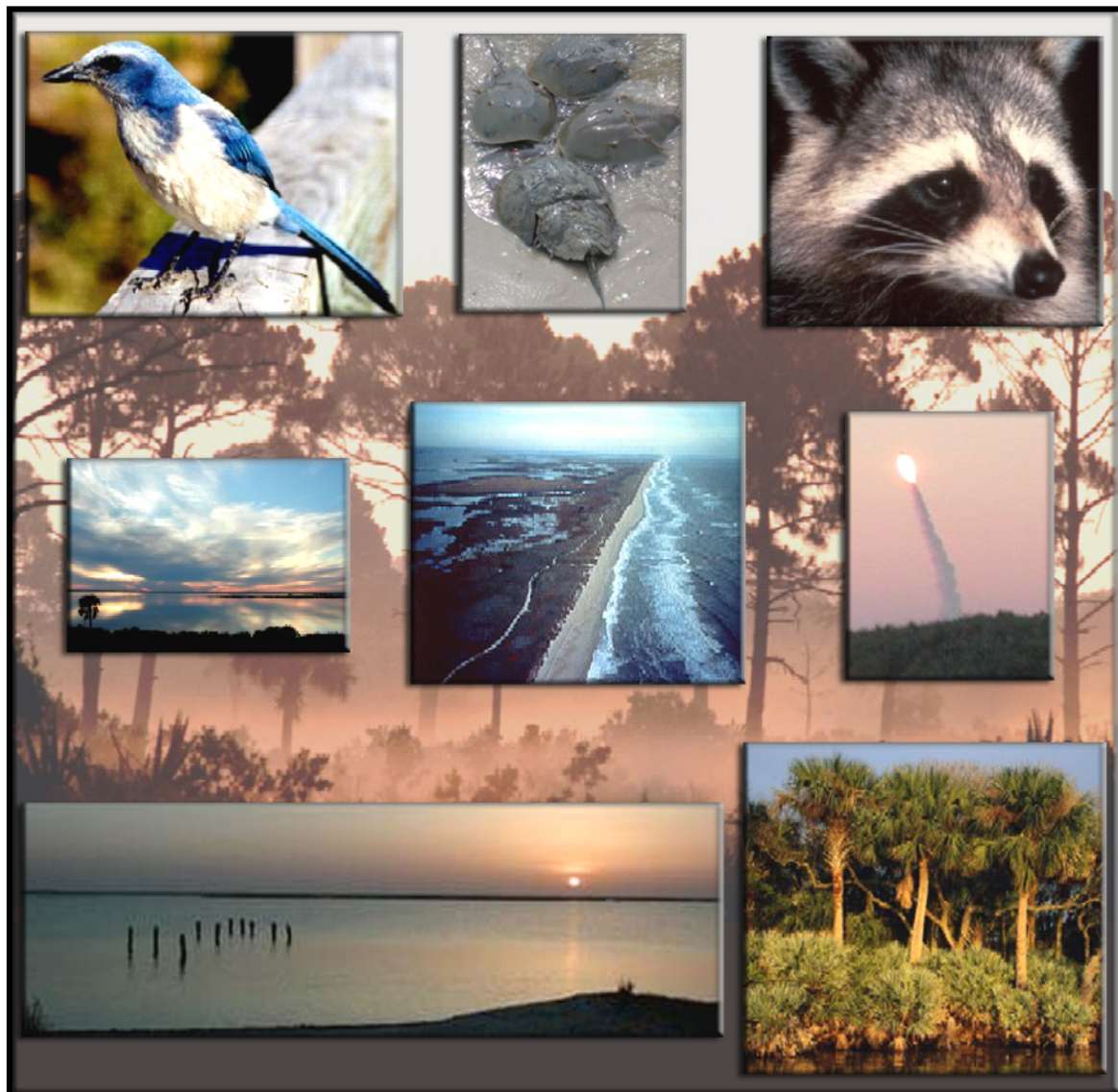




Fire Management Plan

Draft Environmental Assessment

May 2006



Canaveral National Seashore

Fire Management Plan

Draft Environmental Assessment

National Park Service
U.S. Department of the Interior

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Table of Contents

Chapter 1	Purpose and Need	1-1
1.1	Introduction	1-1
1.2	Purpose and Need	1-2
1.3	Background	1-3
1.4	Fire Management Objectives	1-4
1.5	Scoping Issues and Impact Topics	1-8
1.5.1	Important Issues Raised During Scoping Considered in this EA	1-8
1.5.2	Impact Topics Considered in this EA	1-8
1.5.3	Impact Topics Considered but Dropped from Further Analysis	1-10
Chapter 2	Issues and Alternatives	2-1
2.1	Alternatives Considered But Not Analyzed Further in This EA	2-1
2.1.1	Fire Management Plan to include Wildland Fire Use	2-1
2.2	Alternatives Considered and Analyzed in This EA	2-1
2.2.1	Alternative 1 (No Action Alternative) – Fire Management Plan to Include Wildland Fire Suppression, Limited Wildland Fire Use, Debris Burns, Prescribed Fire Use, and Manual/Mechanical Fuel Treatments	2-1
2.2.2	Alternative 2 (Preferred Alternative) – Implement a New Fire Management Plan to Include Updated Fire Management Units, Wildland Fire Suppression, Prescribed Fire Use, Debris Burns, and Non-Fire Fuels Treatment	2-4
2.2.3	Environmentally Preferred Alternative	2-17
2.3	Mitigation Measures and Monitoring	2-17
2.3.1	Fire Management Activities	2-19
2.3.2	Human Health and Safety	2-20
2.3.3	Property	2-20
2.3.4	Natural and Cultural Resources	2-21
2.3.5	Natural Resources	2-22
2.3.6	Air and Water Quality	2-22
2.4	Impact Definitions	2-23
2.5	Comparison of Alternatives	2-27
Chapter 3	Environmental Analysis	3-1
3.1	Soils and Geology	3-1
3.1.1	Affected Environment	3-1
3.1.2	Environmental Consequences	3-2
3.2	Water Resources (including Wetlands and Floodplains)	3-3
