

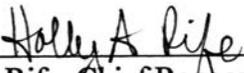


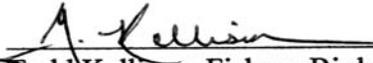
Biscayne National Park

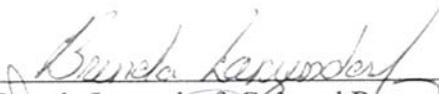
**Fire Management Plan
2004**

2004 Fire Management Plan
Biscayne National Park
Florida

Prepared by:  Date: 3-30-04
Robin Toole, Fire Planner, SERO

Reviewed by:  Date: 4/15/04
Holly Rife, Chief Ranger, BISC

Reviewed by:  Date: 7.20.04
Todd Kellison, Fishery Biologist, BISC

Reviewed by:  Date: 4/23/04
Brenda Lazandorf, Cultural Resources Program Manager, BISC

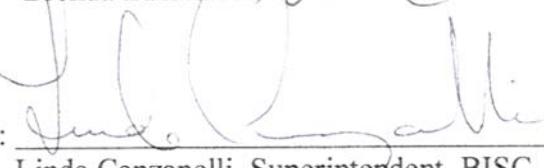
Approved by:  Date: 4/23/04
Linda Canzanelli, Superintendent, BISC

TABLE OF CONTENTS

1.0 <u>INTRODUCTION</u>	1
1.1 Reason for Development of Fire Management Plan	1
1.2 Collaborative Processes.....	1
1.3 Implementation of Fire Management Policy	1
1.3.1 2001 Federal Fire Policy	2
1.3.2 Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems—A Cohesive Strategy	3
1.3.3 A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan	4
1.4 Environmental Compliance.....	4
1.5 Authorities for Implementing Fire Management Plan.....	5
2.0 <u>RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY</u>	5
2.1 Federal Fire Management Policy.....	5
2.2 Establishment of Biscayne National Park	5
2.3 General Management Plan (GMP) Objectives	8
2.4 Resource Management Plan (RMP) Objectives	10
2.5 How Fire Management Plan Supports GMP and RMP Objectives.....	10
3.0 <u>WILDLAND FIRE MANAGEMENT STRATEGIES</u>	11
3.1 General Management Considerations.....	11
3.2 Wildland Fire Management Goals.....	11
3.3 Scope of Wildland Fire Management Elements to be Implemented	12
3.3.1 Wildland Fire Suppression	12
3.3.2 Non-Fire Applications	12
3.4 Park Description	12
3.4.1 Physical and Biotic Characteristics	12
3.4.1.1 Real Property.....	12
3.4.1.2 Soils	12
3.4.1.3 Air Quality.....	13
3.4.1.4 Water Quality	13
3.4.1.5 Floodplains and Wetlands	14
3.4.1.6 Vegetation	14
3.4.1.7 Wildlife and Aquatic Resources.....	16
3.4.1.8 Threatened and Endangered Species	18
3.4.1.9 Cultural and Historic Resources.....	19
3.4.2 Management Considerations	23
3.4.3 Past Role of Fire.....	24
3.4.4 Wildland Fire Management Situation	25
3.4.4.1 Historical Weather Analysis.....	25
3.4.4.2 Fire Season	25
3.4.4.3 Fuel Characteristics and Fire Behavior	25
3.4.4.4 Fire Regime Alteration.....	27
3.4.4.5 Control Problems and Dominant Topographic Features	28

3.4.5	Fire Management Units (FMUs)	28
3.4.5.1	FMU #1: Mainland/Convoy Point	28
3.4.5.1.1	Specific Fire Management Objectives	28
3.4.5.1.2	Fuel Characteristics/Fire Behavior	29
3.4.5.2	FMU #2: Keys with Park Staff/Visitor Facilities	29
3.4.5.2.1	Specific Fire Management Objectives	29
3.4.5.2.2	Fuel Characteristics/Fire Behavior	29
3.4.5.2	FMU #3: Remaining Keys	29
3.4.5.2.1	Specific Fire Management Objectives	29
3.4.5.2.2	Fuel Characteristics/Fire Behavior	30
3.4.6	Values to Protect, Manage, or at Risk	30
4.0	<u>WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS</u>	33
4.1	General Implementation Procedures	33
4.2	Wildland Fire Suppression	33
4.2.1	Range of Potential Fire Behavior	33
4.2.2	Preparedness Actions	33
4.2.2.1	Fire Prevention Activities	34
4.2.2.2	Annual Training Needs of Fire Staff	34
4.2.2.3	Annual Equipment and Supply Readiness Procedures	34
4.2.2.4	Fire Weather and Fire Danger	35
4.2.2.4.1	Weather Station	35
4.2.2.4.2	National Fire Danger Rating System	35
4.2.2.4.2.1	Burning Index	35
4.2.2.4.2.2	Keetch-Byram Drought Index (KBDI)	35
4.2.2.5	Step-Up Staffing Plan	35
4.2.3	Pre-Attack Plan	36
4.2.4	Initial Attack	36
4.2.4.1	Information Used to Set Initial Attack Priorities	36
4.2.4.2	Criteria for Appropriate Initial Attack Response	36
4.2.4.3	Confinement as an Initial Attack Suppression Strategy	37
4.2.4.4	Typical Fire Response Time	37
4.2.4.5	Restrictions and Special Concerns	37
4.2.4.6	Work/Rest Guidelines, Rest and Recuperation	37
4.2.5	Extended Attack and Large Fire Suppression	38
4.2.5.1	Determination of Extended Attack Needs	38
4.2.5.2	Implementation Plan Requirements—WFSA Development	38
4.2.5.3	Complexity Decision Process from Initial to Extended Attack	38
4.2.5.4	Incident Commander Delegation of Authority	38
4.2.6	Exceeding Existing WFIP, Selecting New Strategy	38
4.2.7	Minimum Impact Suppression Tactics	39
4.2.8	Rehabilitation Guidelines and Procedures	39
4.2.9	Reporting and Documentation	39
4.3	Non-Fire Fuel Treatment Applications	40
4.4	Debris Disposal	40
4.5	Emergency Rehabilitation and Restoration	41

5.0	<u>ORGANIZATIONAL AND BUDGETARY PARAMETERS</u>	41
5.1	Fire Management Team Member Responsibilities.....	41
5.2	FIREPRO Funding	43
5.3	Organizational Structure of Fire Management Program	44
5.4	Interagency Coordination	44
5.5	Interagency Contacts	44
5.6	Fire-Related Agreements.....	44
6.0	<u>MONITORING</u>	44
6.1	NPS Fire Monitoring Handbook	44
6.2	Recommended Standard Monitoring Levels	45
6.3	Wildland Fire Monitoring	45
7.0	<u>FIRE RESEARCH</u>	45
8.0	<u>FIREFIGHTER AND PUBLIC SAFETY</u>	46
8.1	Firefighter Safety and Related Training, Qualifications, and Fitness Standards.....	46
8.2	Public Safety Issues/Concerns, and Mitigation Procedures	47
9.0	<u>PUBLIC INFORMATION AND EDUCATION</u>	47
10.0	<u>PROTECTION OF SENSITIVE RESOURCES</u>	47
10.1	Archeological/Cultural/Historic Resources.....	47
10.2	Natural Resources.....	48
10.3	Development/Infrastructure/Inholdings	48
11.0	<u>FIRE CRITIQUES AND ANNUAL PLAN REVIEW</u>	49
11.1	Critiques	49
11.2	Annual Plan Review	50
12.0	<u>CONSULTATION AND COORDINATION</u>	50
13.0	<u>APPENDICES</u>	
13.1	References Cited	
13.2	Definitions of Fire Management Terms	
13.3	Species Lists	
13.4	NEPA Compliance	
13.5	Fire Call-Up List	
13.6	Memoranda of Understanding	
13.7	Limited Delegation of Authority	
13.8	Fire Management Program Organizational Chart	
13.9	Wildland Fire Monitoring Plan	
13.10	Wildland Fire Prevention Plan	

LIST OF TABLES

Table 1: BISC List of Classified Structures (LCS) 20
Table 2: Park ASMIS List 21
Table 3: Climatic Record for Miami, Florida..... 25
Table 4: Historic Fire Weather Parameters for BISC Fire Season 26
Table 5: Potential Fire Behavior Under Average and Extreme Conditions 26
Table 6: Critical Weather Parameters Resulting in Need for Indirect Attack 27
Table 7: Management Strategies and Recommended Standard (RS) Monitoring Levels 45

LIST OF FIGURES

Figure 1: General Location Map6
Figure 2: BISC Administrative Map 7
Figure 3: Park Fire Management Units 32

1.0 INTRODUCTION

1.1 Reason for Development of Fire Management Plan

National Park Service (NPS) policy (*Director's Order #18: Wildland Fire Management*, website <http://www.fire.nps.gov/fire/policy/do18/do18.htm>) requires that every park unit with burnable vegetation develop a Fire Management Plan (FMP) approved by the park superintendent. The FMP serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with the unit's resource management objectives. This plan outlines the fire management program at Biscayne National Park (hereinafter referred to as either the "park" or by NPS alpha code "BISC"). The BISC fire management program, guided by federal policy and the park's resource management objectives, will serve to protect life, property, and natural and cultural resources.

This Fire Management Plan pertains specifically to the terrestrial portions of BISC, including the mainland/Convoy Point, and the 42 islands/keys within park boundaries. Structural fires at these sites or at Stiltsville will be addressed in a structural fire plan, in accordance with Director's Order #58.

1.2 Collaborative Processes

In addition to administering BISC, the National Park Service collaborates with the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Customs, U.S. Border Patrol, U.S. Immigration Service, U.S. Army Corps of Engineers, U.S. Coast Guard, the Federal Bureau of Investigation, the National Oceanic and Atmospheric Administration, the Florida Department of Environmental Resources Management, the State Historic Preservation Office, the Florida Fish and Wildlife Conservation Commission, the South Florida Water Management District, the Florida Department of Environmental Protection, the Dade County Department of Environmental Protection, the Florida Department of Law Enforcement, Miami-Dade Police Department, Homestead Police Department, Coral Gables Police Department, Miami-Dade Air Rescue, John Pennekamp Coral Reef State Park, the Biscayne Bay Citizens for South Florida, local universities and colleges, community and business leaders, and park neighbors.

Collaborative opportunities pertaining to fire management at BISC include coordination with nearby Everglades National Park, the Florida Division of Forestry, Miami-Dade Fire Rescue, and local law enforcement.

1.3 Implementation of Fire Management Policy

The organizational structure of this FMP follows the outline furnished in chapter 4 of *Wildland Fire Management Reference Manual-18* (version 3.0, 11/05/02), hereinafter referred to as *RM-18* (website <http://www.fire.nps.gov/fire/policy/rm18/index.htm>). This FMP will guide the park in implementing federal fire management policy and resource and fire management goals as defined in the *2001 Federal Fire Policy; Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire-Adapted Ecosystems—A*

Cohesive Strategy; and A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

1.3.1 2001 Federal Fire Policy

The 1994 fire season with its 34 fatalities triggered a series of reports under the rubric FIRE 21, including the *1995 Federal Wildland Fire Management Policy and Program Review*. This review, the first comprehensive federal fire policy for the Departments of Agriculture and the Interior, provided direction for fire management programs and activities, including such areas as safety, protection priorities, preparedness, suppression, wildland fire use, prevention, and wildland-urban interface roles and responsibilities. Following the escape of the Cerro Grande Prescribed Fire in May 2000, the *1995 Federal Fire Policy* was evaluated and revised in the *2001 Review and Update of the 1995 Federal Wildland Fire Management Policy (2001 Federal Fire Policy)*. The *2001 Federal Fire Policy* finds no fundamental flaws in the 1995 document. It builds on the *1995 Federal Fire Policy*, and addresses issues not fully covered in 1995, including rehabilitation and restoration of burned lands, the importance of sound science driving fire management activities, and the need for the full range of fire management activities to achieve ecosystem sustainability.

The *2001 Federal Fire Policy* states that “...successful implementation of 2001 Federal Fire Policy depends on the development and implementation of high-quality Fire Management Plans by all land managing agencies.” The policy is founded on the following guiding principles:

1. Firefighter and public safety is the first priority in every fire management activity.
2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
3. Fire management plans, programs, and activities support general and resource management plans and their implementation.
4. Sound risk management is a foundation for all fire management activities.
5. Fire management programs and activities are economically viable, based upon values to be protected, costs, and general and resource management objectives.
6. Fire management plans and activities are based upon the best available science.
7. Fire management plans and activities incorporate public health and environmental quality considerations.
8. Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.
9. Standardization of policies and procedures among Federal agencies is an ongoing objective.

1.3.2 Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems—A Cohesive Strategy

The *Cohesive Strategy* was developed by the USDA National Forest Service, the US Department of the Interior, and the National Association of State Foresters, in response to the 2000 fire season, during which more than 6.8 million acres of public and private lands burned—more than twice the 10-year national average. The magnitude of these fires was attributed to severe drought, accompanied by a series of storms that produced thousands of lightning strikes followed by windy conditions; and the long-term effects of almost a century of aggressively suppressing all wildfires, resulting in an unnatural buildup of brush and small trees throughout forests and rangelands. The *Cohesive Strategy* provides an overall framework for implementing fire management and forest health programs. It is based upon the following operating principles:

- ❑ **Firefighting Readiness:** Increase firefighting capability and capacity for initial attack, extended attack, and large fire support that will reduce the number of small fires becoming large, to better protect natural resources, to reduce the threat to adjacent communities, and reduce the cost of large fire suppression.
- ❑ **Prevention Through Education:** Assist state and local partners to take actions to reduce fire risk to homes and private property through programs such as FIREWISE.
- ❑ **Rehabilitation:** Focus rehabilitation efforts on restoring watershed function, including the protection of basic soil, water resources, biological communities, and prevention of invasive species.
- ❑ **Hazardous Fuel Reduction:** Assign highest priority for hazardous fuels reduction to communities at risk, readily accessible municipal watersheds, threatened and endangered species habitat, and other important local features, where conditions favor uncharacteristically intense fires.
- ❑ **Restoration:** Restore healthy, diverse, and resilient ecological systems to minimize uncharacteristically intense fires on a priority watershed basis. Methods will include removal of excessive vegetation and dead fuels through thinning, prescribed fire, and other treatment methods.
- ❑ **Collaborative Stewardship:** Focus on achieving the desired future condition on the land in collaboration with communities, interest groups, and state and federal agencies. Streamline process, maximize effectiveness, use an ecologically conservative approach, and minimize controversy in accomplishing restoration projects.
- ❑ **Monitoring:** Monitor to evaluate the effectiveness of various treatments to reduce unnaturally intense fires while restoring forest ecosystem health and watershed function.

- Jobs: Encourage new stewardship industries and collaborate with local people, volunteers, Youth Conservation Corps members, service organizations, and Forest Service work crews, as appropriate.
- Applied Research and Technology Transfer: Focus research on the long-term effectiveness of different restoration and rehabilitation methods to determine those methods most effective in protecting and restoring watershed function and forest health. Seek new uses and markets for byproducts of restoration.

1.3.3 A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan

In August, 2001, the Secretaries of Agriculture and the Interior joined the Western Governor’s Association, National Association of State Foresters, National Association of Counties, and the Intertribal Timber Council to endorse *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy*. This report marked the initial fulfillment of two key Congressional directives that:

- The Secretaries of the Interior and Agriculture and the Governors jointly develop a long-term national strategy to address the wildland fire and hazardous fuels situation and the needs for habitat restoration and rehabilitation; and
- The strategy should be developed with “close collaboration among citizens and governments at all levels.”

The four goals of the *10-Year Comprehensive Strategy* are:

1. Improve fire prevention and suppression
2. Reduce hazardous fuels
3. Restore Fire-Adapted Ecosystems
4. Promote community assistance

Its three guiding principles are:

1. Priority setting that emphasizes the protection of communities and other high-priority watersheds at risk
2. Collaboration among governments and broadly representative stakeholders
3. Accountability through performance measures and monitoring for results

1.4 Environmental Compliance

In association with this plan, an Environmental Assessment that meets the requirements of the National Environmental Policy Act, including compliance with Section 106 of the National Historic Preservation Act and with Section 7 of the Endangered Species Act, is included as Appendix 13.4.

1.5 Authorities for Implementing Fire Management Plan

Authority for fire management at the park originates with the Organic Act of 1916. The Organic Act established the National Park Service “to promote and regulate the use of the Federal areas known as national parks, . . . which purpose is 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 generations.”

The 1978 “Redwood amendment” to the General Authorities Act of 1970 expands upon the provisions of the Organic Act, stating that, “. . . the protection, management, and administration of these [Park Service] 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. . . .”

As an NPS fire management program by design tiers to the respective park unit’s general and resource management objectives, fire management is an effective way of implementing the above legislation.

2.0 RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

2.1 Federal Fire Management Policy

The *2001 Federal Fire Policy*, discussed in section 1.3.1, is the product of a collaborative effort involving the U.S. Department of the Interior, the U.S. Department of Agriculture, the Department of Energy, the Department of Defense, the Department of Commerce, the U.S. Environmental Protection Agency, the Federal Emergency Management Agency, and the National Association of State Foresters. The report recognizes the role that fire plays as a critical natural process, as well as the detrimental effects of its absence in fire-adapted ecosystems.

2.2 Establishment of Biscayne National Park

The National Park System consists of more than 380 units representing our country’s finest natural and cultural assets. Biscayne National Monument was established in 1968 by Congress (Public Law 90-606) “to preserve and protect for the education, inspiration, recreation and enjoyment of present and future generations a rare combination of terrestrial, marine, and amphibious life in a tropical setting of great natural beauty.” The monument was expanded in 1974 (Public Law 93-477) and again in 1980 (Public Law 96-287), when it was redesignated Biscayne National Park. The 1980 expansion included approximately 66,500 acres of water, 4,500 acres of mainland shoreline, and 49 acres of keys, bringing the park’s gross acreage to 172,924 acres. With 95 percent of these acres covered by water, BISC is the largest marine park in the National Park System.

In both the 1968 and 1980 enabling legislation, Congress recognized “the unique and special values” of the resources within BISC, as well as the “. . . vulnerability of these resources to destruction or damage due to easy human access by water, as well as the pollutant transmission ability of the water medium.” Congress therefore directed the National Park Service to “Manage

this area in a positive and scientific way in order to protect the area’s natural and historic resource integrity” (House Report 96-693).

Resource-based recreation is an important part of the park’s mission. The park was used by more than 442,000 visitors in 1999 (<http://www.nps.gov/bics>). While boating is the most visible activity within the park, other recreational activities include snorkeling, diving, fishing, camping, picnicking, and hiking on nature trails. The park provides excellent opportunities for the public to learn about marine ecosystems and the fragile, threatened nature of Biscayne Bay. The park also offers outstanding opportunities for scientific research due to the diversity, complexity and inter-relatedness of its natural and cultural resources and provides a dynamic laboratory for study and learning.

