context for interpretation of archeological remains. The sites of both areas must be studied within the same context to properly interpret the archeological record contained in each component.

Lands outside DRTO are managed by the National Oceanic and Atmospheric Agency (NOAA) and the State of Florida. Every effort will be made to enhance interagency cooperation and partnership so that the submerged resources and associated values of Tortugas Banks are afforded at least the same level of protection, preservation and study as those within DRTO.

Systematic inventory of submerged lands within DRTO has been conducted annually from 1993–1997 by the NPS Submerged Resources Center (SRC), formerly Submerged Cultural Resources Unit. Currently more than 90% of navigable areas in the park shallower than 10m has been surveyed with remote sensing equipment directed toward location of cultural remains. A portion of this area, primarily South Loggerhead Reef has been investigated and documented archeologically. This area has also been surveyed using remote sensing equipment that characterizes natural resources on the seabed, which has demonstrated the cost-effectiveness of a combined natural and cultural survey approach. The survey was conducted in part to develop and refine a model methodology for application to other NPS submerged areas.

Although most of the 10m or shallower priority area has been surveyed and the presence of cultural remains indicated, only a portion of surveyed area has been archeologically documented and evaluated for significance. Very little area deeper than 10m has been surveyed.

The long-term goal of 100% survey of all submerged lands and evaluation of all archeological materials within the park can be met in a stepped approach designed to cover high-potential areas and provide interim information for management decisions.

Immediate goal is to complete 100% remote sensing survey of all navigable areas shallower than 30 feet (10m) following the model developed during the 1993–1997 survey. This model can serve as minimum acceptable standards. Priority consideration should be given to combining seabed classification with the cultural resource remote sensing survey. Data will be added to the cumulative Geographic Information System (GIS) developed during the SRC survey known as the DRTO Survey GIS Database and to the NPS Archeological Sites Information Management System (ASMIS) and appropriate natural resource databases.

Intermediate goal is to conduct 20% random sample remote sensing survey of areas within the park deeper than 30 feet to characterize nature and extent of cultural resources in this area. Completion of this task will aid planning for additional survey to complete 100% coverage.

Although magnetic anomalies located by remote sensing survey indicate presence of cultural materials, they should be archeologically evaluated to determine their nature and significance as soon as possible, ideally concurrent with remote sensing operations. Anomalies that are not investigated are not included in the park's

archeological site inventory, however, prior to investigation they can be considered as potentially significant archeological areas for management purposes. Anomaly areas must be dived to determine whether ferrous materials are buried. If exposed, minimal documentation, which includes precise location, written description, video and photography, should be conducted and analyzed for potential significance and added to the DRTO Survey GIS Database and ASMIS. Systematic test excavation to evaluate buried anomalies should be second priority to documentation of exposed remains, although it should be conducted as soon as practical.

Full evaluation and documentation of sites determined potentially significant relative to the National Register for Historic Places criteria will be completed as areas are archeologically evaluated. An appropriate multiproperty National Register nomination will be completed. This nomination may be either a thematic, district or perhaps cultural landscape nomination. DRTO, ideally combined with Tortugas Banks, because of its many properties of potential national and international significance, should be evaluated for eligibility as a World Heritage Site upon acceptance of the multi-property National Register nomination.

II. Monitoring

Knowing resource condition and how it changes on a continuing basis is fundamental to the park's ability to manage its resources and perpetuate their integrity. A comprehensive monitoring plan, to which both natural and cultural specialists will contribute, will be developed tested and implemented. The proposed program will embrace a holistic approach, which includes both natural and cultural aspects so far as practical in a single set of protocols. The objective is to understand the nature and present condition of resources and how and why they change so as to direct management decisions and evaluate their success or failure.

Initially, identification of appropriate criteria such as integrity, potential significance, accessibility, and vulnerability will be developed to aid in establishing priorities for inclusion in the program on a site by site basis. Then, procedures will be developed that will minimally provide an index detailing which attributes will be monitored, set parameters for management decisions, and define which data will be collected for longitudinal study and evaluation.

The monitoring program will contain at least three principal components:

1) Annual basic site assessment of the sites prioritized by the criteria;
2) Event-driven assessments of impact from storms, hurricanes, vessel groundings, divers, ARPA violations, etc.;
3) Long-term detailed assessments to monitor site dynamics. Sites for this component will be selected upon the completion of the remote sensing survey and site evaluation of the current Inventory Program (section I).