3.2.1	Affected Environment	3-3
3.2.2	Environmental Consequences	3-4
3.3	Vegetation	3-6
3.3.1	Affected Environment	3-6
3.3.2	Environmental Consequences	3-7
3.4	Wildlife	3-10
3.4.1	Affected Environment	3-10
3.4.2	Environmental Consequences	3-12
3.5	Air Quality	3-16
3.5.1	Affected Environment	3-16
3.5.2	Environmental Consequences	3-16

3.6	Visitor Use and Experience (including Park Operations).....	3-18
3.6.1	Affected Environment	3-18
3.6.2	Environmental Consequences	3-19
3.7	Human Health and Safety	3-20
3.7.1	Affected Environment	3-20
3.7.2	Environmental Consequences	3-21
3.8	Cultural Resources	3-23
3.8.1	Affected Environment	3-23
3.8.2	Environmental Consequences	3-24
3.9	Cumulative Impacts	3-26
Chapter 4	Consultation and Coordination	4-1
4.1	List of Preparers	4-1
4.2	Persons, Organizations, and Agencies Consulted	4-1
4.3	Persons, Organizations, and Agencies Who Received this EA	4-1
4.4	Scoping	4-2
Chapter 5	References Cited.....	5-1
Appendix A – Consultations with the U.S. Fish and Wildlife Service and The Florida Department of State: Division of Historical Resources		

List of Tables

Table 1-1	Impact Topics for Canaveral National Seashore Fire Management Plan EA	1-12
Table 2-1	Fire Management Objectives per FMU	2-6
Table 2-2	Five Year Prescribed Fire Schedule	2-7
Table 2-3	Five Year Mechanical Fuel Reduction Schedule	2-8
Table 2-4	Monitoring Strategies and Recommended Standards (RS) Monitoring Levels	2-18
Table 2-5	Impact Definitions	2-23
Table 2-6	Comparison of Alternatives.....	2-27
Table 3-1	Key Vegetative Openings Provided by Prescribed Burning per FMU.....	3-9
Table 3-2	Federally Endangered and Threatened Species	3-11
Table 3-3	Key Wildlife Species Protected by Prescribed Fires per FMU	3-15
Table 3-4	Affected Impact Topics and Activities/Land Uses Contributing to Fire Management Plan Cumulative Impacts	3-27
Table 3-5	Cumulative Impacts.....	3-28