Figure 1 - Biscayne National Park Location

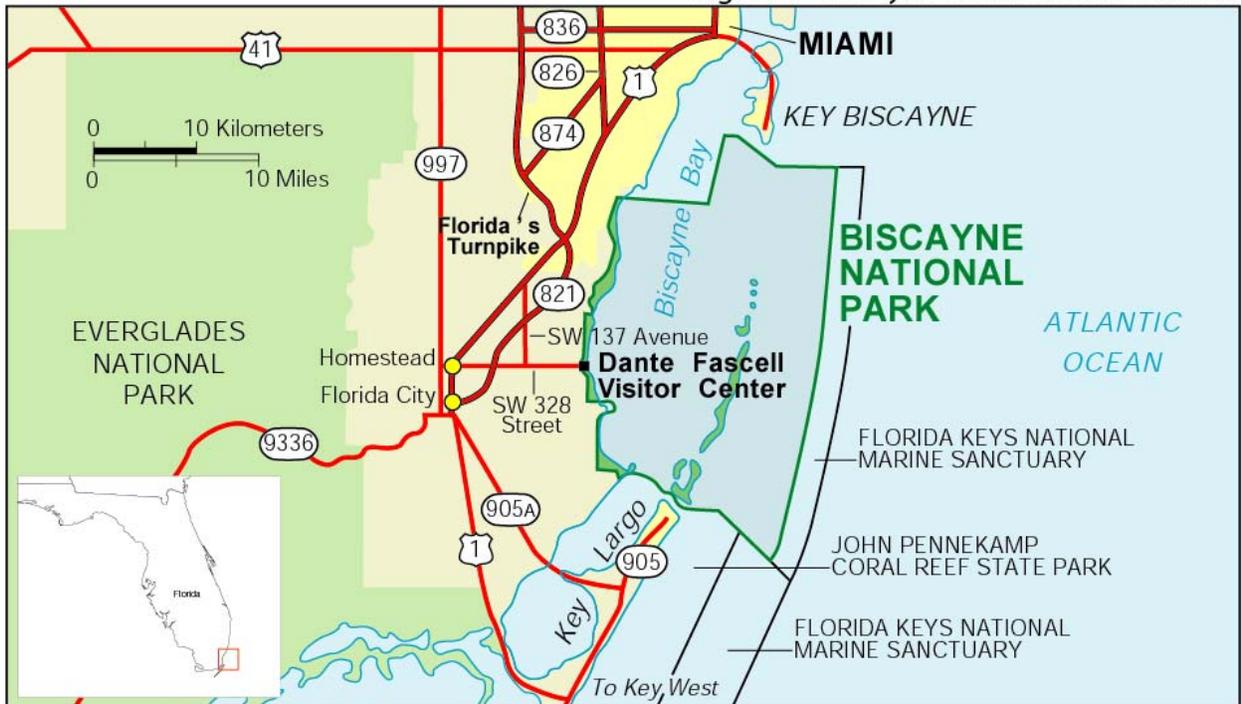
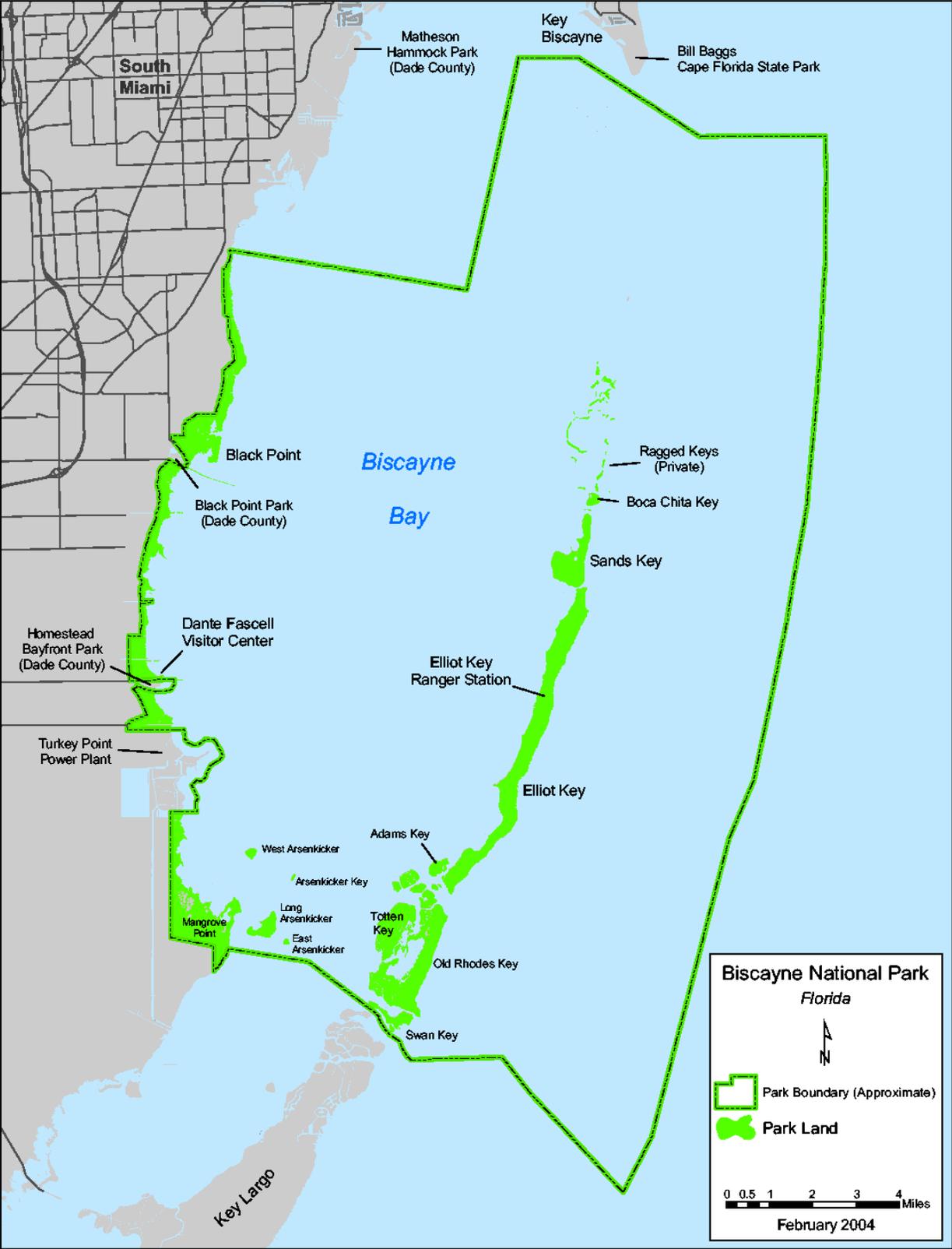


Figure 2 - Biscayne National Park



2.3 General Management Plan Objectives

A 1983 General Management Plan/Development Concept Plan/Wilderness Study and Environmental Assessment (GMP/EA) was developed in order to provide guidance for the preservation, use, development, and operation of the park, as well as to evaluate the suitability of park lands for wilderness designation under the Wilderness Act. As per the GMP/EA, the park's management objectives include the following:

- ❑ To manage the park's natural resources in a positive and scientific manner so as to protect, to the greatest degree possible, the complex and interrelated biological and geological processes.
- ❑ To identify, evaluate, and preserve cultural resources in accordance with legislative and executive requirements and NPS policy.
- ❑ To encourage and participate in natural and social scientific research for the purposes of developing adequate baseline data and monitoring changes in park resources.
- ❑ To cooperate with the State of Florida, Dade County, and other appropriate local and federal agencies, citizens' organizations, and quasi-public agencies to ensure the maximum protection of park resources and scenic values....

The GMP divides BISC into four planning units—the mainland, the bay, the barrier system, and the reef tract—based on their particular resources characteristics and opportunities for compatible uses. A description of each planning unit follows, with management objectives as per the GMP.

- ❑ Mainland Unit: Along the mainland shoreline of Biscayne Bay is one of the longest continuous stretches of mangrove forest left on Florida's east coast. Mangroves are critically important to the park's health, filtering out pollutants while contributing valuable nutrients to the bay. The mainland unit provides wildlife habitat, including important bird rookeries, and is also critical to various marine populations. Apart from the headquarters facility at Convoy Point and marinas at Homestead Bayfront County Park and Black Point County Park, drainage canals constitute the only development presently penetrating the mangrove shoreline within the park.

The management objective for this unit is to preserve it in its natural state (except for the existing headquarters site at Convoy Point) and to help visitors understand the important ecological role served by the virtually unbroken mangrove shoreline.

- ❑ Bay Unit: Biscayne Bay is a broad, shallow estuary where freshwater from the land mixes with saltwater from the sea. The bay serves as a nursery for infant and juvenile marine life, and the rich biotic community supports an important commercial and sport fishery. Within the clear waters of the bay, dense beds of turtle grass and patches of algae, sponges, and soft coral nurture a diverse collection of other marine and estuarine life. The bay's water is relatively clean in spite of the constant threat of pollution from mainland industrial,

agricultural, and urban sources. Shipping plies the center of the bay along the Intracoastal Waterway, and the sheltered water provides a wide range of recreational uses, including sailing, motorboating, waterskiing, swimming, snorkeling, and fishing.

The management objective for this unit is to allow established recreational and commercial activities to continue with controls necessary to guarantee the protection of marine species, water quality, bay-bottom communities, and visitor safety.

- Barrier System: This unit consists of a chain of 42 islands/keys, which (with the exception of the Arsenicker keys) forms a natural north-south barrier between the ocean to the east, and the shallow waters of Biscayne Bay to the west. Elliott Key, the largest of these islands, is considered the first of the true Florida Keys. It, and the keys to its south, are the remains of coral reefs that formed when ocean waters were much higher than they are today. The islands to the north of Elliott Key, from Sands Key to Soldier Key, are considered “transitional” islands, sharing features of both the hard rock coral keys to the south and the sand barrier islands to the north. The mudflats and tidal channels of a shallow area known as the “Safety Valve” constitute a distinct transition between the Atlantic Ocean and Biscayne Bay. The keys contain various habitats including hardwood hammocks, mangrove wetlands, sandy beaches, and rocky intertidal areas.

Before Europeans found this area, the Tequesta people had hunting and fishing camps located on these islands, satellite camps of the main settlement located at the mouth of the Miami River (downtown Miami today). Later, homesteaders farmed, fished, and salvaged ships which foundered on the nearby coral reefs. Weekend retreats were built on Boca Chita Key and Adams Key, two of the three park keys which have facilities for visitors today.

The management objective for this unit is to retain its natural character, providing the opportunity for visitors to explore undeveloped subtropical keys and the waterways winding through them, and to use the existing developed areas to provide support facilities for the park’s major interpretive messages and basic visitor services.

- Reef Tract: The warm waters of the shallow sea beyond the barrier system foster living coral and many other forms of colorful life that find shelter and food among the coral communities. Algae and other plants growing in and around the reef provide an important food source for fish, shrimp, crabs, and a myriad of other animals. BISC includes the northernmost living patch reefs of the United States, as well as shoal reefs that parallel the park’s eastern boundary. Remains of sunken ships are scattered throughout the reef tract.

The management objective for this unit is to preserve its cultural and natural resources and to provide a meaningful and safe surface and underwater experience for visitors.

The wilderness study determined that four areas of BISC—the Arsenicker Keys, the keys and creeks south of Caesar Creek, the undeveloped portions of Elliot Key, and Sands Key—were possibly eligible for wilderness designation. However, due to the limited sizes of these areas and the obtrusiveness of surrounding land and water uses, no wilderness designation was proposed.

An amended General Management Plan (GMP) is currently under development for the park. The Fire Management Plan will be revised as appropriate to incorporate any new management direction provided by this GMP.

2.4 Resource Management Plan Objectives

The park's 1995 Resource Management Plan includes the following goals and objectives:

- Goal: Maintain and improve water quality.
 - Objective: Address/mitigate for presence of contaminants.
- Goal: Protect and preserve natural resources of park and adjacent areas.
 - Objective: Address external threats to park resources.
 - Objective: Restore critical habitat.
- Goal: Develop a better understanding of the park's resources, the interrelationships among the various components, and the requirements for their management.
 - Objective: Data management.
 - Objective: Document trends in biological populations.
- Goal: Protect and preserve cultural resources.
 - Objective: Protect upland archeological sites.
 - Objective: Catalogue/archive artifacts.
- Goal: Conduct park operations within NPS guidelines.

2.5 How Fire Management Plan Supports General and Resource Management Plan Objectives

Principle #3 of the *2001 Federal Fire Policy* states that “fire management plans, programs, and activities [will] support general and resource management plans and their implementation.” This Fire Management Plan serves as a detailed and comprehensive program of action to implement federal fire management policy principles and goals, which in turn support the park's general and resource management plan objectives, as well as its enabling legislation. Specifically:

- Wildland fire suppression will serve to protect human life, property, and natural and cultural resources from the adverse effects of unwanted fire.

- ❑ Mechanically maintaining existing defensible space around all park buildings will serve to protect them in the event of a wildland fire.

3.0 WILDLAND FIRE MANAGEMENT STRATEGIES

3.1 General Management Considerations

The park's fire management goals, which follow, incorporate BISC's overall management objectives as well as previously-discussed federal fire management policy principles and goals, including firefighter and public safety, collaboration, and accountability.

3.2 Wildland Fire Management Goals

Fire management goals at BISC are:

- ❑ Suppress all wildland fire in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.
- ❑ Use non-fire applications to maintain existing defensible space around all park buildings.
- ❑ Manage all wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximizing efficiency via intra- and interagency coordination and cooperation.
- ❑ Maintain existing and develop new agreements with federal, state and local agencies in order to facilitate close working relationships and mutual cooperation regarding fire management activities.
- ❑ Develop and conduct a monitoring program with recommended standard monitoring levels commensurate with the scope of the fire management program, and use the information gained to continually evaluate and improve the fire management program.
- ❑ Integrate knowledge gained through natural resource research into future fire management decisions and actions.
- ❑ Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective fire management program.
- ❑ Plan and conduct all fire management activities in accordance with all applicable laws, policies and regulations.
- ❑ Incorporate the minimum impact suppression tactics policy into all suppression activities, to the greatest extent feasible and appropriate.

3.3 Scope of Wildland Fire Management Elements to be Implemented

BISC will implement a combination of wildland fire suppression and non-fire applications. As the ecosystem at BISC is not fire-maintained, prescribed fire will not be used.

3.3.1 Wildland Fire Suppression

A wildland fire is defined as any nonstructural fire, other than prescribed fire, that occurs in the wildland. All wildland fires at BISC, regardless of origin, will be suppressed.

3.3.2 Non-Fire Applications

BISC will use non-fire applications (mechanical techniques) to maintain existing defensible space around all park buildings.

3.4 Park Description

BISC has been divided into three fire management units (FMUs) to facilitate the achievement of fire management objectives. A description of the general physical and biotic characteristics of the park, below, is followed by descriptions of the FMUs.

3.4.1 Physical and Biotic Characteristics

3.4.1.1 Real Property

Biscayne National Park contains 172,924 gross acres. It is located to the south of the City of Miami, in Miami-Dade County, Florida. The park is about 22 miles long, with its northern boundary near Key Biscayne and its southern boundary near Key Largo. The park's western boundary is roughly defined by the landward extent of a mature red mangrove forest that forms a narrow band, 100-2,000 feet wide, along the western shoreline of Biscayne Bay. The park's eastern boundary follows the 60-foot-depth contour, for an approximate width of 14 miles. Biscayne is primarily a marine park, with 95 percent of its area submerged within either the shallow Biscayne Bay or the more turbulent waters of the Hawk Channel and the Florida Straits.

The terrestrial portion of the park, totaling 9,075 acres, includes 4,825 acres of largely undeveloped mangrove shoreline on the park mainland, and 4,250 acres scattered across 42 islands/keys. The only overland access to the park is at the Convoy Point Visitor Center via Southwest 328th Street (North Canal Drive).

3.4.1.2 Soils

The mangrove wetlands at the park are underlain by peat. As per website http://www.co.miami-dade.fl.us/derm/Ecosystems/coastal_wetlands.asp#mangrove, the flux of water within mangrove wetlands moves nutrients around and carries away dead material, making it available as food for marine life. As mangroves die, their root systems and litter become peat.

The upper Florida Keys, from Soldier Key (within the northern portion of BISC) south to Big Pine Key, are the remains of a shallow coral patch reef that thrived one hundred thousand or more years ago, during the Pleistocene epoch. The ocean level subsided during the following glacial period, exposing the coral to die in the air and sunlight, forming limestone bedrock. The sand that accumulated above the water surface on this limestone bedrock became the home for drifting seeds of beach plants. As the seeds grew and developed, their roots stabilized the soil, allowing the development of coastal strand and hardwood hammock communities. These areas maintain a fine balance between accretionary and degradational processes, as soils tend to be shallow (with few exceptions, less than 20 cm deep) and organic turnover rates are extremely rapid. For production to be sustained, nutrient cycling must be very efficient, with little leaching beyond the rooting zone (http://www.fiu.edu/~serp1/eco/eco/tree_island_research.htm).

3.4.1.3 Air Quality

The region of south Florida including the park is designated a class II air shed under the 1977 amendments to the Clean Air Act. Under class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen and nitrogen dioxide, provided that the national ambient air quality standards, established by the Environmental Protection Agency (EPA), are not exceeded.

Miami is the major source of pollutants in Dade County and the park. Its primary pollutants are total suspended particulates and ozone. The levels of nitrogen dioxide, carbon monoxide, and sulfur dioxide produced in the city do not appear to significantly influence the park's air. Occasionally, during early morning temperature inversions, pollution from Miami reduces visibility over Biscayne Bay. Low-flying military aircraft using Homestead Air Force Base frequently pass over the park and may affect air quality.

The Turkey Point power plant, located to the south of park headquarters, may also affect air quality in the park vicinity.

There are no major air pollution sources within the park. Motorboat exhaust is the most common pollutant resulting from visitor use and management activities.

3.4.1.4 Water Quality

BISC encompasses a large portion of Biscayne Bay and the offshore waters south of Miami in Miami-Dade County. Biscayne Bay, designated an Outstanding Florida Water by the state legislature, covers approximately 428 square miles, with a contributing watershed of approximately 938 square miles. The Biscayne Bay watershed is highly urbanized and includes 16 percent of the state's population in an area that represents less than two percent of the land available in the state. South Florida is one of the rapidly growing areas of the country, and this is occurring despite the fact that more than a third of the contributing watershed is considered protected wetlands.

Water quality within the bay has been described as ranging from bad to near pristine (Mulliken and VanArman 1995). The majority of the water quality problems in the bay are located in the northern region and are associated with the city of Miami. Surface water runoff from urban land

uses has been identified as the major source of contaminants in the bay. As per the park's Resource Management Plan,

The park's western boundary is the site of one active solid waste landfill, two inactive landfills, a power generating facility that utilizes nuclear and petroleum based fuels, and a former military base that has 150 individual hazardous waste sites within its boundaries. The lands west of the park that contain these facilities serve as the headwaters of Biscayne Bay and the coral reef platform. Thus, there is a high potential for the migration of leachate and other pollutants into park waters.