The monitoring results can trigger a full multi-disciplinary site impact investigation based on specific indicators of changing site conditions. These indicators, developed as part of the monitoring program, may be site specific.

The monitoring program will be multidisciplinary, including both natural and cultural resource assessment components (e.g., coral growth rates and distribution). It will incorporate comprehensive baseline data and produce cumulative results. All data will be accessible in the DRTO Survey GIS Database and ASMIS and natural resource databases as appropriate.

III. Research

Research conducted within DRTO that contributes significantly to knowledge about park resources and is directed toward park management objectives will be promoted. Research will conform to the NPS Cultural Resource's Management Handbook and the Secretary of Interior's Standards and Guidelines in addition to regional and park specific policies.

All research conducted on archeological resources must be done under an approved research proposal and either a NPS Research permit or an Archeological Resources Protection Act permit. Activities having an affect or potential to affect cultural resources are governed by the National Environmental Policy (NEPA), the National Historic Preservation Act (NHPA), the Archeological Resources Protection Act (ARPA) and Antiquities Act of 1906 (AA).

The park research coordinator must receive proposals in written and electronic format. The proposal should consist of a clear purpose statement discussing the proposed research, research design and the relevance of the research to park goals, regional archeology and the mission of the NPS. In addition, the proposal should present discussions on theoretical frameworks and methodology and include a discussion on potential site impact that includes consideration of both natural and cultural effects. Proposals that incorporate sediment disturbance, collection of materials or any intervention must include compelling evidence as to why the proposed research is essential to significant research concerns and that the purpose of the research can only be achieved by utilizing park resources. A clear statement discussing requests for NPS support is to be presented. Any cooperative agreement, memoranda of understanding or memoranda of agreement should be established prior to proposal submission. Specific research products and a timetable for their submission and a vitae of the principal investigator (along with vita for senior project participants) should accompany proposals.

All student training, field schools and education-oriented research will be completely nondestructive, nonimpact and nonintrusive to both natural and cultural resources. Access will focus on sites already fully documented and results will be incorporated into the monitoring program (outlined in section II).

Review and evaluation of research proposals will follow standard NPS procedures. In addition, the park will request review by appropriate park scientific and management personnel, Southeast Archeological Center (SEAC), SRC, and two appropriate academic peer reviewers (one of which may be suggested by the researcher submitting the proposal). Upon proposal approval, specific permitting conditions will be specified. In addition to standard permitting conditions that detail data dissemination, a park-specific condition requires all electronically accessible data meet ASMIS and DRTO Survey GIS Database standards and format. The park and SEAC will receive copies of all original data, written, graphic and electronic, and publications that directly or indirectly result from research conducted under the proposal or permit. All field data, objects, specimens, samples, features and structures retrieved, along with associated records and reports will be managed within the park's museum collection.

For projects that entail no collections or intervention, a research permit will be issued. Projects impacting cultural resources (through sample and artifact collection, excavation, or any ground disturbing activities or other intervention) will require an ARPA/AA permit. The Southeast Regional Director signs all park ARPA permits.

If the research proposal is denied, the research coordinator may provide comments and suggestions for the principal investigator to incorporate into a revised research design.

The park research coordinator will determine the extent to which fieldwork will be monitored. The monitoring protocol will vary on a project-by-project basis according to planned activities.

If research is proposed within the boundaries of DRTO and in non-park service areas (such as areas under the jurisdiction of NOAA, other federal agencies, or the state of Florida), the agencies involved will coordinate review and evaluation of the proposal and collectively develop a monitoring program. The principal submitting the proposal is responsible for compliance with all agency-specific requirements.

IV. Education/Interpretation

Visitors and others interested in the submerged cultural resources of DRTO will be provided with access to high quality interpretation and opportunities to enhance appreciation of the specific archeological and historical values of the park's cultural resources in a wide historical context. The park will develop a list of sites that will be identified and interpreted to the public. Other cultural sites will not be identified to the public. Listed sites will have complete documentation and monitoring program in place. The exceptions are sites currently identified to the public. These sites should be priority for development of the monitoring program. Currently listed sites, for example the "Windjammer Site" and the "East Key Site" (both listed in the park brochure) should be priority for developing the monitoring program and as such serve as test cases for monitoring.

Additional sites that may be appropriate for opening to public access and interpretation will be considered. These sites should be fully evaluated for impact to the site and surrounding natural resources, and a monitoring program should be in place prior to identifying to the public.