List of Figures

Figure 1-1	Canaveral National Seashore Vicinity	1-13
Figure 1-2	Canaveral National Seashore	1-14
Figure 2-1	Canaveral National Seashore Fire Management Units	2-9
Figure 2-2	Apollo Beach Burn Units	2-10
Figure 2-3	Playalinda Beach Burn Units	2-11
Figure 2-4	Max Hoeck Burn Units	2-12
Figure 2-5	Bill’s Hill Burn Units	2-13
Figure 2-6	Mosquito Lagoon Burn Unit	2-14
Figure 2-7	Klondike Beach Burn Units	2-15
Figure 2-8	Perimeter Fuel Break for Bill’s Hill.....	2-16

Chapter 1 Purpose and Need

1.1 INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts from actions proposed in the Canaveral National Seashore (CANA) Fire Management Plan (FMP).

This EA has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the environment;
- Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;
- National Park Service Conservation Planning, Environmental Impact Analysis and Decision Making; Director's Order (DO) #12 and Handbook.

The Purpose of an Environmental Assessment (EA)

There are three primary purposes of an EA:

- To help determine whether the impact of a proposed action or alternative could be significant, thus indicating that an environmental impact statement (EIS) is needed;
- To aid in compliance with NEPA when no EIS is necessary by evaluating a proposal that would have no significant impacts, but that may have measurable adverse impacts; and
- To facilitate preparation of an EIS if one is necessary.

Key goals of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials.

In this case, the Superintendent of Canaveral National Seashore is faced with a decision to revise the Seashore's 1999 Fire Management Plan as described below. This decision would be made within the overall management framework already established in the 1981 Canaveral National Seashore General Management Plan¹ and the 1997 CANA Resources Management Plan. It is consistent with the 2001 Federal Wildland Fire Management Policy and Guidelines. The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the 1981 General Management Plan and the 2001 Federal Wildland Fire Management Policy and Guidelines.

¹ A revision of the 1981 GMP is currently being planned. The Fire Management Plan may be adjusted as appropriate once the new GMP is completed.

In making decisions about resources administered by the National Park Service (NPS), the Park Service is guided by the requirements of the 1916 Organic Act and other laws, such as the Clean Air Act, Clean Water Act, and Endangered Species Act. The authority for the conservation and management of the National Park Service is clearly stated in the Organic Act, which states the agency's purpose "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as would leave them unimpaired for the enjoyment of future generations." This authority was further clarified in the National Parks and Recreation Act of 1978: "Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

The requirements placed on the National Park Service by these laws, especially the Organic Act, mandates that resources are passed on to future generations "unimpaired" (DOI, 2001a). Impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be less likely to constitute impairment to the extent that it is an unavoidable result from an action necessary to preserve or restore the integrity of park resources or values (DOI, 2001b). This EA addresses whether the actions of the various alternatives proposed by Canaveral National Seashore impair resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the Seashore (2) key to the natural or cultural integrity of the Seashore or opportunities for enjoyment of the Seashore, and (3) identified as a goal in the Seashore's general management plan or other Park Service planning documents (see Chapter 3, Environmental Consequences).

Congress authorized Canaveral National Seashore on January 3, 1975, through Public Law 93-626. It was established to "... preserve and protect the outstanding natural, scenic, scientific, ecologic, and historic values of certain lands, shoreline, and waters of the State of Florida, and to provide for public outdoor recreation use and enjoyment of the same..." (Public Law 93-626). It is the most recent National Seashore and occupies 24 miles of an undeveloped barrier island on Florida's Atlantic coast supporting many species of birds and other wildlife. The lands and waters administered by the National Park Service adjoin the Kennedy Space Center and Merritt Island National Wildlife Refuge. Emphasizing natural preservation, Canaveral's legislation prohibits new development beyond that necessary for public safety and proper administration.