The Miami-Dade County Department of Environmental Resources Management has conducted water quality monitoring in Biscayne Bay since 1979. Data are collected from about 100 sampling stations. Monitoring includes physical and meteorological observations, including such features as water depth, water temperature, and air temperature, plus analysis for 22 water quality parameters. Water quality monitoring results are available on the U.S. Environmental Protection Agency's STORET website http://oaspub.epa.gov/storpubl/station_selection.

The park has conducted water quality monitoring on a regular basis beginning in the mid- to late-1980s. Effective in 1991, 12 water quality monitoring stations (seven bay and five reef platforms) were established. Instruments monitor conductivity, temperature, dissolved oxygen, pH and turbidity (reef sites only). Water quality monitoring objectives for the park are to: (1) supply information that is useful in the understanding of the cycling of water diurnally, seasonally and annually, and (2) study the impacts of human influence on such systems so as to be able to better preserve and protect park water clarity, quantity, and quality.

3.4.1.5 Floodplains and Wetlands

The Federal Emergency Management Agency mapped the floodplains of Dade County in 1980. With the exception of limited areas of higher ground near Cutler Ridge and Homestead, the 100-year floodplain extends well over 10 miles inland from Biscayne Bay; the entire park lies within the 100-year floodplain.

With the exception of the hardwood hammocks and built-up land on Convoy Point, Elliot Key, Adams Key, Boca Chita Key, and other scattered sites, almost all of the emergent land within park boundaries is classified as wetlands by the U.S. Fish and Wildlife Service.

3.4.1.6 Vegetation

The primary vegetation communities that occur at the park are mangrove wetlands and hardwood hammocks.

- Mangrove Wetlands: Mangroves stretch along the 14 miles of shoreline comprising the mainland portion of the park, and also vegetate the park's keys to varying degrees (some of the lower elevation keys are completely covered by mangroves, while others are fringed along the bay side coastline or covered in lower elevation areas). Mangrove wetlands are extremely important to the ecology of subtropical coastal zone ecosystems. With their impenetrable root system, mangroves keep BISC's waters clean and clear by slowing the water that flows into the bay from the land, allowing the sediment carried by the runoff to

settle out. Additionally, mangroves help to stabilize the coast and protect it from tropical storms and hurricanes. The roots also provide shelter and protection for many marine organisms, while the tree branches provide breeding and nesting areas for birds. Leaves fall from mangroves year round. The leaves break down to become food for many organisms including commercially important species of fish, shrimp, and the Florida spiny lobster. Mangroves inhabiting the park include red (*Rhizophora mangle*), white (*Laguncularia racemosa*), and black (*Avicennia germinans*).

With the exception of small, isolated patches of marsh grass, the mangrove wetlands at BISC lack embedded sawgrass or cordgrass prairies, and thus do not support wildland fire. Bob Panko, Fire Management Officer at nearby Everglades National Park, notes that lightning strikes that hit in these mangroves do not ignite fires, but rather create a small circle of deadened vegetation at the site of the strike (5/15/03 e-mail correspondence).

- Hardwood Hammocks: Subtropical hardwood hammocks cover the higher portions of many of the park's keys. Representative trees include West Indian mahogany (*Swietenia mahogani*), paradise tree (*Simarouba glauca*), geiger tree (*Cordia sebestena*), poisonwood (*Metopium toxiferum*), seagrape (*Coccoloba uvifera*), pigeon plum (*Coccoloba diversifolia*), gumbo limbo (*Bursera simaruba*), wild tamarind (*Lysiloma latisiliqua*), satin leaf (*Chrysophyllum oliviforme*), and ironwood (*Ostrya virginiana*). These are trees not typically found within the continental United States outside of south Florida, and belie the area's close relationship with the Caribbean.

Hammocks develop at elevations high enough to prevent seasonal flooding. The dense shade created by a mature hammock regulates the temperature inside, keeping it several degrees cooler during the summer months, and sheltering the hammock interior from winter winds. Although fire is a necessary characteristic of many forest communities in south Florida, the hardwood hammock is intolerant of fire. The sparse understory, dense shade of the canopy, and permeating moisture of a hammock helps to insulate it from fire. In very dry periods, however, hammocks become more vulnerable to wildland fire, and a major burn can completely destroy a hammock.*

On those park keys with enough elevation to support hardwood hammocks, narrow strips of transitional vegetation communities generally occur between the coastline and the hammock. On the ocean side, where there is sand on or near the key's edge (particularly on the upper half of Elliot Key and on Boca Chita Key), the transition community includes seaside spurge (*Chamaesyche mesembryanthemifolia*), bay cedar (*Suriana maritima*), oxeye daisy (*Borrichia* spp.), cactus (*Opuntia* spp.), nickerbean (*Caesalpinia bonduc*), sea lavender (*Limonium latifolium*), black torch (*Erithalis fruticosa*), and in some cases, buttonwood (*Conocarpus erectus*). Where there is no sand on the ocean side, vegetation typically shifts from buttonwood along the coast to hardwood hammock.

* Source: http://www.co.miami-dade.fl.us/derm/Ecosystems/eco_tropical_hardwood.asp

On the bay side of these same park keys, the coastline is typically mangrove, shifting to a community including buttonwood, saffron palm (*Sideroxylon celastinum*), joewood (*Jacquinia keyensis*), and black bead (*Pithecellobium keyense*), which then shifts to hardwood hammock.

Additional trees and shrubs that have been documented in the park include balsam apple/pond apple (*Clusia rosea*), coconut palm (*Cocos nucifera*), date palm (*Phoenix dactylifera*), Florida cherry palm (*Pseudophoenix sargentii*), Florida thatch palm (*Thrinax radiata*), Key lime (*Citrus aurantifolia*), lemon (*Citrus limon*), monk orchid, (*Oeceoclades maculata*), sargent palm (*Pseudophoenix sargentii*), seven-year-apple (*Genipa clusiifolia*), silver palm (*Coccothrinax argentata*), sour orange (*Citrus aurantium*), tangerine (*Citrus reticulata*), and wild banyantree (*Ficus citrifolia*).

The Institute for Regional Conservation is currently conducting a vascular plant inventory at the park.

Appendix 13.3 includes a list of known park flora.

3.4.1.7 Wildlife and Aquatic Resources

The park encompasses a complex system of marine and terrestrial communities. As 95 percent of the park is water, the majority of its wildlife is associated with ocean or shoreline habitats. Examples of park fauna, some of which are federally-listed threatened or endangered species, are provided below. Section 3.4.1.7 discusses federally-listed species at BISC.

Aquafauna

- ❑ Marine Invertebrates: Biscayne Bay is host to over 800 invertebrate species (Mulliken and VanArmen 1995), including shellfish such as shrimp (*Penaeus* spp.), crabs (*Portunus* and *Callinectes* spp.), and spiny lobster (*Panulirus argus*). Other invertebrate classes include annelid worms (Polychaeta), crustaceans (Crustacea), chitons (Amphineura), snails and slugs (Gastropoda), mussels, scallops, and oysters (Pteriormorphia), and echinoderms (Echinoidea, Holothuroidea, and Ophiuroidea).
- ❑ Fish: Biscayne Bay serves as a nursery area for larvae and juveniles of a wide variety of fish (Ault et al. 2001). Many species of these early development stage fish live and reproduce in the adjacent barrier coral reef and other offshore habitats as adults. Biscayne Bay is also a transition area for the fishes of eastern Florida, with a population of tropical and temperate water fishes. Studies have identified at least 512 fish species in Biscayne Bay (Mulliken and VanArmen 1995). Fish species documented in park waters include barracuda (*Sphyraena barracuda*), Atlantic stingray (*Dasyatis sabina*), damselfish (*Pomacentrus* spp.), mackerel (*Scomberomorus* spp.), mullet (*Mugil* spp.), pompano (*Trachinotus carolinus*), hogfish (*Lachnolaimus maximus*), tarpon (*Megalops atlanticus*), snook (*Centromus* spp.), as well as many members of fish families such as snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae), spadefish (Ephippidae), surgeonfish (Acanthuridae), triggerfish (Balistidae), parrotfish (Scaridae), and jacks (Carangidae).

The Florida Audubon is currently conducting a freshwater fish inventory of canals within mainland park boundaries and ephemeral ponds on park keys. A marine fish inventory is scheduled to begin within the year.

- Marine mammals: Marine mammals documented to occur in park waters include the Atlantic bottlenose dolphin (*Tursiops truncatus*), finback whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), right whale (*Balaena glacialis*), Sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), and West Indian manatee (*Trichechus manatus*).
- Marine reptiles: Marine reptiles documented to occur in park waters include the loggerhead sea turtle (*Caretta caretta*), Atlantic green turtle (*Chelonia mydas mydas*), leatherback sea turtle (*Dermochelys coriacea*), Atlantic hawksbill sea turtle (*Erectmochelys imbricata*), and Kemp's ridley sea turtle (*Lepidochelys kempii*).

Terrestrial Fauna

- Mammals: Mammals documented to occur at the park include the bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), Seminole bat (*Lasiurus seminolus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Wagner's mastiff-bat (*Eumops glaucinus*), Mexican red-bellied squirrel (*Sciurus aureogaster*), black rat (*Rattus rattus*), and marsh rabbit (*Sylvilagus palustris*).

The University of Miami recently completed a small- and medium-size mammal inventory at the park, and has provided the park with a draft report of its findings. Fly By Night Incorporated recently completed a bat inventory at the park and is presently completing a report of its findings.

- Reptiles and Amphibians: Reptiles documented to occur at the park include the American alligator (*Alligator mississippiensis*), American crocodile (*Crocodylus acutus*), reef gecko (*Sphaerodactylus notatus*), green anole (*Anolis carolinensis*), ground skink (*Scincella lateralis*), mole skink (*Eumeces egregius*), Florida box turtle (*Terrapene carolina bauri*), striped mud turtle (*Kinosternon baurii*), black swamp snake (*Seminatrix pygaea*), corn snake (*Elaphe guttata*), dusky pigmy rattlesnake (*Sistrurus miliarius barbouri*), eastern diamondback rattlesnake (*Crotalus adamanteus*), eastern indigo snake (*Drymarchon corais couperi*), Everglades racer (*Coluber constrictor paludicola*), Everglades rat snake (*Elaphe obsoleta rossalleni*), mangrove diamondback (*Malaclemys terrapin rhizophorarum*), northern coral snake (*Micrurus fulvius*), and yellow rat snake (*Elaphe obsoleta quadrivittata*). Amphibians documented to occur at the park include the Cuban tree frog (*Osteopilus septentrionalis*), greenhouse frog (*Eleutherodactylus planirostris*), green tree frog (*Hyla cinerea*), squirrel tree frog (*Hyla squirella*), southern toad (*Bufo terrestris*), and eastern narrowmouth toad (*Gastrophryne carolinensis*).

The U.S. Geological Survey recently completed a herpetofaunal inventory at the park, and is presently completing a report of its findings.

- Avifauna: Birds at BISC include permanent resident species, as well as winter or summer migrants. Species documented to occur at the park include the black-whiskered vireo (*Vireo altiloquus*), royal tern (*Sterna maxima*), Caspian tern (*Sterna caspia*), American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), broad-winged hawk (*Buteo platypterus*), osprey (*Pandion haliaetus*), northern harrier (*Circus cyaneus*), eastern screech owl (*Otus asio*), double-crested cormorant (*Phalacrocorax auritus*), herring gull (*Larus argentatus*), belted kingfisher (*Ceryle alcyon*), black-bellied plover (*Pluvialis squatarola*), gray catbird (*Dumetella carolinensis*), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), glossy ibis (*Plegadis falcinellus*), fulvous whistling-duck (*Dendrocygna bicolor*), red-breasted merganser (*Mergus serrator*), Louisiana waterthrush (*Seiurus motacilla*), magnolia warbler (*Dendroica magnolia*), palm warbler (*Dendroica palmarum*), mangrove cuckoo (*Coccyzus minor*), red-bellied woodpecker (*Melanerpes carolinus*), and Key West quail dove (*Geotrygon chrysis*).

Appendix 13.3 includes a list of known park fauna.

3.4.1.8 Threatened and Endangered Species

The following federally-listed* animal and plant species are documented to occur within park boundaries:

Federally-Listed Animals

- American alligator (*Alligator mississippiensis*), T/SA
- American crocodile (*Crocodylus acutus*), E
- Bald eagle (*Haliaeetus leucocephalus*), T
- Eastern indigo snake (*Drymarchon corais couperi*), T
- Elkhorn coral (*Acropora palmata*), C
- Finback whale (*Balaenoptera physalus*), E
- Green sea turtle (*Chelonia mydas*), E
- Hawksbill sea turtle (*Erectmochelys imbricata*), E
- Humpback whale (*Megaptera novaengliae*), E
- Kemp's ridley sea turtle (*Lepidochelys kempii*), E
- Key Largo woodrat (*Neotoma floridana smalli*), E
- Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*), E
- Least tern (*Sterna antillarum*), E
- Leatherback sea turtle (*Dermochelys coriacea*), E
- Loggerhead sea turtle (*Caretta caretta*), T
- Piping plover (*Charadrius melodus*), T
- Right whale (*Balaena glacialis*), E
- Schaus swallowtail butterfly (*Herclides aristodemus ponceanus*), E
- Sei whale (*Balaenoptera borealis*), E
- Smalltooth sawfish (*Pristis pectinata*), E
- Sperm whale (*Physeter macrocephalus*), E
- Staghorn coral (*Acropora cervicornis*), C
- West Indian manatee (*Trichechus manatus*), E

- Wood stork (*Mycteria americana*), E

Federally-Listed Plants

- Beach jacquemontia (*Jacquemontia reclinata*), E
- Semaphore prickly pear cactus (*Opuntia corallicola*), C

*C = candidate taxon, ready for proposal; E = endangered; T = threatened; T/SA = similarity of appearance to a threatened taxon

Within park boundaries, critical habitat is designated for the West Indian manatee throughout Biscayne Bay and its tributaries. Terrestrial and aquatic critical habitat is designated for the American crocodile throughout the southernmost portion of Biscayne Bay.

3.4.1.9 Cultural and Historic Resources

Cultural resources at the park include prehistoric sites that provide evidence of aboriginal settlement of the Biscayne Bay region; historic shipwrecks; submerged historic non-shipwreck sites (e.g. docks, ballast piles, navigation aids, etc.); archeological ruins related to nineteenth- and early-twentieth-century homesteading and pioneer settlements; and the buildings and structures from the Honeywell complex, a private resort associated with the development of the Miami area as a vacation destination during the first half of the twentieth century.

Current knowledge regarding the location and distribution of BISC's archeological deposits are based on dated and incomplete terrestrial and hydrographic surveys. It is highly probable that many more significant sites will be identified in the future once park survey coverage is complete. Pending archeological investigations center on identifying the remains of the 1890 homestead of Annie E. Higgs and the documented existence of an 1837 Black Seminole village. The latter site is located in the vicinity of Black Point, and its inhabitants may have been involved in the Underground Railroad.

Proposed land acquisitions include the Miami Circle—a Tequesta village settlement at the mouth of the Miami River, and Virginia Key Beach—the location of an historic Black beach on Virginia Key currently nominated for inclusion on the National Register of Historic Places (NRHP). Additionally, should the park expand its eastern boundary to the 300-foot contour, currently under the jurisdiction of the Florida Keys National Marine Sanctuary, there would be a corresponding increase in the number of submerged archeological sites.

Park properties currently listed on the National Register of Historic Places (NRHP) are Offshore Reefs Archaeological District (1981), Sweeting Homestead Site (1997), and Boca Chita Key Historic District (1997). Since the establishment of the NRHP listings, new archeological sites have been identified. The Jones Property and the Totten Key Native American Complex are deemed to be significant by NRHP standards, and/or to the park's mission, "to preserve and enhance the unique combination of land, water, wildlife and historic elements of Biscayne National Park for the education, inspiration, and recreation of present and future generations."

Native American Sites: Archeological evidence that the earliest aboriginal inhabitants of the South Florida Peninsula visited the Biscayne Bay area 10,000 BP (Before Present) is found along upland areas adjacent to current park boundaries. At that time, Biscayne basin was a freshwater marsh or lake. Around 4,000 BP, the rise in sea level—the result of retreating glaciers—inundated Biscayne basin with seawater and created the keys that we see today. The inundation of the ancient coastline likely obscures the material remains of the Native Americans that inhabited the park during the Paleolithic (12,000 - 9,500 BP) and Archaic (9,500 - 2,500 BP) periods. Identified Native American sites in the park span the entire Formative period (2,500 BP - ~500 BP) portraying intensive, long-term settlements that reflect the pre-Columbian connection between humans and marine resources.

South Florida archaeologists distinguish Formative period remains as Glades I (2,500 - 1,250 BP), Glades II (1,250 - 800 BP) and Glades III (800 BP - 1513 AD). In 1513, Juan Ponce de Leon referred to Glades III Native Americans inhabiting the Miami area as the Tequesta. Glades sites are reflected in four shell middens located on keys within park boundaries. A notable Glades site, the Totten Key Complex, consists of a shell midden, an earthen midden and a rock mound. During the eighteenth century, the Miccosukee and Seminole began colonizing South Florida. Historians have noted a strong Seminole presence in northern Biscayne Bay during the late-nineteenth century; however their relationship to the marine resources of the park are only now being investigated.

Historic Homesteading and Pioneering Sites: Euro-American settlement of the park’s keys began in 1871 with the completion of the government survey driven by the Homestead Act of 1862. Historical documents indicate that all six homesteading families that settled on Elliott Key prior to the development of Miami, supplemented their plantation income by fishing, turtling, sponging, and wrecking. The Sweeting Homestead site is deemed significant for the information it is likely to yield about the early settlement of the keys. The development of Miami had a tremendous impact on the lives of early settlers. The household remains of Israel Lafayette Jones, an African American who purchased Porgy Key in 1898, reflect this period of transition.

Historic Resort Development: With the exception of the Fowey Rocks Lighthouse, an offshore 1877 historic structure currently owned and operated by the United States Coast Guard, all surviving park architectural resources are located within Boca Chita Key Historic District. Built between 1937 and 1940 as a private resort/summer retreat for the wealthy Mark C. Honeywell, the NRHP district is significant for its architectural style and its association with the recreational development of Miami. Contributing properties to the district consist of three buildings, eight structures, and one object (a cannon). Ten of these structures are noted on the List of Classified Structures, identified in Table 1. There are four non-contributing properties that include two archeological sites.