Alternatives to direct access to submerged cultural and natural resources, such as through video, virtual environment and Internet technology will be developed. Specific considerations will be given to enhancing access and experience to the non-diving public and producing interpretive products accessible to all levels of

education that emphasize NPS goals and mission, site preservation and the cultural diversity of the park's maritime history.

The park will also develop an integrated regional interpretive approach to maritime history as represented by the archeological record within the natural environment of DRTO, Biscayne National Park, the Florida Keys National Marine Sanctuary and Florida parks. The park will develop formal partnerships where appropriate to enhance a regional approach to archeological investigations and public interpretation of their results.

V. Protection

Protection of natural and cultural resources is a park priority. Protection extends to the associated values of these resources in the broader ecosystem and cultural context. Specific enforcement protocols will be developed for archeologically sensitive areas. The park will consult with SEAC to develop a standardized ARPA response capability and procedures. The park will develop, evaluate and institute remote-sensing surveillance devices to enhance law enforcement efficiency. The park will also develop park-specific submerged cultural resource law enforcement training for park rangers that will be incorporated into law enforcement priorities and park patrol procedures. The park protection program will revise and institute appropriate partnerships with other agencies, organizations and individuals to enhance resource protection capabilities and effectiveness.

Scuba diving is encouraged in the park. The park will investigate and evaluate a permit system for scuba diving and determine whether it is a desirable management alternative. The park will encourage diving only in archeologically surveyed and evaluated areas and direct divers away from archeologically sensitive areas, where moorings are present or boat anchoring is allowed. Mooring buoys directing diving to specific natural resource locations will be placed so as to protect archeological sites in the vicinity. Buoys placed for access to archeological sites will be placed so as to protect natural resources in the vicinity.

Security of site location data in the park is to be maintained. The park will work to develop computer security procedures for access to site-specific data contained in the DRTO Survey GIS Database by appropriate personnel while ensuring site-location data security. Specific site-location data shall be treated as secure information regardless of source, whether electronic or analog, unless clearly already in the public domain.

APPENDIX I: METHODS FOR ASSESSING IMPACTS ON NATURAL RESOURCES

MAPPING ANALYSIS

Each of the management alternatives encompasses different areas and/or visitor use and access levels for the four management zones. A first step in evaluating the natural resource impacts of each alternative plan is to analyze the amount of area set aside for protection in conjunction with visitor carrying capacities (see table 1). The total area of each underwater habitat type by depth category is listed in table A2b (appendix G). Proportions of underwater habitat areas within research natural area zones are given in table A2c (appendix G).

One of the most important indicators of the health of the coral reef system is the diversity of the reef fish community. Diversity measures of all fishes and of the snapper-grouper-grunt complex, both within the park and for the entire Tortugas region, are given in table A6. The proportions of diversity protected by various research natural area zones are also given. Sustaining greater diversity of the reef fish community provides for a more pristine environment and greater attractiveness for viewing by visitors.

The sampling effort conducted during 1999 provides a good baseline understanding of reef fish spatial abundance and size patterns in the park. Statistical models were developed to describe relationships between species density and length distributions and habitat (Meester 2000). Average fish densities (numbers per unit area) within habitat types were multiplied by habitat areas to estimate spatial abundance for a given species. These spatial abundance maps were used as initial population values in the simulation model described below.

Spatial Population Simulation Model

The testing of alternative management plans with respect to fishing impacts for Dry Tortugas National Park requires the use of a spatially and temporally dynamic population simulation model. If spatial dynamics are not accounted for, the effective exploration of spatial and/or temporal alternatives is not allowed (Pelletier and Magal 1996). The model was designed and built in the C++ programming language to take advantage of its object-oriented capabilities. The resulting model is called the STOCaST (**S**patial and **T**emporal **O**bject-oriented **C**ohort-**ST**ructured) model, and is spatially composed of the subunit grid structure described in Meester (2000)**.** The population is composed of a length- and time-based cohort structure. The model incorporates functions for growth, aging, natural mortality, fishing mortality, fecundity (egg production), and animal movements.

The STOCaST model was used to simulate the impact of implementing the management alternatives on the snapper, grouper, and grunt reef fish populations (as well as hogfish) from Key West out to the Dry Tortugas (including the park and the Dry Tortugas Bank and Riley's Hump). These families of reef fish were chosen because they are the most sought-after reef fish by both the recreational and commercial fisheries. A total of 19 species were simulated, including groupers (rock hind, graysby, coney, red hind, black, scamp, yellowfin, yellowmouth, and red); snappers (mutton, gray, dog, lane, and yellowtail); and grunts (margate, tomtate, white, bluestriped; and hogfish). The population parameters for each of these species are taken from Ault et al. (1998) and Meester (2000).