1.2 PURPOSE AND NEED

Fire has always been an integral part of most of Florida habitats. Florida's climate promotes fires through seasonal dry periods and frequent thunderstorms that produce lightning. Central Florida has some of the highest incidences of lightning strikes anywhere in the world. The flora and fauna of Florida have evolved in relation to fire. Many plant communities including scrub, pine

flatwoods, coastal strand, and marshes, depend on fire for their continued existence. The habitat of many threatened and endangered animals and plants depends on periodic burning. Fire suppression and landscape fragmentation mean that wildfires can no longer burn across the Florida landscape.

According to fire ecologist Dr. Cecil Frost (1998), "... fire once played a role in shaping all but the wettest, the most arid, or the most fire-sheltered plant communities of the United States."

While a natural fire regime no longer exists at the Seashore, the inherent role of fire is increasingly being recognized and incorporated into forest management.

The NPS Wildland Fire Management Guidelines (DO-18) state that, "all parks with vegetation that can sustain fire must have a fire management plan." The purpose of this federal action is to develop a fire management plan and program that utilizes the benefits of fire to achieve desired natural and cultural resource conditions while minimizing the fire danger to park resources and adjacent lands from hazardous fuel accumulations. There is a need to manage native plant communities, such as coastal hammocks, and restore and protect the historic landscape. At the same time, visitors, facilities, and resources on and adjacent to the Seashore must be safeguarded.

1.3 BACKGROUND

Canaveral National Seashore (CANA) is located on the east coast of central Florida, covering both southeast Volusia and northeast Brevard counties. It is roughly 40 miles east of Orlando and 12 miles south of Daytona Beach (Figure 1-1). The Seashore stretches from the communities of Bethune Beach and Edgewater along its northern boundary to Kennedy Space Center on the southern end (Figure 1-2). CANA's western boundary follows the Intracoastal Waterway in the upper one-third and runs along State Road 3 (Kennedy Parkway) in the lower two-thirds. The eastern boundary of CANA extends 0.5 miles offshore, paralleling the beach for approximately 24 miles. The Seashore is comprised of 57,662 acres of barrier islands, lagoons, coastal hammocks, pine flatwoods, and offshore waters.

CANA represents an example of a relatively stable barrier island backed by a productive lagoon system. A majority of CANA's acreage consists of Mosquito Lagoon, the northernmost water body of the Indian River Lagoon system. This estuary, recognized as an Estuary of National Significance, contains species diversity among the highest of any estuary in North America (Provancha et al. 1992). The far-reaching ecological importance of this area has been demonstrated by the variety of agencies that presently protect its waters and biodiversity. The State of Florida has designated Mosquito Lagoon as an Outstanding Florida Water. Mosquito Lagoon was additionally designated an Aquatic Preserve by the State of Florida through the Florida Aquatic Preserve Act of 1975.

The southern two-thirds (roughly 40,000 acres) of Canaveral National Seashore is owned by the National Aeronautics and Space Administration (NASA). The U.S. Fish and Wildlife Service (FWS) has managed the majority of the NASA portion since 1962, when the Merritt Island National Wildlife Refuge (MINWR) was established. Administrative control of the majority of this area was given to FWS in the Park's 1975 enabling legislation. Through a cooperative agreement between NPS and FWS, FWS is responsible for all natural resource management in

the southern part of the park, including fire management, while NPS is responsible for archeological site monitoring and protection.

The northern one-third of the park (15,700 acres, along with the 24 miles of beach and primary dune) was transferred to the NPS from the state of Florida. The revised Fire Management Plan addresses this portion of CANA.