Table 1: BISC List of Classified Structures (LCS)

LCS ID	Structure No.	Preferred Structure Name
90190	HS-1	Boca Chita Lighthouse
90191	HS-2	Boca Chita Chapel
90192	HS-3	Boca Chita Picnic Pavilion
90193	HS-4	Boca Chita Garage
90194	HS-5	Boca Chita Engine House and Cistern

LCS ID	Structure No.	Preferred Structure Name
90195	HS-6	Boca Chita Bridge
90196	HS-7	Boca Chita Stone Walls
91570	HS-8	Boca Chita Canal
91571	HS-9	Boca Chita Retaining Walls
91616	HS-10	Boca Chita Concrete Walkways

The Cocolobo Club was another private resort built in the early-twentieth century. All of the facilities on the key, including the still-standing Cocolobo buildings, were totally destroyed in 1992 by Hurricane Andrew, which passed almost directly over Adams Key.

Submerged Cultural Resources: The combination of shallow reefs, prevailing easterly winds, the proximity of the swift-moving Florida Current, heavily traveled shipping lanes, pilot error and inadequate aids to navigation created a historic “ship trap” along the reefs of the park. Forty-three shipwreck sites and 16 submerged historic non-shipwreck sites are located within park boundaries, dating back to the mid-eighteenth century. As European exploration of this region began in the early-sixteenth century, it is probable that older remains exist. Twenty-eight of the shipwreck sites and seven of the non-shipwreck sites are located within the boundaries of the Offshore Reefs Archaeological District, the only existing National Register of Historic Places underwater shipwreck district in a National Park Service unit. This district is deemed significant for the information that it yields regarding more than 200 years of historic maritime commerce and transportation.

Park sites listed in the Archeological Sites Management Information System (ASMIS) are identified in Table 2, listed by site category.

Table 2: Park ASMIS List

ASMIS #	Common Name	Current Documentation Level	On NRHP
Submerged Historic Shipwreck			
BISC-00036	Elliott Key	I	No
BISC-00022	Soldier Key	II	No
BISC-00001	St. Lucie	I	No
BISC-00027	Hurricane Creek Wreck	I	No
BISC-00017	UID Wreck #2	I	Yes
BISC-00018	Chain Wreck	I	Yes
BISC-00019	Mongo Wreck	I	Yes
BISC-00002	Hubbard	II	Yes
BISC-00009	Black Wreck	II	Yes
BISC-00014	Lugano	II	Yes
BISC-00011	Cement Wreck	II	No
BISC-00054	Arakanapka	II	No
BISC-00015	Alicia	III	Yes
BISC-00004	Barge Wreck	I	No
BISC-00012	Erl King Wreck	II	Yes
BISC-00029	Pacific Reef Wreck	II	Yes
BISC-00030	Morgan's Wreck	I	Yes
BISC-00035	Pillar Dollar	II	Yes
BISC-00058	Brick Wreck	I	Yes
BISC-00059	Box Car Wreck	I	Yes

ASMIS #	Common Name	Current Documentation Level	On NRHP
Submerged Historic Shipwreck			
BISC-00062	Long Reef Cannon Wreck	II	Yes
BISC-00055	Biscayne Channel Barge	I	No
BISC-00056	Bug Light Wreck	I	No
BISC-00057	Bell Wreck	I	No
BISC-00064	Ledbury Reef Wreck	II	No
BISC-00066	Ledbury Reef Ballast Wreck	II	No
BISC-00070	Safety Valve Barge	II	No
BISC-00013	Mandalay	III	Yes
BISC-00008	Schooner Wreck	III	Yes
BISC-00020	Fowey	III	Yes
BISC-00023	Populo	III	Yes
BISC-00033	Outline Wreck	III	Yes
BISC-00010	Jordan's Ballast	I	Yes
BISC-00061	Second Wreck	II	Yes
BISC-00075	Ring Wreck	II	Yes
BISC-00053	Bottle Wreck	II	No
BISC-00063	Fowey Rock Barrel Wreck	II	No
BISC-00031	Stair's Wreck	I	Yes
BISC-00032	Ball Buoy	I	Yes
BISC-00060	Capt. Ed's Wreck	II	Yes
BISC-00072	Blockade Runner Wreck	II	Yes
BISC-00073	Ore Wreck	II	Yes
BISC-00074	Aladdin Lamp Wreck	II	Yes
Submerged Historic Non-Shipwreck Archeological Site			
BISC-00026	Machinery Wreck	I	No
BISC-00003	Adam's Key Pier	I	No
BISC-00089	Sunken Bell Buoy	II	No
BISC-00006	University Dock	I	No
BISC-00087	Steel Beams	I	No
BISC-00005	Old Rhodes Channel Ballast	II	No
BISC-00024	Sand's Cut Ballast	I	No
BISC-00034	Airplane Wreck	II	No
BISC-00078	Old Rhodes Key Ballast	II	No
BISC-00007	Pig Iron	I	Yes
BISC-00052	Pacific Ballast Scatter	I	Yes
BISC-00080	Triumph Reef Metal Scatter	I	Yes
BISC-00025	Triumph Reef Ballast	II	Yes
BISC-00028	Elkhorn Reef Ballast	II	Yes
BISC-00079	Triumph Reef South Ballast	II	Yes
BISC-00051	Legare Barrels	III	Yes
BISC-00083	Soldier Key Timbers	I	No
BISC-00084	Fowey Rock Light	II	No
Submerged Isolated Artifacts			
BISC-00078	Old Rhodes Key Ballast	II	No
BISC-00007	Pig Iron	I	Yes
BISC-00016	Square Hole	I	No
BISC-00068	Anchor	I	No
BISC-00086	Anchor Fluke	I	No
BISC-00088	Anchor Stock	II	No
BISC-00090	Tannehill Cannon	II	No
BISC-00071	Ajax Reef Anchor	II	Yes

ASMIS #	Common Name	Current Documentation Level	On NRHP
Submerged Isolated Artifacts			
BISC-00076	Admiralty Anchor	II	Yes
BISC-00077	Long Reef Anchor	II	Yes
Terrestrial Prehistoric Archeological Site			
BISC-00048	Totten Key Complex (Rock)	II	No
BISC-00048.1	Earthen Midden	II	No
BISC-00081	Soldier Key Midden	II	No
BISC-00043	Sand's Key #1	I	No
BISC-00047		I	No
BISC-00049	Sand's Key #2	I	No
BISC-00037		I	No
BISC-00038		I	No
BISC-00039		I	No
BISC-00040		I	No
BISC-00041		I	No
BISC-00042		I	No
BISC-00044		I	No
BISC-00045		I	No
BISC-00046		I	No
Terrestrial Historic Archeological Site			
BISC-00082	Soldier Key Ruins	I	No
BISC-00067	Sweeting Homestead	III	Yes
BISC-00092	Jones Property	II	No
BISC-00092.01	Porgy Key Residence	II	No
BISC-00092.02	Totten Key Canal	II	No
BISC-00092.03	Totten Key Grove	II	No
BISC-00065	Boca Chita	IV	Yes
BISC-00065.01	Boca Chita Lighthouse	IV	Yes
BISC-00065.02	Boca Chita Chapel	IV	Yes
BISC-00065.03	Boca Chita Picnic Pavilion	IV	Yes
BISC-00065.04	Boca Chita Garage	IV	Yes
BISC-00065.05	Boca Chita Engine House	IV	Yes
BISC-00065.06	Boca Chita Bridge	IV	Yes
BISC-00065.07	Boca Chita Stone Walls	IV	Yes
BISC-00065.08	Boca Chita Canal	IV	Yes
BISC-00065.09	Boca Chita Retaining Walls	IV	Yes
BISC-00065.10	Boca Chita Concrete Walkways	IV	Yes

ASMIS numbers 21 and 69 unassigned; ASMIS numbers 85 and 91 voided
Revised 3/12/03

3.4.2 Management Considerations

- ❑ Ensure that firefighter and public safety remains the primary consideration in planning and conducting all fire management activities.
- ❑ Ensure that archeological/cultural/historic resources are considered in planning and conducting all fire management activities.

- ❑ Ensure that smoke management is considered in planning and conducting all fire management activities.
- ❑ Ensure that all applicable laws, policies and regulations are considered in planning and conducting all fire management activities.
- ❑ Ensure that socio-political economic impacts, including wildland urban interface, are considered in planning and conducting all fire management activities.
- ❑ Ensure that appropriate fire prevention and suppression actions are addressed in the right-of-way plans of development/vegetation management/contingency documents associated with and required for electrical transmission lines located on agency land.
- ❑ Ensure that fire management activities are coordinated as appropriate with all affected parties. This includes any federally recognized Indian tribes that have historical, cultural, economic or other interests in the proposed action or its effects (required, for example, by 36 CFR 800, 40 CFR 1508, and 43 CFR 10).

3.4.3 Past Role of Fire

The islands throughout Florida Bay in the Everglades or most of the Florida Keys are not fire-maintained ecosystems (the only exception in the Florida Keys are those islands, such as Big Pine Key, located far to the south and west of BISC, with areas of pine rocklands on them where fire does play a role). According to Bob Panko, Fire Management Officer at Everglades National Park, there have been no recorded fires in 60 years on any of the islands throughout Florida Bay, despite a large amount of lightning activity (5/15/03 e-mail correspondence).

There is little information in the historic record pertaining to past fire occurrence or fire use within present park boundaries. The report entitled *Biscayne National Park Historic Resource Study* (Leynes and Cullison 1998) does note that,

...the keys did not offer a great deal of arable land to the early settlers, and much of that was covered with hardwood hammocks. Early visitors to the area valued these clusters of mature hardwoods for their mahogany. Later settlers generally saw the hammocks as worthless, and the “almost universal custom” was to clear the “scrubby woods” to plant fields or groves. The preferred method of clearance was burning.

Since BISC entered National Park Service administration in 1968, all wildland fire within its boundaries has been suppressed. The annual occurrence of wildland fires at BISC is very low; since 1977, only eight documented wildland fires have occurred within park boundaries, burning a total of two acres. These fires have been restricted to previously disturbed sites, with landscape features and exotic vegetation.

3.4.4 Wildland Fire Management Situation

3.4.4.1 Historical Weather Analysis

The climate in the Miami area is classified as humid subtropical, with an average annual temperature of 76° Fahrenheit. Summers tend to be hot and quite humid, with frequent lightning. Winters tend to be cooler, windier and drier. Rainfall and temperatures are highest between May and October, peaking in the hurricane season. Hurricanes can occur from June through November, with the highest probability in September and early October. Average annual precipitation is approximately 56 inches. Table 3 provides climatic data for Miami.

Table 3: Climatic Record for Miami, Florida

Month	Daily High Temperature (F)	Daily Low Temperature (F)	Average Temperature	Total Precipitation (inches)
January	75.3	59.3	67.3	2.01
February	76.3	60.2	68.3	2.08
March	79.2	64.4	71.8	2.39
April	82.5	67.9	75.2	3.03
May	85.2	71.9	78.6	6.21
June	87.6	75.1	81.3	9.33
July	89.1	76.5	82.8	5.7
August	89.2	76.7	83	7.58
September	87.9	75.8	81.9	7.63
October	84.6	72	78.3	5.64
November	80.2	66.6	73.4	2.66
December	76.7	61.5	69.1	1.83

Source: website <http://www.weathercenter.com/almanacs/miami.htm>

3.4.4.2 Fire Season

While wildland fire ignitions may occur throughout the year at BISC, the greatest potential for a given wildland fire burning significant acreage lies between the months of February and July, as judged from an analysis of historic fire occurrence at nearby Everglades National Park (EVER). Of the 956 wildland fires that occurred at EVER between 1971 and 2002, 62 (92 percent) of the 67 fires that burned more than 1,000 acres each occurred during the months of February through July.

3.4.4.3 Fuel Characteristics and Fire Behavior

The primary fuel type represented at BISC has been classified according to the National Fire Danger Rating System (NFDRS) and the Northern Forest Fire Laboratory Fire Behavior Prediction System (FBPS) (Deeming et al 1978:30, Anderson 1982).

- Fuel Model R: This model (FBPS fuel model 8) most closely represents hardwood hammock leaf litter at the park. Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentration

that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards.

Other vegetation present at the park, but composing areas too small to logically delineate and manage as fuel models, are the previously discussed narrow strips of transitional vegetation communities between the coastline and hardwood hammocks on some keys, and small, isolated patches of coarse, reed-like marsh grass.

Table 4 illustrates historic fire weather parameters at “average” and “extreme” levels for the park fire season.

Table 4: Historic Fire Weather Parameters for BISC Fire Season (February 1 - July 31), NFDRS RAWS Station 086702

Fire Weather/Behavior Parameters	Average Fire Season Weather	97th Percentile Fire Season Weather
20-foot wind speed	7 miles/hour	15 miles/hour
Maximum temperature	87 degrees Fahrenheit	94 degrees Fahrenheit
Minimum relative humidity	52%	29%
1-hour fuel moisture	11%	6%

Table 5 demonstrates anticipated fire behavior at BISC under these average and extreme conditions, as well as critical threshold values influencing fire controllability. The values were calculated using the BEHAVE (Andrews 1986) fire behavior prediction model utilizing weather inputs from the nearby Everglades National Park fire cache RAWS weather station (NFDRS 086702). The weather data utilized cover the 34-year period from 1970-2003, and the weather indices were calculated using the FireFamily Plus (Bradshaw 2002) software package. It should be recognized that the table values are based upon models rather than direct observation of fire behavior in this fuel type. As BISC managers have the opportunity to observe and monitor fire behavior, these values may be refined and the model calibrated to better reflect local fuel and weather conditions.

Everglades National Park, from whom BISC will access fire weather/fire danger information, uses the Keetch-Byram Drought Index (KBDI) as its primary drought indicator, which, based upon the level, indicates low to extreme drought conditions influencing fire behavior (see section 4.2.2.4.2.2).

Table 5: Potential Fire Behavior Under Average and Extreme Conditions

NFDRS Model	FBPS Model	Fire Behavior; Average Conditions		Fire Behavior; Extreme Conditions	
		Flame Length	Rate of Spread	Flame Length	Rate of Spread
R	8	1 ft	2 chains/hr	2 ft	5 chains/hr

Average conditions = 1970-2003 NFDRS station 086702 mean fire season weather conditions

Extreme conditions = 1970-2003 NFDRS station 086702 97% percentile fire season weather conditions

Assumes maximum spread with 0% slope

Table 6 outlines potential critical weather parameters that would result in fire behavior exceeding initial attack capabilities (flame lengths greater than eight feet). These values were calculated using the RX Window Module of the BEHAVE program (Andrews 1986). Such values are useful for facilitating recognition of potential extreme fire behavior conditions. It should be noted that generally two or three weather parameters must be aligned in order for extreme conditions to result. It should also be noted that these are modeled values and should serve only as guidelines. As the opportunity arises, fire monitoring data collection on wildland fires will facilitate refinement of these values, as well as development of critical values for additional parameters.

Table 6: Critical Weather Parameters Resulting in Need for Indirect Attack

NFDRS Model	FBPS Model	Moisture of Extinction	Critical Weather Parameters Resulting in Fire Behavior Exceeding Direct Attack Capabilities
R	8	30%	Flame lengths unlikely to exceed 8 feet even under extreme conditions

Moisture of extinction is defined as the 1-hour fuel moisture upper limit beyond which the fuels described by the given model will not burn. One-hour fuel moisture is a function of temperature, relative humidity, and shading.

3.4.4.4 Fire Regime Alteration

As per chapter 25 (Fire in Tropical and Subtropical Ecosystems) of the USDA Forest Service General Technical Report entitled *Wildland Fire in Ecosystems: Effects of Fire on Flora* (2000), “Vegetation types ranging from hardwood forests to grasslands in subtropical Florida, Hawaii, Puerto Rico, and the Virgin Islands are characterized by stand-replacement fire regimes.”

In regard to Florida salt marsh and mangrove, and Florida tropical hardwood forests, the report provides the following information:

Florida Salt Marsh and Mangrove: Although salt marshes occur in both the temperate zone and the tropics, fire mediates the tension zone between mangrove and salt marsh only in the tropics. In subtropical Florida, salt marsh is wedged between mangrove on the seaward side and freshwater marsh on its inland edge. Freezing temperatures probably have some influence on the juxtaposition of mangrove and salt marsh, but fires originating either in the salt marsh or further inland in freshwater marsh, control the inland advance of the mangrove. When intense fires are stopped by mangrove, the outer fringe of trees is killed and the marsh expands (Wade and others 1980). Under moderate burn conditions the mangrove acts as a firebreak....

Florida’s salt marshes are dominated by black rush, gulf cordgrass, sand cordgrass, and inland saltgrass, mixed with a number of species found in freshwater marshes, notably sawgrass and cattail. Because salt marsh is under tidal influence and relatively isolated from human activities, a large proportion of ignitions are lightning caused. Fires supported by high fuel loadings frequently burn over standing water. Fire behavior varies considerably depending on the dominant species contributing to the fuel....

Mangroves rarely burn, but they are influenced by fire in seasonal environments such as in Florida. Mangroves are a tropical and subtropical forest type growing in brackish to high salinity coastal sites that have weak wave action. Four species of mangrove are found in Florida: red mangrove, black mangrove, white mangrove, and buttonwood. Each tends to be indicative of different levels of

salinity or tidal influence. Lightning may be an important factor in the structure and dynamics of mangroves by creating numerous circular holes of dead and dying trees that may develop into patches of more flammable herbaceous vegetation. Fire is responsible for checking the encroachment of mangrove into salt marsh, and it is not uncommon to find red or white mangrove scattered through long unburned freshwater marshes. They have even been observed in the understory of cypress domes.

Florida Tropical Hardwood Forests: Hardwood forests in southern Florida are usually islands imbedded in a matrix of marsh, prairie, or savanna. Fires burning in tropical hardwood forests (called hammocks in Florida), hardwood swamps, and bays or bayheads likely originate in the more easily ignited matrix fuels. The forest islands usually serve as effective firebreaks with fires burning only at their periphery. Fires have the opportunity to enter these ecosystems during extreme droughts, where they may cause conversion to earlier successional stages or shifts to marsh vegetation. Depending on fuel and weather conditions, vegetation structure, and type of substrate, the fires may be low-intensity surface fires, fires that burn out organic soils, or crowning fires moving through dense low shrubs, palmettos, or trees. Many of the tropical hardwoods have the ability to resprout if top-killed, but fires are lethal if the organic substrate is consumed. It is not uncommon fires burning through grass fuels to go out at night as humidity recovers, but will hold over in hardwood forests, igniting the grass fuels the next day.

3.4.4.5 Control Problems and Dominant Topographic Features

With the terrestrial portions of BISC exhibiting minimal topographical relief, weather and fuels are the primary influences upon fire behavior. See section 3.4.4.3 for a discussion of NFDRS fuel model R characteristics and fire behavior, and Table 5 for potential fire behavior under average and extreme conditions.

3.4.5 Fire Management Units (FMUs)

As previously stated, three FMUs have been identified and established within BISC in order to facilitate the accomplishment of fire management objectives.