The model was run 20 years into the future for each alternative to access the impact of implementing each alternative on spawning stock biomass (SSB), yield in weight, and egg production of the stocks. Spawning stock biomass is the biomass of all reproductively viable individuals in a stock, and egg production is the number of eggs produced by a stock in a year. The yield in weight is the total weight of the catch taken by the fishing activity. STOCaST assumes no stock-recruitment relationship, and therefore the results shown are to be considered minimal responses to the impact of implementing research natural area zones. Not enough is known about the true form of the stock-recruitment relationship for reef fish, and the inclusion of such a relationship in the model may produce overly optimistic results, depending on the form of the relationship chosen.

The results are shown in figures B7, B9, and B11 in the "Impacts on Natural Resources" section and allow for the evaluation of each alternative as to its impacts on the maintenance of sustainable reef fish stocks under exploitation and to the fishing activity operating in the Dry Tortugas region. The results are shown for the options described in figure B5 (appendix G), which shows the spatial extents and boundaries of NPS research natural areas and the sanctuary's ecological reserves for alternatives C, D, and E, and for alternative C without the sanctuary's reserve (alternative C1), which is not an alternative that is discussed in this document. Simulations of alternative plans that establish research natural areas (alternatives C, D, and E) presume that the research natural area would be

implemented in conjunction with the Florida Keys National Marine Sanctuary marine reserves in the adjacent waters of the Tortugas region. It is important to realize that the use of spatial closures (marine reserves, research natural areas, etc.) will not produce immediate results and will vary significantly by species according to the level of fishing pressure exerted on each and each species' movement characteristics and life span. Significant changes in population size and structure should be recognizable at approximately half the time of the species life span, and the results presented here are to be expected at one year less than the species life span. The endpoints (spawning stock biomass, yield in weight, and egg production) of the simulations are shown as a relative measure compared to alternative A, the status quo, which receives a value of 1.00. The fish are assumed to move in large home ranges, allowing for fish to cross boundaries between zones on a daily basis. Equilibrium conditions, which occur at one year past the life span of each species, are reached, and show what the comparative impacts of each alternative will be on the reef fish stock of interest.

Analytical Hierarchy Process (AHP) Model

The analytical hierarchy process (AHP) model is a method of breaking down a complex, unstructured situation into its component parts (Saaty 1986). These parts, or variables, are arranged into a hierarchical order, assigned numerical values using subjective judgments on the relative importance of each variable, and synthesized to determine which variables have the highest priorities and should be acted upon to influence the outcome of the situation (Saaty et al. 1994). AHP procedures allow resource managers to structure and execute hundreds of quantitative and qualitative assessments simultaneously to evaluate alternatives and rapidly calculate summary values (Schmoldt et al. 1994, Golden et al. 1989)). The analysis as to which management alternative provides the best protection for the park's resources is structured as an AHP model and analyzed using the Expert Choice decision support software (Forman and Saaty 1999).

The model is set up to determine the best alternative for meeting the park's objectives of sustaining a near-pristine environment. This is achieved by establishing a goal that the AHP model seeks to optimize with the following subcriteria: (1) maintain and protect natural ecological processes; (2) minimize human impacts; (3) establish monitoring system; and (4) provide management and research direction. This goal is assessed by determining the impact of each management alternative on criteria within four major categories: (1) essential and unique habitats, (2) fisheries resources, (3) wildlife, and (4) environmental setting. See table A4 for all criteria assessed within each of these four categories. Each of these criteria may be impacted by a variety of invasive human uses (table A5), and several matrices are established that describe the impact of each invasive use on each criterion. Multiplying these matrices provides the relative risk associated with each use and the framework for determining long-term impacts on the resources of the park. The AHP model framework is given in table A7.

The hierarchical structure employed in this approach is flexible and can be modified to incorporate dynamic circumstances or opinions of differing experts. Comparative analyses were guided by information from the literature and ongoing studies, integrating the primary factors reflecting environmental impact, and allowing the ranking of various policy alternatives. The overall model results are shown in figure B13. Sensitivity analyses (performance-type) were employed to evaluate the effects of differing weighting schemes upon model outcomes. These analytic processes are iterative. The model structures, data matrices, and their decision outcomes will evolve with increasing insight into the complex biological and socioeconomic attributes of the park's system.