1.4 FIRE MANAGEMENT OBJECTIVES

National Park Service Wildland Fire Management Guidelines (DO-18) require that all parks with vegetation capable of sustaining fire develop a wildland fire management plan. The plan should meet the specific resource management objectives for that park and ensure that firefighter and public safety are not compromised. This guideline identifies fire as the most aggressive natural resource management tool employed by the National Park Service. The guideline further states that all non-structural fires occurring in the wildland are classified as either wildland fires or prescribed fires. Prescribed fires and wildland fire use may be authorized by an approved wildland fire management plan and contribute to a park's resource management objectives. Human-caused wildland fires are unplanned events and may not be used to achieve resource management objectives by a park. At Canaveral National Seashore, human-caused wildland fires would not be used to achieve resource management objectives.

Wildland is an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

Wildland fires are any non-structure fires, other than prescribed fires, that occur in the wildland. This term encompasses fires previously called both wildfires and prescribed natural fires.

Prescribed Fires are any fires ignited by management actions in defined areas under predetermined weather and fuel conditions to meet specific objectives.

Wildland fire use is the management of naturally ignited (*e.g.* lightning) or human-ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

DO-18 identifies three paramount considerations for each Park's fire management program. They are:

- Protect human life and property both within and adjacent to Park areas;
- Perpetuate, restore, replace, or replicate natural processes to the greatest extent practicable; and
- Protect natural and cultural resources and intrinsic values from unacceptable impacts attributable to fire and fire management activities

At CANA, all wildland fires, regardless of origin or ignition source, would be suppressed via the appropriate initial attack response. Prescribed fire would be used primarily to reduce hazard fuels accumulations and promote ecosystem sustainability. Non-fire applications would include general grounds-care operations such as mowing and weedeating in open areas during the growing season. Non-fire fuels treatment would be used to create and/or maintain existing

defensible space around Seashore buildings, maintain existing firebreaks (including refurbishing existing holding lines around prescribed fire units prior to burning), and create and maintain a hazard fuels break along a section of the park perimeter to help prevent the spread of fire to and from adjacent non-agency lands. The Seashore's fire management goals, which follow, incorporate the park's overall management objectives as well as previously-discussed federal fire management policy principles and goals, including firefighter and public safety, collaboration, and accountability.

CANA's 1981 General Management Plan, which provides guidance for the preservation, use, development, and operation of the Seashore, influences fire management planning and activities by encouraging staff to:

- Plan and manage the Seashore, to the extent possible, in ways that enhance natural ecological and geological processes and mitigate human impacts on these processes.
- Identify, inventory, and monitor the condition of the several park resources (natural, historic, prehistoric) and provide appropriately for their protection and use.
- Coordinate planning and development of the Seashore with not only NASA and FWS but with the surrounding communities in order to protect the Seashore ecosystem.

The park's 1997 Resource Management Plan (RMP) states that CANA's resource management planning "... is based upon protection and preservation, as well as public use, of the natural and cultural resources." The RMP includes the following objectives:

- Preserve and protect natural values (scenic, scientific, and ecological).
- Preserve and protect historic values.
- Provide for public outdoor use and enjoyment.
- Fulfill responsibilities under generic legislation.

Principle #3 of the 2001 *Federal Fire Policy* states that, "fire management plans, programs, and activities [would] support general and resource management plans and their implementations."

In regards to fire management at the Seashore, the RMP states the following:

CANA is located in one of the most active lightening strike areas in the country. This, combined with the volatile fuels (particularly saw palmetto) and the extremely high fuel loads that have been allowed to accumulate, makes wildfire or human-ignited fire a serious threat. In addition, a number of vegetative communities and the animals that they support are dependent on periodic light to moderate fires. The past policy of complete fire suppression has resulted in a gradual change to less natural plant communities. Unless fuel loads are reduced, the danger of an excessively hot fire that would damage native vegetation and threaten adjacent developed areas is severe.

The park would utilize planned ignitions and, where appropriate, maintain critical natural habitat for a number of CANA's threatened and endangered species. Implementation of a fire program would require additional staffing or assistance from MINWR or other outside sources to record fire weather, provide initial response capability, reduce hazardous fuels, and monitor management-ignited fires.