3.4.5.1 Fire Management Unit #1: Mainland/Convoy Point

FMU #1 contains approximately 4,825 acres. Development within this FMU is concentrated at the built-up land on Convoy Point, including the park headquarters and visitor center; visitor and staff parking areas; staff housing; a maintenance and storage area; temporary storage sheds; a field laboratory and dive locker; a picnic area with tables, grills, and restrooms; park and public boat basins; docks; and a park boat ramp.

3.4.5.1.1 Specific Fire Management Objectives for FMU #1

- ❑ Suppress any wildland fire via the appropriate initial attack response.
- ❑ Control 100% of all wildland fires during initial attack.
- ❑ Maintain existing defensible space of at least 30 feet around park buildings.

3.4.5.1.2 Fuel Characteristics/Fire Behavior

The area surrounding the development within FMU #1 is maintained by regular mowing. Beyond that, the vegetation cover is mangrove wetlands, with small, isolated patches of marsh grass. The mangrove wetlands themselves do not support fire. The patches of marsh grass may burn. The western park boundary north of Convoy Point is bordered by a saltwater intrusion levee, which should concurrently serve as a firebreak.

3.4.5.2 Fire Management Unit #2: Keys With Park Staff/Visitor Facilities

FMU #2 contains 1,838.5 acres, divided between Boca Chita Key (32.12 acres), Elliot Key (1727.27 acres), and Adams Key (79.07 acres).

Facilities at Boca Chita include a boat dock, picnic area, restrooms, and primitive camping area. Also located on Boca Chita are the previously discussed (section 3.4.1.9) historic architectural resources associated with the Honeywell private resort. One of these, the Boca Chita Lighthouse, is intermittently open to the public.

Facilities at Elliot Key include a visitor center (ranger station) with a restroom facility connected by a wooden boardwalk, two staff housing units, a maintenance complex, a maintenance dock, two public boat docks (Elliot Key Harbor and University Dock), a campground with picnic tables and grills, and walking trails.

Facilities at Adams Key include staff housing, a public boat dock, a picnic area with a pavilion, restrooms, a cistern for collecting drinking water, a generator shed, and walking trail.

3.4.5.2.1 Specific Fire Management Objective for FMU #2

- Suppress wildland fire via the appropriate initial attack response.
- Maintain existing defensible space of at least 30 feet around park buildings.

3.4.5.2.2 Fuel Characteristics/Fire Behavior

The primary burnable vegetation within FMU #2 is hardwood hammock leaf litter, represented by NFDERS fuel model R. See section 3.4.4.3 for a discussion of fuel model R characteristics and fire behavior, and Table 5 for potential fire behavior under average and extreme conditions.

3.3.5.3 Fire Management Unit #3: Remaining Keys

FMU #3 contains the remaining islands/keys within park boundaries, comprising approximately 2,411.5 acres.

3.4.5.3.1 Specific Fire Management Objective for FMU #3

- Suppress wildland fire via the appropriate initial attack response.

3.4.5.3.2 Fuel Characteristics/Fire Behavior

The primary burnable vegetation within FMU #3 is hardwood hammock leaf litter, represented by NFDERS fuel model R. See section 3.4.4.3 for a discussion of fuel model R characteristics and fire behavior, and Table 5 for potential fire behavior under average and extreme conditions.

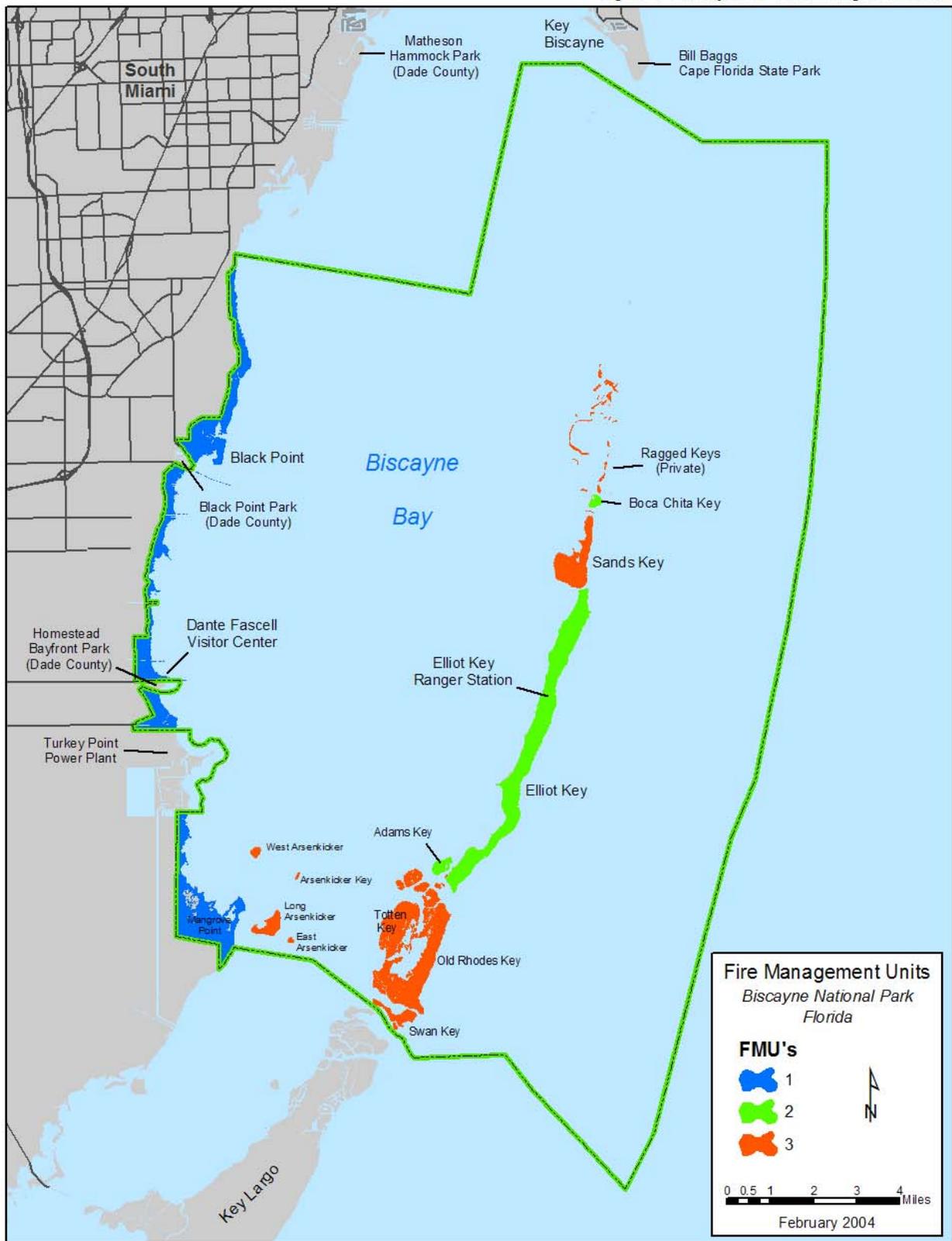
3.4.6 Values to Protect, Manage, or at Risk

- Human health and safety: Firefighter and public safety is the highest priority in every fire management activity. In light of this:
 - Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job) employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).
 - No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (LCES)*, current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the park include:
 - Lightning
 - Snags and dead trees with weak root systems
 - Stinging/biting insects, ticks, and poisonous snakes
 - Dehydration, heat exhaustion and heat stroke
 - Wildland fire incident commanders will minimize firefighter exposure to heavy smoke by incorporating the recommendations outlined in the publication *Health Hazards of Smoke* (Sharkey 1997), available from the Missoula Technology and Development Center.
 - Park neighbors, visitors and local residents will be notified of all fire management events that have the potential to impact them.
 - The BISC superintendent or designee may, as a safety precaution, temporarily close parts of the park to the visiting public.
 - Smoke on roadways will be monitored and traffic control provisions taken to ensure motorist safety during fire events at the park. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander on a particular event will determine visibility levels):
 - Posting of “Smoke on Road” signs on either side of the affected area.

* LCES is an acronym intended to remind firefighters of the four key elements associated with firefighter safety: Lookouts, Communications, Escape Routes, and Safety Zones.

- Reducing the posted speed limit when visibility is strongly reduced, and escorting vehicles with a well-marked law enforcement vehicle as necessary.
 - Closing the road to traffic when visibility is severely reduced.
- Property – To the greatest extent feasible and appropriate, park infrastructure, any other development, and adjacent non-agency land will be protected during all fire management activities.
- Natural and cultural resources – Natural and cultural resources will be protected from the adverse effects of unwanted fire as well as the adverse effects of fire management activities (see section 10.0). During all suppression activities, the minimum impact suppression tactics policy will be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation (see section 4.2.7).
- Air and water quality: The park will comply with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements. Additionally:
- The suppression response selected to manage a wildland fire will consider air quality standards.
 - During fire suppression, water will be used in lieu of fire retardant.

Figure 3 - Biscayne NP Fire Management Units



4.0 WILDLAND FIRE MANAGEMENT PROGRAM COMPONENTS

4.1 General Implementation Procedures

As wildland fire will not be used for resource benefits at BISC, suppression is the only appropriate response to a wildland fire. The requirement for a decision checklist as part of the Stage 1: Initial Fire Assessment of the wildland fire implementation plan (WFIP) is considered to be met at the programmatic level in this Fire Management Plan.

4.2 Wildland Fire Suppression

RM-18 defines wildland fire suppression as “an appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. [This may include confinement within natural or pre-existing boundaries.] All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.”

4.2.1 Range of Potential Fire Behavior

Weather and fuels are the primary influences upon fire behavior at BISC. Depending upon the season and fire weather conditions, including periods of drought, fire behavior can range from low-intensity to extreme. However, even under extreme conditions, flame lengths in NFDRS fuel model R are unlikely to exceed direct attack capabilities.

See Table 4 for historic fire weather parameters for the BISC fire season, Table 5 for potential fire behavior under average and extreme conditions, and section 3.4.4.3 for NFDRS fuel model R characteristics and fire behavior.

4.2.2 Preparedness Actions

NPS policy requires that every unit with a fire management program incorporate preparedness considerations into its fire management plan (*RM-18*, chapter 7, provides guidelines). While BISC does have firefighter-qualified staff, the park depends primarily upon cooperators for its wildland fire suppression needs. Preparedness at the park will involve:

- ❑ Ensuring that the park has access to additional fire resources as the need arises.
- ❑ Maintaining fire records, weather data, maps and other associated information. The park fire management officer (hereinafter referred to as the park FMO) will submit BISC data annually, including daily situation reports during fire events, to the Southeast Regional Office FMO for entry into the Shared Application Computer System (hereinafter referred to as SACS), or the appropriate reporting system. The park FMO will utilize other system options as appropriate to maintain data on employee qualifications, hazard fuels, FIREPRO, etc.

- Preparing a pre-season risk analysis.
- Maintaining detection capabilities. Fire detection will be accomplished primarily by park field personnel, with additional input from visitors, cooperators and adjacent landowners.

4.2.2.1 Fire Prevention Activities

Prevention activities, designed to minimize the occurrence of human-caused wildland fires at the park, generally fall within one of three broad categories, as follows (*RM-18*, chapter 8, provides guidance):

- Education – Educating the public regarding the importance of wildland fire prevention can change people’s behavior. Park methods include signs, posters, bulletin boards, and face-to-face contacts with visitors, all of which facilitate public awareness, understanding, and support.
- Engineering – Engineering involves reducing or eliminating fire risks (ignition sources) and hazards (fuels). Park methods include creating and maintaining defensible space of at least 30 around all buildings, and utilizing fire-safe roofing materials (metal, asphalt shingles) on all buildings.
- Enforcement – Enforcement involves activities that ensure compliance with fire regulations and ordinances (including public use and access restrictions during times of high fire danger). Any wildland fire at the park will be investigated, both to identify the responsible party if human-caused, and to gain information that can be applied to future prevention efforts.

4.2.2.2 Annual Training Needs of Fire Staff

NPS fire management training meets criteria specified within the training curriculum approved by the National Wildland Coordination Group (NWCG), which is tiered to positions described in the NWCG *Wildland Fire Qualifications*, *Prescribed Fire Job Qualifications*, and *Incident Command System Wildland Fire Job Performance* guides. The park FMO will conduct annual training need analyses, and coordinate training courses as appropriate. Courses identified will be based upon employee needs (as reflected in individual employee development plans), park fire management needs, and regional priorities. Training will be conducted on an interagency basis to the greatest extent possible. Any firefighter-qualified park staff will receive at least eight hours of annual safety refresher training (see section 8.1).

The park FMO will submit all pertinent employee data to the Southeast Regional Office FMO for entry into IQCS (or the appropriate reporting system).

4.2.2.3 Annual Equipment and Supply Readiness Procedures

As previously stated, BISC depends primarily upon cooperators for its wildland fire suppression needs.

4.2.2.4 Fire Weather and Fire Danger

4.2.2.4.1 Weather Station

The park FMO will access weather data from Everglades National Park.

4.2.2.4.2 National Fire Danger Rating System

The National Fire Danger Rating System (NFDRS) enables a land management unit to determine fire danger based upon an evaluation of the upper limit of predicted fire behavior. Calculations of fire behavior are based on fuels, topography and weather. NFDRS outputs give relative ratings of potential wildland fire growth and behavior, thereby allowing a unit to systematically correlate its readiness level to the predicted fire problems of the day. Everglades National Park uses the burning index (the NPS standard) as its primary day-to-day indicator of the potential amount of effort needed to suppress a single fire in a particular fuel type within a given area, and the Keetch-Byram Drought Index as its primary drought indicator. Both of these indices influence decisions regarding prevention activities, initial attack, and extended attack.

4.2.2.4.2.1 Burning Index

The burning index (BI) is a number on an open-ended scale (although typically between 0 and 100), expressing the potential amount of effort needed to suppress a single fire in a particular fuel type within a given area. BI is based upon fuel model, fuel moisture, and current and forecasted weather parameters. As the BI increases, expected fire intensity increases. The higher the expected fire intensity, the more effort that will be necessary for fire suppression.

4.2.2.4.2.2 Keetch-Byram Drought Index (KBDI)

The KBDI is a mathematically-calculated drought indicator relating to the amount of moisture in the top seven inches of soil or duff. It ranges from 0-800, with 0 being saturated and 800 indicating maximum drought. Drought directly influences the flammability of all fuel/vegetation complexes (as drought progresses the upper soil layers dry, increasing the amount of dead and cured live fuels available for consumption), which in turn influences fire behavior and control efforts. For a description of fire behavior and effects that can be expected at increasing levels of drought in the southeast, see website <http://www.tncfire.org/resource/keetch.htm>.

4.2.2.5 Step-Up Staffing Plan

Because BISC depends upon cooperators for its wildland fire suppression needs, the park has no step-up staffing plan. The park FMO will stay apprised of fire danger via communication with Everglades National Park.

ONPS and FIREPRO fund routine preparedness actions. If severity funding is necessary, the park FMO will submit a written assessment of the current and potential situation, including a description of mitigating actions and costs to the SERO FMO.

4.2.3 Pre-Attack Plan

RM-18, chapter 7, provides a pre-attack planning checklist that will serve as a reminder of various elements to be considered at the park (as applicable) upon reaching staffing class levels 4 or 5 (as per Everglades National Park).

4.2.4 Initial Attack

Initial attack forces comprise the first suppression personnel to arrive at a fire, as well as any reinforcements that arrive during the first burning period. The incident commander (IC), who will be at least ICT5-qualified, will develop an appropriate management response to the incident, organize and direct the fire resources on hand toward safe, efficient implementation of that response, monitor the effectiveness of the suppression tactics, and adjust strategy and tactics accordingly. If the IC is not qualified for the existing or predicted level of complexity, s/he will be replaced by a qualified IC at the first opportunity. The IC will be responsible for the fire until it is out or until s/he is relieved of that duty via a formal command change.

In addition to BISC firefighters, cooperators who may perform initial attack on a wildland fire within FMU #1 (Mainland/Convoy Point), include the Florida Division of Forestry, Miami-Dade Fire Rescue, or Everglades National Park (EVER) firefighters.

BISC firefighters or EVER firefighters may respond to a wildland fire within FMUs #2 or #3 (park islands/keys).

4.2.4.1 Information Used to Set Initial Attack Priorities

The goal in all initial attack actions is to suppress the fire in a cost-effective manner, consistent with resource management objectives. Initial attack priorities at BISC are tiered to firefighter and public safety (the highest priority in every fire management activity), and the threat that the wildland fire poses to park values. Factors considered in assessing the degree of threat that the fire poses include the fire location, fuels, current and forecasted weather, and current and predicted fire behavior. When multiple fires are reported, fires occurring in the wildland-urban interface will take priority over fires occurring in natural areas.

4.2.4.2 Criteria for Appropriate Initial Attack Response

The appropriate initial attack response will be determined from an analysis of the given situation, and must be consistent with the park's general and resource management objectives. Factors dictating the appropriate management response include firefighter and public safety, fire location, current and predicted fire weather/fire behavior, park values at risk, cost-effectiveness, and potential adverse effects of both the fire and suppression efforts.

The appropriate initial attack response will vary from fire to fire, and sometimes even along the perimeter of the same fire. Options range from monitoring with minimal on-the-ground disturbance to aggressive suppression actions along the entire fire perimeter.

4.2.4.3 Confinement as an Initial Attack Suppression Strategy

A confinement strategy may be implemented as the initial attack action as long as it is not used to meet resource objectives. Confinement is selected in lieu of wildland fire use to maximize firefighter safety, minimize suppression costs, minimize cost + loss in low-valued and commodity resource areas, and to maximize availability of critical suppression and management resources during periods of high fire danger associated with fire in highly-valued resource areas.

Confinement may also be a strategic selection through the wildland fire situation analysis (WFSA) process when a fire is expected to exceed initial attack capability or planned management capability. When confinement is selected as the initial action, the same management process applies as for wildland fire use decisions. A long-term implementation plan is needed to guide the implementation of the confinement strategy. The wildland fire implementation plan (WFIP), prepared in stages, meets this requirement.

4.2.4.4 Typical Fire Response Time

Depending upon its location, the response time (from the time the fire report is received) to a wildland fire within FMU #1 (Mainland/Convoy Point) can take 5 minutes to an hour for BISC firefighters, about 30 minutes for Miami-Dade Fire Rescue, about 30 minutes for the Florida Division of Forestry, and 15 to 45 minutes for Everglades National Park (EVER) firefighters.

Again depending upon its location, the response time (from the time the fire report is received) to a wildland fire within FMU #2 (keys with park staff/visitor facilities; Boca Chita, Elliot and Adams keys) can take 5-45 minutes for BISC firefighters).

The response time for EVER firefighters, via helicopter, to a wildland fire within FMUs #2 or #3 (remaining keys) is about 45 minutes.

4.2.4.5 Restrictions and Special Concerns

Chainsaws, hand tools and drip torches may be used at any time for fire management purposes. Fire engines or slip-on units may be used as water sources, provided that they stay on existing roads. Water will be used in lieu of fire retardant. Heavy equipment such as bulldozers and plows for constructing fireline will not be used at the park, nor will fireline explosives.