TABLE A6: PERCENT OF REEF FISH DIVERSITY (TOTAL FISHES AND FISHES IN THE SNAPPER-GROUPER-GRUNT COMPLEX) PROTECTED BY A RESEARCH NATURAL AREA ZONE FOR DIFFERENT MANAGEMENT ALTERNATIVES. Tortugas region values for alternatives D and E presume that the research natural area zone within the park would be implemented in conjunction with an research natural area/ecological reserve for the Florida Keys National Marine Sanctuary's surrounding waters.

	Total Number of Species	Case 1: Alternatives A & B	Case 2: Alternative C without a sanctuary ecological reserve	Case 3: Alternative C with a sanctuary ecological reserve	Case 4: Alternative D	Case 5: Alternative E
Reef Fish Community						
Tortugas region	194	0.0	63.9	83.0	81.4	87.6
Park only	141	0.0	87.9	87.9	80.1	100.0
Snapper-Grouper-Grunt						
Tortugas region	35	0.0	77.1	94.3	82.9	94.3
Park only	28	0.0	96.4	96.4	78.6	100.0

TABLE A4: SUMMARY OF THE PARK'S AFFECTED NATURAL RESOURCES

(1) Essential and Unique Habitats corals and coral reefs, hardbottoms, sea grasses, sand islands	**(2) Fishery Resources** exploited reef fish (snapper-grouper-grunt complex), exploited macroinvertebrates, unexploited reef resources, sharks and rays, pelagic species, baitfish, protected/endangered species
(3) Wildlife Resources nesting birds, other migratory birds, sea turtles, marine mammals	**(4) Environmental Setting** Soundscape, night-time lighting, water quality/pollution

TABLE A5: SUMMARY OF INVASIVE HUMAN USES THAT MIGHT IMPACT PARK'S NATURAL RESOURCES

Boating Groundings (contact damage, fuel spills, etc.) and propeller damage Anchoring Sewage and trash dumping, fuel leaks Scuba diving, snorkeling, swimming Fishing	Hiking, walking Camping, picnicking Wildlife watching, photography (from land, sea or air) Seaplanes, aircraft Facilities, lighting

TABLE A7: AHP MODEL STRUCTURE FOR THE PARK'S AFFECTED NATURAL RESOURCES

		Symbol		Symbol
GOAL:	**Define a preferred alternative for the national park**			
	(1) maintain and protect natural ecological processes			
	(2) minimize human impacts.			
	(3) establish monitoring system and identify threats.			
	(4) provide management and research direction.			
CRITERIA:	**Natural Resource Conditions:**		**Level 2 Sub-Criteria:**	
(1) Fishery Resources:		**fishery**		
	(a) exploited groupers	groupers	(1a) spawning stock biomass	ssb
	(b) exploited snappers	snappers	(1b) yield in weight	Y_w
	(c) exploited grunts	grunts	(1c) stock egg production	eggs
	(d) exploited macroinvertebrates (shrimp, lobster, conch)	exp_mi	(1d) average size	Lbar
	(e) unexploited reef fish resources (herbivores-butterfly fish, damselfish, invertebrates, etc.)	unexp_rf		
	(f) sharks and rays	sharks		
	(g) pelagics (kingfish, mackerel, dolphinfish, billfish, tunas, etc.)	exp_pel		
	(h) baitfish	baitfish		
	(i) exceptional and protected resources (e.g., jewfish)	protect		
(2) Essential & Unique Habitats:		**habitats**		
	(a) corals and coral reefs (gorgonions, sponges)	corals	(2a) percent cover and abundance	%cover
	(b) hardbottoms (soft corals, sponges and algae)	hardbot	(2c) diversity	diversit
	(c) seagrasses	seagrass		
	(d) sand	sand		
	(e) islands (7 of coral and sand)	islands		
(3) Wildlife Resources:		**wildlife**		
	(a) nesting birds (sooty and noddy terns, frigate birds)	birds_ne	(3a) nests and pairs	nests
	(b) other migratory birds	birds_mi	(3b) animal abundance	abund
	(c) marine turtles (green and loggerhead turtles)	turtles		
	(d) marine mammals	mar_mam		
	(g) exceptional resources (e.g., Loggerhead Forest)	wild_er		
	(h) endangered/threatened resources	wild_end		
(4) Other Natural Environments:		**environs**		
	(a) Natural Soundscape:	sound		
	(b) Night-time Lighting:	lights		
	(c) Water Quality:	wq		

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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