CANA's 1999 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 Seashore's General and Resource management plan objectives, as well as its enabling legislation. Specifically, it states that:

- Wildland fire suppression would serve to protect human life, property, and natural and cultural resources from the adverse effects of unwanted fire.
- Prescribed fire and non-fire applications would serve to reduce hazard fuels accumulations. Reducing hazard fuels accumulations creates fuel conditions that support low-intensity fires, thereby reducing the threat of catastrophic wildland fire, and reducing the risk of negative impacts to natural and cultural resources, Seashore infrastructure, and adjacent property in the event of a wild fire. It also improves conditions for firefighter and public safety.
- Prescribed fire would serve to promote ecosystem sustainability at CANA. The plant communities here are fire-dependent or fire-adapted. Fire plays an essential role in maintaining serial stages of succession. Lack of fire favors fire-intolerant species over fire dependent ones. The interruption of natural burn cycles also results in abnormal fuel loading and unnaturally severe fires when ignitions do occur. Prescribed fire would also serve to improve habitat for the Florida scrub jay (*Aphelocoma coerulescens*), Bald eagle (*Haliaeetus leucocephalus*), Southeastern beach mouse (*Peromyscus polionotus niveiventris*), Eastern indigo snake (*Drymarchon coraisi couperi*), and Gopher tortoise (*Gopherus polyphemus*), all federally- or state-listed species.
- Mechanically creating and/or maintaining existing firebreaks would facilitate suppression efforts and help prevent the spread of wildland fire to and from adjacent non-agency land.
- Mechanically creating and/or maintaining defensible space around Seashore buildings would serve to protect them in the event of a wildland fire.

Fire management goals at CANA are to:

- Protect life, property, and Seashore resources from wildland fire.
 - 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 (including adjacent non-agency land).
 - Use prescribed fire and/or non-fire applications to reduce hazard fuels accumulations, which in turn:
 - Reduces the threat of catastrophic wildland fire, and reduces the risk of negative impacts to park resources in the event of a wildland fire.
 - Improves conditions for firefighter and public safety, and reduces suppression costs in the event of a wildland fire.
 - Mechanically create and/or maintain firebreaks, which facilitate suppression efforts and help prevent the spread of wildland fire to and from adjacent non-agency land.
 - Mechanically create and/or maintain defensible space around Seashore buildings.

- Conduct a fire prevention program to reduce human-caused wildland fires.
- Use prescribed fire to restore fire to its natural role at CANA and promote ecosystem sustainability. This includes:
 - Simulating natural fire return intervals to maintain fire-dependent or fire-adapted vegetation communities and their associated animal species.
 - Improving and/or maintaining habitat for the Florida scrub jay, Bald eagle, Southeastern beach mouse, Eastern indigo snake, and Gopher tortoise.
 - Promoting nutrient recycling for healthy soil conditions.
- Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective fire management program.
- Provide Seashore employees with fire operations training and experience so as to develop fully qualified personnel commensurate with the normal fire year workload.
- Manage all wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximizing efficiency via interagency coordination and cooperation.
- Develop new and maintain existing memoranda of understanding with state and local fire management agencies in order to facilitate close working relationships and mutual cooperation regarding fire management activities.
- Incorporate the minimum impact suppression tactics (MIST) policy into all suppression activities, to the greatest extent feasible and appropriate.
- Integrate knowledge gained through natural resource research into future fire management decisions and actions.
- 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.
- Plan and conduct all fire management activities in accordance with all applicable laws, policies and regulations.
- Promote understanding, appreciation, and support among Seashore visitors and neighbors for the Seashore's fire management program through interpretation, public information media, and local public school programs.

1.5 SCOPING ISSUES AND IMPACT TOPICS

On April 3, 2006, Canaveral National Seashore announced to the public its intentions to revise the 1999 Fire Management Plan. The announcements were made through a press release sent to five newspapers: the *Florida Today*, the *New Smyrna Observer*, the *Daytona News Journal*, the *Kennedy Space Center Daily News* (specific to the Kennedy Space Center), and the *Orlando Sentinel*. Public notices were displayed on the Seashore's website. The scoping letter and draft fire management plan were sent to Merritt Island National Wildlife Refuge, the Florida Department of State's Division of Historical Resources (State Historic Preservation Office, or SHPO), Dynamac Corporation on behalf of the Kennedy Space Center, the U.S. Fish and Wildlife Service office in Jacksonville, the NPS Southeast Archaeological Center, and the NPS Southeast Regional office. Formal consultation letters were sent to the U.S. Fish & Wildlife Service and the Florida SHPO. The public scoping period ended on May 5, 2006.