4.2.4.6 Work/Rest Guidelines, Rest and Recuperation

The *Interagency Incident Business Management Handbook* (chapter 10, section 12.6) provides comprehensive direction on work/rest guidelines and rest and recuperation (R&R). It also provides guidance on the application of management-directed days off for employees at their home units. Management of work schedules, directed days off and R&R will be incorporated as appropriate into BISC fire management activities to give personnel proper rest so they remain productive, mentally alert, and physically capable of performing their jobs safely.

4.2.5 Extended Attack and Large Fire Suppression

4.2.5.1 Determination of Extended Attack Needs

Extended attack occurs when a wildland fire has not been controlled by initial attack forces, and additional firefighting resources are arriving, en route, or being ordered by the initial attack incident commander. It requires a wildland fire situation analysis (WFSA) to guide a re-evaluation of suppression strategies. The WFSA process determines current fire complexity and facilitates selection of a new management response, which in turn determines the number and type of resources needed for extended attack. Extended attack continues until the fire has been suppressed, or until transition to a higher-level incident management team is completed.

4.2.5.2 Implementation Plan Requirements—WFSA Development

A WFSA, required when extended attack occurs, serves as the decision record for selection of the appropriate management response. Whenever reasonable doubt exists regarding the successful outcome of an initial attack response, the park FMO will immediately begin a WFSA.

4.2.5.3 Complexity Decision Process from Initial to Extended Attack

One of the WFSA components is a fire complexity analysis guide. This guide contains specific yes/no questions regarding fire elements, including current and predicted fire behavior, resources committed, resources threatened, safety, ownership/jurisdiction, external influences, change in strategy, and existing overhead. The total number of positive responses to the questions determines the complexity/management level of the fire, i.e. type I, type II, or type III. The incident commander will submit the WFSA to the park superintendent for approval. If fire complexity dictates, the park FMO will request an interagency incident management team (type I or II) through the Florida Interagency Coordination Center.

4.2.5.4 Incident Commander Delegation of Authority

When an incident management (IM) team is mobilized to a BISC fire event, the park FMO will coordinate the transition of authority for suppression actions, and serve as agency advisor to the team during their time on the incident. The park superintendent will execute a written limited delegation of authority to the incoming incident commander, which will be included in the briefing package provided to the incoming IM team. The park superintendent will also conduct the eventual close-out and evaluation of the team. Appendix 13.7 provides a copy of the BISC limited delegation of authority for an incoming incident commander.

4.2.6 Exceeding Existing WFIP, Selecting New Strategy

The existing wildland fire implementation plan (WFIP) is exceeded when a wildland fire escapes initial attack or when the appropriate management response has not been successful, or when a prescribed fire can no longer be implemented in accordance with the approved plan. (As previously stated, prescribed fire will not be used at the park.) A wildland fire situation analysis (WFSA) will be used to determine a new appropriate management strategy.

4.2.7 Minimum Impact Suppression Tactics

NPS policy requires fire managers and firefighters to select management tactics commensurate with a wildland fire's existing or potential behavior, but which cause as little impact to natural and cultural resources as possible. All suppression activities at BISC will therefore incorporate the minimum impact suppression tactics policy, to the greatest extent feasible and appropriate for the given situation. Examples of minimum impact suppression tactics that will be implemented include:

- ❑ Keeping fire engines or slip-on units on existing roads.
- ❑ Not using heavy equipment (e.g. bulldozers, plows) for constructing fireline.
- ❑ Not using fireline explosives.
- ❑ Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of handline construction whenever possible.
- ❑ Keeping fireline width as narrow as possible when it must be constructed.
- ❑ Avoiding ground disturbance within known natural (e.g. critical habitat, T&E species) and archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- ❑ Using water in lieu of fire retardant.
- ❑ Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.
- ❑ Minimizing cutting of trees.
- ❑ Scattering or removing debris as prescribed by the incident commander.
- ❑ Protecting air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.

RM-18, chapter 9, provides minimum impact suppression tactics guidelines. The park FMO will provide input in the selection and implementation of minimum impact suppression tactics for any wildland fires that go into extended attack.

4.2.8 Rehabilitation Guidelines and Procedures

Fire rehabilitation involves short-term actions (generally 0-6 months) to stabilize a burned area and mitigate the effects of fire suppression activities. Immediate rehabilitation actions to prevent further land degradation or resource loss, or to ensure safety, may be undertaken as part of the incident. Rehabilitation action at the park will typically involve removing any trash and debris from an incident location and along the fireline.

Rehabilitation actions may be funded through emergency fire operations accounts. The park FMO will plan major rehabilitation efforts, which cannot be undertaken during or immediately after an incident, for implementation as soon as feasible.

4.2.9 Reporting and Documentation

When BISC reaches staffing levels 4 or 5 (as determined by the Everglades National Park step-up staffing plan), or upon confirmation of a wildland fire on park land, the park FMO will notify

the Southeast Regional Office FMO of such at the earliest possible time. During a fire event, the park FMO will submit a daily situation report to the Southeast Regional Office FMO for entry into SACS (or the appropriate reporting system). The park FMO will also complete a final record for each wildland fire, to be kept on file at BISC, which will include:

- ❑ Individual fire report DI-1202
- ❑ Narrative
- ❑ Wildland fire implementation plan
- ❑ Daily weather forecasts and spot weather forecasts
- ❑ Cumulative fire map showing acreage increase by day
- ❑ Total cost summary
- ❑ Monitoring data

GPS/GIS data should be the norm for recording location information whenever practical.

4.3 Non-Fire Fuel Treatment Applications

Non-fire fuels management at the park includes mowing, typically between the months of January and November, to maintain defensible space of at least 30 feet around park buildings/structures, where nonflammable material (e.g. concrete, gravel) is not present. This will be conducted in compliance with NEPA, NHPA, and other legal requirements. Maintenance of defensible space is an ONPS-funded activity.

4.4 Debris Disposal

There are areas on park keys where park staff cut and pile exotic vegetation as part of an invasive plant control project. There are also palm trees located throughout the park, which frequently shed their fronds. As the palm fronds fall in high visitor use areas, they are collected by maintenance staff as part of the park's grounds maintenance program. Additionally, coastal clean-up activities on barrier islands and vegetation removal in proximity to sites listed on the National Register of Historic Places are periodically conducted to promote resources preservation and protection stewardship. These activities also result in woody fiber and other combustible, non-toxic materials being collected and organized into debris piles. Burning these debris piles is the preferred course of action for two reasons: 1) it is impractical and cost-prohibitive to haul the debris off the keys/islands, and 2) burning will serve to destroy the seed bank and live vegetative material contained in the debris and thus prevent further spread and reinfestation of exotic, invasive species.

As per RM-18 (chapter 10, section VIII),

Fire may be used to dispose of wildland fuels generated from maintenance activities (such as grass or brush mowing or clippings), hazard tree removal, or during construction activities. These materials must be deemed infeasible or impractical to mechanically remove and must be in a non-wildland fuel environment (parking lot, boneyard, gravel pit, etc.)...All such activities and all new debris burning projects will be reviewed by a fire management officer, or appointed staff person, having wildland fire knowledge, in areas without a fire management officer.

If, after consultation with the fire management officer, it is determined that a debris disposal burn will meet all of the following conditions then it may be conducted within debris disposal guidelines.

1. Has virtually no chance to exceed the perimeter of the non-wildland environment.
2. Will not damage surrounding natural or cultural resources.
3. Does not present a safety threat to crew members.
4. Will not require curtailment during the burning operation.
5. Will not require a prescribed fire burn boss or fire-qualified personnel to implement.
6. Requires no follow-up monitoring to evaluate environmental impacts.

Otherwise, it will constitute a prescribed fire and must comply with all requirements for that type of activity.

For debris burns, all personnel will wear appropriate personal protective equipment. The supervisor of the burn will notify appropriate agencies (air quality, local fire departments, etc.) and neighbors and obtain all needed permits, and will develop an appropriate safety and evacuation plan in case of injuries or other emergencies. The crew should include someone who has previously conducted a similar burn at the site or a similar site.

4.5 Emergency Rehabilitation and Restoration

Burned area emergency stabilization and rehabilitation actions are intended to protect public safety, stabilize and minimize unacceptable change to biotic communities and imminently threatened cultural resources (treatment to prevent further erosion of sites; not inventory or mitigation of sites), improve ecosystem structure and function according to approved field unit management plans, and repair or replace minor facilities damaged or destroyed by a wildland fire. Burned area rehabilitation (BAR) subactivity funds can only be used for treatments on agency lands within the perimeter of the fire or impact area downstream from the burned area. The use of BAR funding is further limited based on treatment effectiveness and to improve economic efficiencies. The Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook provides treatment guidance and standards.

5.0 ORGANIZATIONAL AND BUDGETARY PARAMETERS

5.1 Fire Management Team Member Responsibilities*

SUPERINTENDENT

- Approves:
 - Park fire management plan.
 - Delegation of authority and briefing statement for any incoming incident management teams.
 - Wildland fire situation analysis.

* One individual may act in more than one of these roles.

- Ensures that:
 - All aspects of the park fire management program are effectively planned and implemented.
 - The park fire management plan is reviewed and revised as necessary.
 - An adequate number of trained and qualified personnel is available (via inter- and intra-agency cooperation) to meet park fire management needs.
- Conducts a post-fire critique of every wildland fire at the park.
- Establishes and maintains cooperative relationships with the public, media, other agencies, and park neighbors regarding BISC's fire management program.
- May, as a safety precaution, temporarily close all or part of the park to the visiting public in the case of a wildland fire or during extraordinary fire danger.

CHIEF RANGER/PARK FMO

- Plans, coordinates and implements all aspects of the park fire management program, including:
 - Conducting an annual preseason fire readiness inspection.
 - Coordinating and completing preparedness tasks.
 - Conducting annual fire-related training need analyses; organizing or arranging for training courses as appropriate.
 - Conducting fire management program budgeting process, requesting and tracking emergency preparedness and suppression expenditures, and fuels management accounts.
 - Maintaining fire-related computer files and submitting data to the Southeast Regional Office FMO for entry into SACS (or the appropriate reporting system).
 - Obtaining weather information.
 - Apprising park staff of Everglades National Park-determined step-up staffing levels, and any fire management activities.
 - Providing fire-related input to park superintendent, including research proposals, and recommending restrictions/area closures, as appropriate, when fire danger reaches critical levels.
 - Preparing delegation of authority for park superintendent's signature, and representing superintendent with incoming incident management teams.
 - Providing or coordinating the required physical fitness testing for park personnel.
 - Ensuring that only NWCG-qualified personnel are assigned to fire management activities at BISC.
 - Requesting additional fire resources as necessary through the FL Interagency Coordination Center.
 - Collaborating with park superintendent to ensure that fire-related MOUs and cooperative agreements are updated/revised as appropriate.
 - Enforcing any temporary park closures.

LAW ENFORCEMENT OFFICER

- ❑ Investigates all wildland fire ignitions at the park.
- ❑ Conducts evacuations, controls/escorts traffic, and performs other public safety duties as needed during wildland fire events.

RESOURCE MANAGEMENT SPECIALIST

- ❑ Continues coordination with the Southeast Archeological Center to ensure that BISC has the most current data regarding archeological resources within its boundaries. Provides recommendations on how to mitigate adverse effects to these resources during fire management activities.
- ❑ Continues coordination with the U.S. Fish and Wildlife Service to ensure that BISC has the most current data regarding identified sensitive, proposed, and listed species, as well as any proposed or designated critical habitat areas within its boundaries. Provides recommendations on how to mitigate adverse effects to these resources during fire management activities.
- ❑ Provides input regarding minimum impact suppression tactics.
- ❑ Coordinates any necessary compliance with Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act.

ADMINISTRATION

- ❑ Notifies FMO and LEO of smoke/fire reports.
- ❑ Acts as communication center during ongoing fire management activities.

5.2 FIREPRO Funding

FIREPRO funds are separate from the ONPS appropriation, and must be utilized for fire-dedicated functions. Base funding needs are calculated each year through the FIREPRO funding analysis. All positions base-funded by FIREPRO will remain dedicated to wildland fire management, with at least 80% of their normal tour-of-duty spent on wildland fire activities. FIREPRO provides funding for fire planning and oversight functions, budgeted activities necessary to prepare for the normal fire year, and for the development and implementation of the wildland fire suppression, emergency rehabilitation, and hazard fuels reduction programs. FIREPRO-funded fire management program elements include (see chapter 18 of *RM-18* for element details):

- ❑ Preparedness
- ❑ Prescribed fire management
- ❑ Wildland fire management

- ❑ National resource crews
- ❑ Step-up plans
- ❑ Severity
- ❑ Emergency rehabilitation

5.3 Organizational Structure of Fire Management Program

Appendix 13.8 provides an organizational chart depicting the BISC fire management program and its relationship to the park's overall organizational structure.

5.4 Interagency Coordination

BISC coordinates fire management activities with the Florida Division of Forestry, the Florida Interagency Coordination Center, Miami-Dade Fire Rescue, and local law enforcement (see chapter 5 of *RM-18* for authority and guidelines regarding interagency coordination).

5.5 Interagency Contacts

Florida Division of Forestry, Miami-Dade County, (954) 475-4194, or 911
Florida Interagency Coordination Center, (850) 521-2070
Miami-Dade Fire Rescue (Station 16, Homestead), 911
Miami-Dade Police Department, (305) 258-0733, or 911

5.6 Fire-Related Agreements

BISC is developing a memorandum of understanding (MOU) with Miami-Dade Fire Rescue. The BISC superintendent and FMO will review this MOU annually and update it as necessary. A statewide reciprocal fire protection MOU also exists between the U.S. Department of the Interior (National Park Service and U.S. Fish and Wildlife Service) and the Florida Division of Forestry. Appendix 13.6 includes copies of fire-related MOUs.

BISC has no structural firefighting capability. All structural fire events at the park will be referred to Miami-Dade Fire Rescue.

6.0 MONITORING

6.1 NPS Fire Monitoring Handbook

NPS policy requires managers to monitor the effects of all wildland and prescribed fires. Monitoring directives, summarized here from *Director's Order #18* are:

- ❑ Fire effects monitoring must be done to evaluate the degree to which objectives are accomplished.
- ❑ Long-term monitoring is required to document that overall programmatic objectives are being met and undesired effects are not occurring.

- Evaluation of fire effects data is the joint responsibility of fire management and natural resource management personnel.

BISC will conduct its fire monitoring program in accordance with the *NPS Fire Monitoring Handbook 2001 (FMH 2001)*, which outlines standardized methods to be used for monitoring wildland fires. Monitoring protocols will be reviewed and approved at the Southeast Regional Office level before receiving funding. The park FMO will coordinate with the Southeast Regional Office Fire Ecologist to establish monitoring plots at select locations within the park.

6.2 Recommended Standard Monitoring Levels

FMH 2001 provides recommended standards, divided into four monitoring levels, which constitute the lowest level of fire monitoring to be conducted by NPS units. Table 7 illustrates how these monitoring levels correspond to the given park management strategy.

Table 7: Management Strategies and Recommended Standard (RS) Monitoring Levels

Management Strategy	RS Level
Suppression: All management actions are intended to extinguish or limit the growth of a fire.	1. Environmental
	2. Fire observation
	-Reconnaissance
	-Fire conditions
Prescribed fire: Management uses intentionally set fires as a management tool	1. Environmental
To meet specific objectives.	2. Fire observation
	-Reconnaissance
	-Fire conditions
	3. Short-term change
	4. Long-term change

*Bold face print in RS level column indicates mandatory monitoring for the given management strategy.

6.3 Wildland Fire Monitoring

As indicated, wildland fire suppression requires level 1 and the first stage of level 2 monitoring. Level 1 monitoring, coordinated by the park FMO, involves environmental or planning data that provide the basic background information needed for decision-making when a wildland fire occurs. The reconnaissance stage of level 2 monitoring, also coordinated by the park FMO, provides a basic overview of a fire event. Monitoring the effect of suppressed wildland fire on vegetation or other area-specific variables can identify specific threats to park resources, facilitate adjustments to suppression actions, and identify the need for a rehabilitation response.

7.0 FIRE RESEARCH

The park's Resource Management Plan indicates no specific fire research necessary to implement or refine the fire management program.

8.0 FIREFIGHTER AND PUBLIC SAFETY

8.1 Firefighter Safety and Related Training, Qualifications, and Fitness Standards

Firefighter and public safety is the first priority in every fire management activity. Agency administrators at all levels must stress that firefighter and public safety *always* takes precedence over property and resource loss. This policy will be emphasized throughout all fire management operations at the park.

The NPS wildland fire training, qualification, and certification system meets or exceeds all National Wildfire Coordinating Group (NWCG) standards. Only fully qualified (i.e. meeting NPS qualifications and accepted interagency knowledge, skills and abilities for the assigned fire job) employees will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position). All personnel (including emergency hire firefighters) engaged in fireline operations must have completed a minimum of 32 hours of basic wildland fire training, including the modules on basic firefighting, basic fire behavior, and standards for survival.* The park FMO will coordinate at least eight hours of mandatory annual safety refresher training for all BISC staff likely to be on the fireline.

Any firefighter-qualified park fire management personnel will be equipped with approved personal protection equipment (PPE), and trained in its proper use. Operational personnel on wildland and prescribed fires (which will not be conducted at the park) are required to use the PPE. Mandatory PPE includes:

- ❑ 8” high, laced, leather boots with lug soles
- ❑ Fire shelter
- ❑ Hard hat with chin strap
- ❑ Goggles/safety glass
- ❑ Ear plugs
- ❑ Nomex shirt and trousers
- ❑ Leather gloves

The NPS *Wildland Fire Qualification System Guide* contains a supplemental list of PPE. Special PPE and hazard analysis is required for operations involving fuel gelling agents, fireline explosives, aircraft (particularly helicopters), and chainsaw operations. Prior to and throughout all fire management field operations at the park, fireline supervisors will cover safety factors with incident personnel, via operational briefings beforehand, and safety briefings that occur during the incident. No NPS employee, contractor or cooperator will ever be intentionally exposed to life-threatening conditions (see *RM-18*, chapter 3, for further safety-related planning and operational guidelines).

* An exception to this is Miami-Dade Fire Rescue, whose members adhere to state-determined standards during the first operational period of a wildland fire (beyond that, they must adhere to NWCG standards).

NPS policy requires that all personnel (including emergency firefighters) engaged in suppression and prescribed fire duties meet the physical fitness standards set by the NWCG. Physical fitness/work capacity levels for wildland firefighters and other fire-qualified employees will be determined by the “pack test” series of tests. Descriptions of the three work capacity levels (light, moderate and arduous), as well as medical and physical fitness requirements and procedures are outlined in the NWCG *Wildland Fire Qualifications Subsystem Guide*.

8.2 Public Safety Issues/Concerns, and Mitigation Procedures

Under no circumstances will an individual be permitted near a wildland fire at BISC without the appropriate training and required personal protective equipment (PPE). Members of the press may be allowed in the vicinity of a fire only if they are determined to meet the standards established for the light fitness rating, wear the required PPE, and are accompanied by a trained, qualified firefighter who can assist them.

In the case of a large wildland fire, or during times of extraordinary fire danger, the BISC superintendent or designee may, as a safety precaution, temporarily close parts of the park to the visiting public. The chief ranger is responsible for enforcing the closure. Every effort will be made to inform the general public of the situation and evacuate the area, if necessary. If a fire threatens to escape park boundaries, adjacent authorities and landowners will be given as much advance warning as possible so that they may take appropriate action.

9.0 PUBLIC INFORMATION AND EDUCATION

The BISC wildland fire prevention plan, included as Appendix 13.10, outlines public information/education activities related to the park fire management program.

10.0 PROTECTION OF SENSITIVE RESOURCES

10.1 Archeological/Cultural/Historic Resources

The park will incorporate archeological/cultural/historic resources protection into fire management in a variety of ways. For example:

- The park resource management specialist will continue coordination with the Southeast Archeological Center to ensure that BISC has the most current data regarding archeological resources within its boundaries. S/he will provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and will coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.
- Historic buildings will be protected from wildland fire via mowing of the grass around them.
- During all suppression activities, the minimum impact suppression tactics policy (see section 4.2.7) will be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of archeological/cultural/historic resources include:

- Keeping fire engines or slip-on units on existing roads.
- Not using heavy equipment (e.g. bulldozers, plows) for constructing fireline.
- Not using fireline explosives.
- Using existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of fireline construction whenever possible.
- Keeping fireline width as narrow as possible when it must be constructed.
- Avoiding ground disturbance within known archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.

In conjunction with the Southeast Regional Fire Management Office, the Southeast Archeological Center is developing a matrix for cultural resources in the Southeast Region. This matrix will identify values and risks typically associated with different types of archeological sites found in the Southeast, and will provide guidance as to how different fire management activities can be tailored to minimize or mitigate any deleterious effects to the resources potentially at risk.

10.2 Natural Resources

The park will incorporate natural resources protection into fire management in a variety of ways, including minimum impact suppression tactics. The tactics listed in 10.1 as directly or indirectly facilitating the protection of archeological/cultural/historic resources also facilitate the protection of natural resources. Additional tactics include:

- ❑ Avoiding ground disturbance within known natural resource locations (e.g. critical habitat, T&E species). When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- ❑ Using water in lieu of fire retardant.
- ❑ Minimizing cutting of trees.
- ❑ Protecting air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.

The park resource management specialist will continue coordination with the U.S. Fish and Wildlife Service to ensure that BISC has the most current data regarding identified sensitive, proposed, and listed species, as well as any proposed or designated critical habitat areas within park boundaries. S/he will provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and will coordinate compliance with Section 7 of the Endangered Species Act, as appropriate.

10.3 Development/Infrastructure

Development/infrastructure within the Mainland/Convoy Point Fire Management Unit (FMU #1) is concentrated at the built-up land on Convoy Point, including the park headquarters and visitor

center; visitor and staff parking areas; staff housing; a maintenance and storage area; temporary storage sheds; a field laboratory and dive locker; a picnic area with tables, grills, and restrooms; park and public boat basins; docks; and a park boat ramp.

Development/infrastructure within FMU #2 (Boca Chita Key, Elliot Key, and Adams Key) includes:

- Boca Chita Key: A boat dock, picnic area, restrooms, and primitive camping area, as well as historic architectural resources associated with the Honeywell private resort (discussed in section 3.4.1.9).
- Elliot Key: A visitor center (ranger station) with a restroom facility connected by a wooden boardwalk, two staff housing units, a maintenance complex, a maintenance dock, two public boat docks (Elliot Key Harbor and University Dock), a campground with picnic tables and grills, and walking trails.
- Adams Key: Staff housing, a public boat dock, a picnic area with pavilion, restrooms, a cistern for collecting drinking water, a generator shed, and walking trail.

11.0 FIRE CRITIQUES AND ANNUAL PLAN REVIEW

11.1 Critiques

As per NPS policy, the park superintendent or designee will conduct a post-fire critique of every wildland fire at BISC, involving as many personnel who participated in the incident as possible. The critique will follow *RM-18* (chapter 13) guidelines, and will cover all aspects of the incident, including safety, tactics, difficulties encountered, areas needing improvement, and whether or not specified objectives were met. The information gathered from these critiques will be used to continually improve the effectiveness and efficiency of the fire management program. The critique will be attached to the associated DI-1202 fire report as a permanent record, and stored in park fire files.

As previously stated, firefighter and public safety is the first priority in every fire management activity. Any incident which results in human entrapment, serious injury, fatalities, or near-misses, will be investigated and reviewed, with appropriate administrative action taken based upon investigation results. Additionally, the park superintendent may request a regional-level review of any incident in which:

- The fire crosses park boundaries into another jurisdiction without the approval of the adjacent landowner or agency.
- The park receives adverse media attention.
- Significant property damage occurs.
- Controversy involving another agency occurs.

The Southeast Regional Office FMO will conduct an in-depth review of any wildland fires involving a type I or type II team.

11.2 Annual Plan Review

The park FMO will review the FMP annually and identify any changes that should be made to improve the effectiveness of the plan. The BISC superintendent will approve significant changes to the body of the plan (excluding grammatical corrections, minor procedural changes, deletions, corrections, and additions to the appendices). The park FMO will promptly forward copies of all changes to the Southeast Regional Office FMO for review and comment. Changes requiring approval will be submitted with a new cover sheet for signatures and dates, which will replace the original cover sheet.

A formal plan review will be conducted every five years, and the plan revised to incorporate any policy changes that have occurred in that five-year period.

12.0 CONSULTATION AND COORDINATION

The following individuals provided information, assistance, and guidance in the preparation of this plan:

Karl Bachman, Facility Manager, Biscayne National Park
Rick Clark, Chief of Resources Management, Biscayne National Park
Clint Cross, Wildland Urban Interface Coordinator, NPS Southeast Regional Office
Dean Gettinger, Fire GIS Specialist, NPS Southeast Regional Office
Todd Kellison, Fishery Biologist, Biscayne National Park
Brenda Lazandorf, Cultural Resources Program Manager, Biscayne National Park
Caroline Noble, Fire Ecologist, NPS Southeast Regional Office
Bob Panko, Fire Management Officer, Everglades National Park
Holly Rife, Chief Ranger/Fire Management Officer, Biscayne National Park
Kevin Walsh, Prescribed Fire Specialist, NPS Southeast Regional Office

Appendix 13.1 References Cited

Anderson, H.E. 1982. Aids to Determining Fuel Models for Estimating Fire Behavior. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Experiment Station, Gen. Tech. Rep. INT-122.

Andrews, Patricia. 1986. BEHAVE: Fire Behavior Prediction and Fuel Modeling System. Intermountain Research Station, Ogden, UT. GTR-INT-194.

Ault, Jerald, Steven Smith, Geoffrey Meester, and Jiangang Luo. 2001. Site Characterization for Biscayne National Park – Assessment of Fisheries Resources and Habitats. University of Miami—Rosensteil School of Marine and Atmospheric Science.

Bradshaw, Larry. 2002. Fire Family Plus version 3.0.1.0. Rocky Mountain Research Station Fire Sciences Lab.

Deeming, John E., Robert E. Burgan, and Jack D. Cohen. 1978. The National Fire Danger Rating System. USDA Forest Service, Intermountain Forest and Range Experiment Station, GTR-INT-39.

General Authorities Act of 1970. 16 U.S.C. §§1a-1 et seq., Public Law No. 91-383.

Leynes, Jennifer Brown, and David Cullison. 1998. Biscayne National Park Historic Resource Study. National Park Service, Southeast Regional Office, Atlanta, GA.

Mulliken, John D., and Joel A. VanArman. 1995. Biscayne Bay Surface Water Improvement and Management, Technical Supporting Document. South Florida Water Management District, Planning Department, West Palm Beach, FL.

National Park Service Organic Act of 1916. 16 U.S.C. §§1-18f, 39 Statute F35.

National Park Service, U.S. Department of Agriculture Forest Service, Bureau of Indian Affairs, U.S. Fish and Wildlife, and Bureau of Land Management. 1998. Wildland and Prescribed Fire Management Policy: Implementation Procedures Reference Guide.

National Wildfire Coordinating Group Fireline Handbook, Appendix B, Fire Behavior. 1993. National Interagency Fire Center, Boise, ID.

Redwoods Act of 1978. 16 U.S.C. §§1, 1a-1, Public Law No. 95-250.

Secretaries of Agriculture and the Interior, Western Governor's Association, National Association of State Foresters, National Association of Counties, and the Intertribal Timber Council. 2001. A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-Year Comprehensive Strategy.

Sharkey, Brian, ed. 1997. Health Hazards of Smoke: Recommendations of the April 1997

Consensus Conference. Technical Report 9751-2836-MTDC. U.S. Department of Agriculture, Forest Service. Missoula Technology and Development Center. Missoula, MT.

U.S. Department of Agriculture, Forest Service. 1993. Minimum Impact Suppression Tactics. Northern Region.

U.S. Department of Agriculture, Forest Service. 2000. Wildland Fire in Ecosystems: Effects of Fire on Flora. Gen. Tech. Repot RMRS-GTR-42-volume 2. Fort Collins, CO: Rocky Mountain Research Station.

U.S. Department of Agriculture, Forest Service. 2000. Managing the Impact of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire-Adapted Ecosystems—A Cohesive Strategy. The Forest Service Management Response to the General Accounting Office Report GAO/RCED-99-65.

U.S. Department of the Interior, National Park Service. 1983. General Management Plan/Development Concept Plan/Wilderness Study and Environmental Assessment, Biscayne National Park.

U.S. Department of the Interior, National Park Service. 1995. Resource Management Plan, Biscayne National Park.

U.S. Department of the Interior, National Park Service. 1998. Director's Order #18: Wildland Fire Management.

U.S. Department of the Interior, National Park Service. 2001. Management Policies.

U.S. Department of the Interior, National Park Service. 2001. Wildland Fire Management Reference Manual-18.

U.S. Department of the Interior, U.S. Department of Agriculture. 1995. Federal Wildland Fire Management Policy and Program Review. Final Report—December 18, 1995.

U.S. Department of the Interior (Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service, Bureau of Indian Affairs, Geologic Survey, Bureau of Reclamation), U.S. Department of Agriculture Forest Service, Department of Energy, Department of Defense, Department of Commerce (National Oceanic and Atmospheric Administration/National Weather Service), U.S. Environmental Protection Agency, Federal Emergency Management Agency, National Association of State Foresters. 2001. Review and Update of the 1995 Federal Wildland Fire Management Policy.

Appendix 13.2 Definitions of Terms, as They Pertain to Fire Management

Burning index (BI): A relative number related to the contribution that fire behavior makes to the amount of effort needed to contain a fire in a specified fuel type. Doubling the burning index indicates that twice the effort will be required to contain a fire in that fuel type as was previously required, providing all other parameters are held constant.

Confinement: The restriction of a wildland fire within specific boundaries identified prior to or during the fire event. The boundaries, which are natural or human-made barriers, serve to confine the fire. Direct and/or indirect attack methods can be taken to hold the fire at the barriers, including backfiring, cold trailing, use of hose lays, and patrolling or mopping up the fire perimeter.

Cultural resource: Any physical evidence of past human activity used to reconstruct human history and prehistory.

Direct attack: Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

Extended attack: Occurs when a wildland fire cannot be controlled through initial attack and requires more than two operational periods to be controlled, and/or when the appropriate management response has not been successful. Extended attack implies that the complexity level of the incident will increase beyond the capabilities of initial attack incident command.

Fire management plan (FMP): A strategic document that defines a long-term program to manage wildland and prescribed fires within an NPS unit, in support of the unit's general and resource management plans.

Fire management unit (FMU): Any land management area definable by objectives, topographic features, access, values to be protected, political boundaries, fuel types, major fire regimes, etc. that set it apart from management characteristics of an adjacent unit.

Fire regime: The pattern of fire in an area as determined by its systematic interaction with the biotic and physical environment. It includes the timing, number, spatial distribution, size, duration, behavior, return interval, and effects of natural fires.

Fire weather: Weather conditions that affect fire ignition, behavior, and suppression.

Fuel: All combustible material, including grasses, dead branches and pine needles on the ground, standing live and dead trees, flammable minerals near the surface (e.g. coal) and human-built structures. Fuels are generally divided into four size classes based on their ability to ignite:

- 1 - hour time lag - <1/4" diameter (grass, litter, duff)
- 10 - hour time lag - 1/4" to 1" diameter (twigs, small stems)
- 100 - hour time lag - 1" to 3" diameter (branches)
- 1000 - hour time lag - >3" diameter (large branches and stems)

Fuel model: A simulated fuel complex for which all fuel descriptors required for the solution of a

mathematical rate of spread model have been specified.

Hazard fuels: Large or abnormal fuel concentrations that form a special threat of ignition and resistance to control.

Hazards: The fuels and topography on which a wildland fire will spread.

Holding actions: Planned actions required to achieve wildland and prescribed fire management objectives. For prescribed fires, these actions are developed to restrict the fire inside the planned burn unit. For suppression actions, holding actions may be implemented to prohibit the fire from crossing containment boundaries. These actions may be implemented as firelines are established to limit the spread of fire.

IQCS: Incident Qualifications and Certification System

Incident commander (IC): Person responsible for incident activities including the development and implementation of strategic decisions, and for approving, ordering and releasing resources.

Indirect attack: A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuel breaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.

Initial attack: The actions taken by the first resources to arrive at a wildland fire to protect lives and property, and prevent further extension of the fire.

National Fire Danger Rating System (NFDRS): A set of computer programs and algorithms that allow a unit to estimate fire danger, based on an evaluation of the upper limit of predicted fire behavior.

Preparedness: Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

Prescribed Fire: A management-ignited wildland fire that burns under specified conditions of weather, fuel moisture, soil moisture, etc., that allow confinement of the fire to a predetermined area, and at the same time produce the fire behavior and fire characteristics required to accomplish planned management objectives.

Risk: Any heat source or human activity that can result in wildland fire ignition.

Suppression: All actions intended to extinguish or limit the growth of a fire, regardless of the strategies or tactics chosen.

Values: Areas where losses from wildland fire are unacceptable, such as archeological sites, developments, endangered species, adjacent land, etc.

Wildland fire: Any non-structural fire, other than prescribed fire, that occurs in the wildland.

Wildland fire implementation plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire. A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e., fires managed for resource benefits will have two-three stages of the WFIP completed, while some fires that receive a suppression response may only have a portion of stage I completed.)

Wildland fire situation analysis (WFSA): A systematic decision-making process that evaluates alternative management strategies to determine the most appropriate management strategy for a particular situation. Reasonable management alternatives are identified, analyzed and evaluated, consistent with the expected probability of success/consequences of failure. Evaluation criteria include firefighter and public safety, anticipated costs, resource impacts, and environmental, social and political considerations. From the management alternatives, a preferred alternative is selected, and the decision documented. The evaluation must clearly identify the point at which failure of the alternative is imminent. This becomes the triggering mechanism for re-evaluation of the WFSA, at which point the WFSA is amended or a new WFSA is completed to develop new alternatives.

Wildland fire use: The permitting of a naturally-ignited fire to burn under specific, predetermined environmental conditions, in pre-designated areas, in order to achieve defined resource management objectives.

Appendix 13.3 Park Species Lists

Appendix 13.4 NEPA Compliance

Appendix 13.5 Fire Call-Up List

Appendix 13.6 Memoranda of Understanding

NPS Agreement No.
H5023-02- 0515

Memorandum of Understanding
Between the
United States Department of Interior
(National Park Service, Southeast Region and the
U.S. Fish & Wildlife Service, Southeast Region)
and the
Florida Department of Agriculture and Consumer Services
(Division of Forestry)

ARTICLE I – BACKGROUND AND OBJECTIVES

This Memorandum of Understanding is hereby entered into this October 30, 2002 by and between the **Florida Division of Forestry**, a state agency (the STATE), and the **National Park Service and U.S. Fish and Wildlife Service**, agencies of the U.S. Department of the Interior (DOI), (the SERVICE), covering a reciprocal fire protection agreement.

The SERVICE is mandated to protect and perpetuate natural and cultural resources found within national parks and wildlife refuges, and is responsible for conducting fire management activities in federal parks and wildlife refuges in Florida which are adjacent to areas protected by the STATE; and

The STATE is responsible for conducting fire management activities on state owned and privately owned lands in Florida which are adjacent to and interspersed with National Park and National Wildlife Refuge lands; and

It is to the mutual advantage of both the STATE and the SERVICE to coordinate their efforts in the prevention, detection, suppression, and investigation of wildfires in and adjacent to their areas of responsibility.

Each agency shall render mutual assistance in law enforcement activities and the gathering of evidence and in actual court prosecutions to the fullest extent allowable by law and policy.

ARTICLE II –AUTHORITY

This agreement is entered into under the authority of 42 USC § 1856a (1994) and Florida Statue, Title XXXV, Chapter 589.04 and 590.02.

ARTICLE III –STATEMENT OF WORK

The SERVICE and the STATE agree to:

A. General Operations

1. Working in close consultation with one another, the corresponding field units may conduct fire management activities and preliminary fire-related investigations on the lands located within each other's jurisdictions, all in accordance with the provisions of this Memorandum of Understanding (MOU) and their respective annual operating plans. The plans will be drafted upon execution of this MOU and will be revised or modified as necessary on an annual basis. The prescribed content and format for the plans are set forth in the Attachment "A", the Annual Operating Plan.
2. Each corresponding field unit, upon the request of the other field unit, will dispatch fire fighting equipment and personnel to assist in the emergency suppression of fires in areas for which the requesting field unit is responsible, provided that in the judgement of the sending field unit, the fire danger and risk on lands for which it is responsible are such that the said equipment and personnel may safely be released.
3. Each corresponding field unit, to the best of its knowledge and ability, when suppressing fires for the receiving field unit will adhere to the suppression and mop-up standards of the receiving field unit insofar as resources are available. The fire management strategy to be used within the lands under the jurisdiction of the each field units will be addressed in the annual operating plans or specific Incident Action Plans. If adequate resources are not available to meet such standards, the field unit providing assistance shall notify the field unit requesting assistance at the earliest possible time.
4. Each corresponding field unit will aggressively investigate and report on wild fires under its jurisdiction. Coordination activities will be outlined in the annual operating plan.
5. Each corresponding field unit will keep the other field unit informed of major changes within its own unit with respect to facilities, personnel, equipment, services, and supplies that affect day to day operations.
6. Fire prevention and education programs will be coordinated to achieve the fire prevention objective outlined in the annual operating plans, without duplication of

effort.

7. Field units will ensure that coordinated dispatching of resources will be initiated as rapidly as can be provided.
8. For purposes of making employment compensation claims, personnel dispatched by either corresponding field units for the benefit of the other field unit will be considered as employees of their own government agency. The STATE and the SERVICE will instruct their employees to act under the direction of the receiving field unit when so dispatched. When personnel of a sending unit is working for the benefit of a receiving unit, the receiving unit shall provide or arrange for immediate medical treatment of any injuries which may be incurred at the scene of the fire.
9. Each corresponding field unit will be responsible for the training of its respective fire management personnel and will invite representatives at all levels of the other field unit to attend and participate in training sessions and meetings.
10. Each agency shall provide authorization and identify radio frequencies for cooperative fire management use. Space and or facilities for electronic equipment, radios, and antennas shall be set forth in the annual operating plan. Applicable federal and state laws and regulations will govern use of radio communications.
11. Either corresponding field unit in accordance with its applicable rules and regulations may restrict activity or close areas to the public. However, before such action is taken, the corresponding field units will determine the severity of the situation. Every reasonable effort will be made to insure uniform and simultaneous action by both corresponding field units.
12. Fuel management and prescribed fire activities will be coordinated in order to provide training opportunities and to increase experience and qualifications. Either agency may provide personnel to assist the other on a non-reimbursable basis for fuel management and prescribe fire activities. Local managers may include language in the Annual Operating Plan to further clarify the roles and expectations of fuel management and prescribe fire cooperation. Assistance may also be provided on a reimbursable basis when both parties agree to this beforehand. Actual cost for personnel and prevailing rates for equipment as described in the Annual Operating Plan may be used or the parties will mutually agree upon the reimbursement rate prior to the activities being conducted.
13. Wildfires resulting from escaped prescribed fires ignited by or at the direction or under the supervision of one of the parties to this agreement shall be the financial responsibility of that party. All suppression costs shall be borne by the responsible party. A party may take appropriate suppression action when lands under its protection jurisdiction are involved in or threatened by the fire. Such suppression action may be taken on its own initiative or at the request of the responsible party. A party may take appropriate suppression action, at the request of the responsible

party, when lands under its protection jurisdiction are not involved in or threatened by the fire. The responsible party shall reimburse the other party for all suppression costs incurred in accordance with this claim.

B. Operations within Mutual Threat Zones

For those Service lands where a mutual threat zone is applicable, the SERVICE and STATE agree to define mutual threat zone as a geographical area between two or more jurisdictions onto which representatives from these jurisdictions would respond on initial attack. Due to complexities of boundary locations and maintaining detailed maps on these mutual threat zones, both agencies agree to define the mutual threat zones in the respective Annual Operating Plans.

1. Mutual aid, which is any form of free direct assistance from one fire agency in support of another during an emergency, based upon a pre-arrangement between the agencies involved is detailed in the Annual Operating Plan. Initial attack and extended attack responsibilities of each agency within and outside the mutual threat zone are included in the Annual Operating Plan.
2. SERVICE personnel acting as authorized agents of the STATE, or anyone acting at the direction of the STATE, shall have the same rights the STATE has, pursuant to Florida Statute 590.02 (3) at any or all times upon state or privately owned lands for the purpose of taking fire suppression actions.

C. The parties further agree as follows:

1. Each party to this agreement waives all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance of this agreement.

ARTICLE IV –TERM OF AGREEMENT

This MOU shall be effective on the date herein above first written and shall terminate five (5) years from that date. The term of this Memorandum of Understanding may be extended for an additional five (5) years if warranted and agreed to in writing by both parties.

ARTICLE V –KEY OFFICIALS

National Park Service

Ken Garvin
Southeast Regional Fire Management Officer
National Park Service
Atlanta Federal Center
1924 Bldg., 100 Alabama St., S.W.
Atlanta, GA 30303
404-562-3108 ext. 653

U.S. Fish and Wildlife Service

Roger Boykin
Southeast Regional Fire Coordinator
U.S. Fish and Wildlife Service
1875 Century Boulevard
Atlanta, GA 30345
404-679-7191

State of Florida

Jim Karels
Chief, Forest Protection Bureau
Florida Division of Forestry
3125 Conner Boulevard
Tallahassee, FL 32399-1650
850-488-6106

ARTICLE VI –PRIOR APPROVAL

Not applicable.

ARTICLE VII –REPORTS AND/OR OTHER DELIVERABLES

A. Reports

1. Each corresponding field unit will furnish to the other field unit, or make available upon request, any maps, documents, instructions, records and reports, including fire reports and law enforcement reports, which either field unit considers necessary in connection with this Agreement. Provision of such information shall be subject to the rules and regulations of the federal government, the State of Florida, and the DOI.
2. For statistical purposes each corresponding field unit will report fires in accordance with its current procedures. The field units will exchange fire report data as they deem appropriate.

B. General Payment Provisions

1. When assistance with fire management activities is requested and received by one corresponding field unit, said field unit may reimburse the field unit that rendered the assistance. If a reimbursement is to be made, payment will be made in accordance with this MOU and the annual operating plan. Payment will be based on the actual costs incurred by the field unit rendering assistance.
2. To the extent possible, rates to be charged or reimbursed for equipment used in firefighting shall be set forth in the annual operating plan. If one corresponding field unit agrees to reimburse the other field unit for equipment, (including aircraft), reimbursement will be made at the rates set forth in the annual operating plan. If rates for certain equipment used for fire management activities are not specified in the annual operating plan, the reimbursement rate will be mutually agreed upon by the parties upon conclusion of the fire.
3. One corresponding field unit also may reimburse the other field unit for the cost of the personnel services. Salary or wages will include the actual cost to the sending field unit for work performed during the time between departure from and return to the official station. Overtime may be included, if and when overtime is earned under the laws or rules governing the employees of the sending field unit. It is not intended that salary, overtime, travel or subsistence costs will be reimbursed for the administrative personnel not directly associated with the fire management activities unless specifically agreed upon in the annual operating plan.
4. Payments for reimbursable services rendered under this MOU may be made only upon receipt of an itemized statement that conforms to the requirements set forth

herein. Within 60 days of each reimbursable fire, the field unit rendering the assistance shall furnish the field unit receiving the assistance an itemized statement containing the following information:

- a. The date and location of the fire.
 - b. Name(s) of person(s) who ordered equipment and name(s) of person(s) from whom the equipment was ordered.
 - c. Type of truck or transportation furnished, number of miles traveled, rental rate, and the total evaluated cost as set forth in the annual operating plan.
 - d. Type of tractor, plow, engine, aircraft, or other equipment furnished, hours actually operated, rental rate, and total evaluated cost as set forth in the annual operating plan.
 - e. Names and Social Security Numbers of personnel dispatched to the fire, time of dispatch and time of return to official station, total elapsed time, rate of pay, and total pay.
5. Equipment owned and used by one corresponding field unit to suppress fires on lands for which the other field unit is responsible will be operated, serviced, and repaired by the field unit that owns the equipment unless specified otherwise in the annual operating plan.

C. Reimbursements to the State

1. After a reimbursable fire occurs upon SERVICE lands, the STATE's Regional Forester or designee may prepare and send to the SERVICE's Park Superintendent or Refuge Manager at the receiving unit an itemized statement in accordance with the provisions set forth herein and in the annual operating plan for the field unit involved. The SERVICE, upon receipt of the itemized statement, shall ensure the proper processing of a funding document package.
2. Reimbursements to the STATE shall be made payable to the local field office of the Florida Department of Agriculture and Consumer Services, Division of Forestry.
3. The SERVICE shall not be bound to make any expenditure under the terms of this MOU or any annual operating plan except as funds are appropriated by the Congress of the United States, or otherwise are made available for such purpose.

D. Reimbursements to the Service

1. After a reimbursable fire occurs upon STATE lands, the Park Superintendent or Refuge Manager may prepare and send to the STATE's Regional Forester an itemized statement in accordance with the provisions set forth herein and in the

annual operating plan for the field unit involved. The STATE, upon receipt of the itemized statement, shall ensure the proper processing of a funding document package.

2. Reimbursements to the SERVICE shall be made payable to the National Park Service or the U.S. Fish and Wildlife Service.
3. The STATE shall not be bound to make any expenditure under the terms of this MOU or any annual operating plan except as funds are appropriated by the State of Florida, or otherwise are made available for such purpose.

ARTICLE IX –MODIFICATION AND TERMINATION

- A. This agreement may be modified only by a written instrument executed by all the parties.
- B. Either party may terminate the MOU by providing sixty (60) days advance written notice. In the event that one party provides the other party with notice of its intention to terminate, the parties shall meet promptly to discuss the reasons for the notice and to try to resolve their differences amicably. The parties commit to using every reasonable means available, including the use of a neutral mediator if necessary, to try to avoid terminating this agreement.

ARTICLE X –STANDARD CLAUSES

A. Civil Rights

During the performance of this agreement, the participants agree to abide by the terms of USDI-Civil Rights Assurance Certification, non-discrimination, and will not discriminate against any person because of race, color, religion, sex, or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, sexual orientation, national origin, disabilities, religion, age or sex.

B. Promotions

The State of Florida shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts, or other publications) which states or implies Governmental, Departmental, bureau, or Government employee endorsement of a product, service, or position which the State of Florida represents. No release of information relating to this agreement may state or imply that the Government approves of the State of Florida's work product or considers the State of Florida's work product to be superior to other products or services.

C. Public Information Release

Both the Service and the State will cooperate in seeking out and utilizing media opportunities associated with fire management activities in on state and federal lands. When both agencies are involved in a joint fire suppression effort, or when a news release by one agency is likely to have a direct impact on the other agency, a joint release will be developed and issued by the spokesperson of each agency. Specific information procedures and interface requirements with Incident Management Teams are addressed in the Annual Operating Plan.

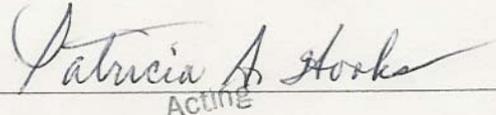
D. Liability Provision

Each party to this agreement will indemnify, save and hold harmless, and defend each other against all fines, claims, damages, losses, judgments, and expenses arising out of, or from, any omission or activity of such person organization, its representatives, or employees.

ARTICLE XI - SIGNATURES

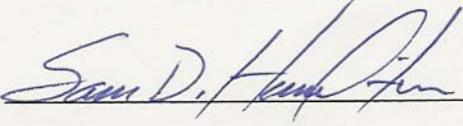
IN WITNESS HEREOF, the following authorized representatives of the parties have signed their names on the dates indicated, thereby executing this agreement.

For the National Park Service:



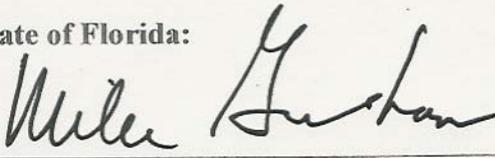
ACTIVE Date 10/31/02
Southeast Regional Director
National Park Service

For the U.S. Fish and Wildlife Service



Date 11/25/02
Southeast Regional Director
U.S. Fish and Wildlife Service

For the State of Florida:



Date 2-3-03
Director of Administration
Florida Department of Agriculture and Consumer Services

COOPERATING AGENCIES

National Park Service

Superintendent
Big Cypress Natl. Preserve
HCR 61 Box 110
Ochopee, FL 33943
Telephone (941) 695-1101

Superintendent
Biscayne National Park
PO Box 1369
Homestead, FL 33090-1369
Telephone (305) 230-1144 x3002

Superintendent
Canaveral National Seashore
308 Julia Street
Titusville, FL 32799-3521
Telephone (321) 267-1110

Superintendent
Castillo De San Marcos Natl. Monument
Fort Matanzas National Monument
1 South Castillo Drive
St. Augustine, FL 32084
Telephone (904) 829-6506 x221

Superintendent
DeSoto National Monument
P.O. Box 15390
Bradenton, FL 34280-5390
Telephone (941) 792-0458 x14

Superintendent
Everglades National Park
40001 State Road 9336
Homestead, FL 33034
Telephone (305) 242-7710

National Park Service

State of Florida

District Manager
Caloosahatchee District, D-17
10941 Palm Beach Blvd.
Fort Myers, FL 33905
Telephone (239) 690-3500

District Manager
Everglades District, D-18
3315 SW College Avenue
Fort Lauderdale, FL 33314
Telephone (954) 475-4120

District Manager
Orlando District, D-12
8431 S. Orange Blossom Trail
Orlando, FL 32809
Telephone (407) 856-6512

District Manager
Bunnell District, D-10
5001 US 1 North
Brunnell, FL 32110
Telephone (386) 446-6785

District Manager
Myakka River, D-15
4723 53rd Avenue
Bradenton, FL 34203-4138
Telephone (941) 751-7629

District Manager
Everglades Distirct, D-18
3315 SW College Avenue
Fort Lauderdale, FL 33314
Telephone (954) 475-4120

State of Florida

Superintendent
**Fort Caroline National Monument
Timucuan Ecological & Historical
Preserve**
13165 Mount Pleasant Road
Jacksonville, FL 32225
Telephone (904) 221-7567 x10

District Manager
Jacksonville District, D-7
7247 Big Oaks Road
Bryceville, FL 32009
Telephone (904) 266-5001

Superintendent
Gulf Islands National Seashore
1801 Gulf Breeze Pkwy
Gulf Breeze, FL 32563

Center Manager
Blackwater Forestry Center, D-1
11650 Munson Highway
Milton, FL 32570
Telephone (850) 957-6140

U.S. Fish & Wildlife Service

State of Florida

Refuge Manager
**Arthur R. Marshall Loxahatchee NWR
Hobe Sound NWR**
19216 Lee Road
Boynton Beach, FL 33437-4796
Telephone (561) 732-3684

District Manager
Everglades District, D-18
3315 SW College Avenue
Fort Lauderdale, FL 33314
Telephone (954) 475-4120

Refuge Manager
**Chassohowitzka NWR
1502 SE Kings Bay Drive**
Crystal River, FL 34429
Telephone (352) 563-2088

Center Manager
Withlacoochee Forestry Center, D-11
15019 Broad Street
Brooksville, FL 34601
Telephone (352) 754-6777

Refuge Manager
**Florida Panther NWR
Ten Thousand Island NWR**
1860 Tollgate Blvd.
Suite 300
Naples, FL 34114
Telephone (941) 353-8442

District Manager
Caloosahatchee District, D-17
10941 Palm Beach Blvd.
Fort Myers, FL 33905
Telephone (239) 690-3500

Refuge Manager
J.N. Darling NWR
1 Wildlife Drive
Sanibel, FL 33957
Telephone (941) 472-1100

District Manager
Caloosahatchee District, D-17
10941 Palm Beach Blvd.
Fort Myers, FL 33905
Telephone (239) 690-3500

U.S. Fish & Wildlife Service

State of Florida

Refuge Manager
Lake Woodruff NWR
P.O. Box 488
DeLeon Springs, FL 32130-0488
Telephone (904) 985-4673

Refuge Manager
Lower Suwanne NWR
Cedar Keys NWR
16450 NW 31ST Place
Chiefland, FL 32626
Telephone (352) 493-0238

Refuge Manager
Merritt Island NWR
Archie Carr NWR
Lake Wales Ridge NWR
Pelican Island NWR
St. Johns NWR
P.O. Box 6504
Titusville, FL 32782
Telephone (321) 861-0667

Refuge Manager
National Key Deer NWR
Crocodile Lake NWR
P.O. Box 430510
Big Pine Key, FL 33043-0510
Telephone (305) 872-2239

Refuge Manager
St. Marks NWR
P.O. Box 68
St. Marks, FL 32355
Telephone (850) 925-6121

Refuge Manager
St. Vincent NWR
P.O. Box 447
Apalachicola, FL 32329-0447
Telephone (850) 653-8808

District Manager
Bunnell District, D-10
5001 US 1 North
Brunnell, FL 32110
Telephone (386) 446-6785

Center Manager
Waccasassa Forestry Center, D-8
1600 NE 23rd Avenue
Gainesville, FL
Telephone (353) 955-2005

District Manager
Orlando District, D-12
8431 S. Orange Blossom Trail
Orlando, FL 32809
Telephone (407) 856-6512

District Manager
Everglades District, D-18
3315 SW College Avenue
Fort Lauderdale, FL 33314
Telephone (954) 475-4120

District Manager
Tallahassee District, D-4
865 Geddie Road
Tallahassee, FL 32304
Telephone (904) 488-1871

District Manager
Tallahassee District, D-4
865 Geddie Road
Tallahassee, FL 32304
Telephone (904) 488-1871

**GUIDELINES FOR THE
ANNUAL OPERATING PLAN**

(to be formulated between the units of the FL Division of Forestry and the NPS or FWS area)

PURPOSE:

Describe the purpose of this plan and how it is to function. Describe the operating procedures between the participating agencies within the framework of the Memorandum of Understanding. Cite the Memorandum of Understanding by title and effective date.

RESOURCE MANAGEMENT:

Discuss each agency's mandates; fire management policies; resource issues and concerns; consequent resource management objectives.

MUTUAL THREAT ZONES:

Discuss the initial attack suppression strategies that are acceptable where the boundary between the two agency's suppression responsibilities are not immediately distinguishable. Include a geographic description and map.

PRESCRIBED BURNING:

List any arrangements for the issuance of burning authorizations by agency. Detail arrangements. Discuss State and local notification procedures for conducting prescribed burns.

OPERATIONS:

Outline the fire organization in the mutual threat zone; list personnel in fire jobs. Discuss procedure for releasing resources and transitioning the fire to the responsible agency. Address acceptable fire suppression strategies. Detail who has first call, second call, support, ICS procedures, and unified command and how it is to function.

COMMUNICATIONS:

Include dispatch procedures and the procedures for keeping each other informed on fire potential and activity, and the status of fire equipment and personnel. Include under what condition radios will be made available including the type of equipment and where it is located.

PERSONNEL AND EQUIPMENT:

Detail resource listing of available equipment and personnel. Include a telephone directory. Discuss the types of equipment and under what conditions and where they may be used. List key personnel and any applicable qualifications. If applicable, list rates for equipment and personnel. Require full Personal Protective Equipment on fire activities, prescribed or wildland fire.

FIRE PREVENTION:

Detail interagency cooperation in fire prevention and fire education efforts.

INCIDENT REPORTS:

Detail arrangements to furnish incident reports to each agency.

TRAINING:

Discuss interagency training to be carried out at the local level. Include courses to be offered, qualified instructors, and location and facilities.

FACILITIES:

List facilities for meeting, training, and for emergency management functions.

FINANCIAL ARRANGEMENTS:

Include under what condition reimbursements will be made. Address the procedures for making reimbursements as outlined in the Memorandum of Understanding.

OTHER:

Detail any other applicable considerations.

PLAN APPROVAL:

District Forester and Park Superintendent approve the annual operating plan.

Appendix 13.7 Limited Delegation of Authority

Appendix 13.8 Fire Management Program Organizational Chart

Appendix 13.9 Wildland Fire Monitoring Plan

Appendix 13.10 Wildland Fire Prevention Plan