1.5.1 Important Issues Raised During Scoping Considered in this EA

There was at least one comment received during scoping which voiced no opposition to the proposed changes. Thus, no additional important issues or impact topics were added for consideration.

1.5.2 Impact Topics Considered in this EA

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, also listed in Table 1-1 below, do merit consideration in this EA.

Soils: Low and moderate-severity fires can benefit soils through a fertilization effect, while high-intensity fires can damage soils; therefore, impacts to soils are analyzed in this EA.

Water Resources (including wetlands and floodplains): NPS policies require protection of water resources consistent with the Federal Clean Water Act. The Indian River Lagoon (IRL) System stretches 156 miles from Ponce de Leon Inlet at the northern end to Jupiter Inlet at the southern end, covering a full 40 percent of Florida's east coast. Three distinct bodies of water make up the IRL System: the Indian River, Banana River, and Mosquito Lagoon. CANA is responsible for maintaining and protecting a large portion of Mosquito Lagoon, which is the northernmost sub-basin of the IRL System. Also, EO 11990 requires federal agencies to minimize the loss or degradation of wetlands. This policy requires that impacts to wetlands be avoided if possible and if wetlands are impacted then mitigation may be required. CANA is located in a transition zone where two types of salt water wetlands overlap.

Thinning treatments, prescribed fires, and wildland fire suppression efforts can adversely impact water quality (sediment delivery, turbidity); therefore, impacts to water resources, including wetlands and floodplains, are analyzed in this EA.

Vegetation: The Seashore is located along the “frost line” of central Florida resulting in a unique combination of temperate and subtropical plants found nowhere else in the western hemisphere. Thinning treatments, prescribed fires, and wildland fire suppression efforts can impact vegetation communities and rare plant species; therefore, impacts to vegetation are analyzed in this EA.

Wildlife: There are resident populations of various species of reptiles, amphibians, birds, mammals, fish, and invertebrates that can be adversely and/or beneficially impacted by thinning treatments, prescribed fires, and wildland fire suppression activities. Therefore, impacts to wildlife are evaluated in this EA.

The Federal Endangered Species Act prohibits harm to any species of fauna or flora listed by the U. S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Such harm includes not only direct injury or mortality, but also disrupting the habitat on which these species depend. Mosquito Lagoon is the northernmost part of the Indian River Lagoon (IRL) system, which contains one of the highest species diversity of any estuary in North America. The lagoon and adjacent uplands provide critical habitat for 13 federally listed threatened and endangered species, including the Eastern indigo snake and the Bald eagle. Therefore, impacts to federally-listed T&E species are analyzed in this EA.

Air Quality: The Federal 1970 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect a park’s air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within the park and surrounding region. In light of these considerations, air quality impacts are analyzed in this EA.

Visitor Use and Experience (including park operations): The 1916 Organic Act directs the NPS to provide for public enjoyment of the scenery, wildlife and natural and historic resources of national parks, “in such a manner and by such means as would leave them unimpaired for the enjoyment of future generations.” Fire management activities can result in the temporary closure of certain areas and/or result in visual impacts that may affect the visitor use and experience of the park. Therefore, potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

Severe fires can potentially affect operations at national parks, especially in more developed sites like visitor centers, campgrounds, administrative and maintenance facilities. These impacts can occur directly from the threat to facilities of an approaching fire, and more indirectly from smoke and the diversion of personnel to firefighting. Fires have caused closures of facilities in parks around the country. Thus, the potential effects of the FMP alternatives on park operations would be considered in this EA.

Human Health and Safety: Wildfires can be extremely hazardous, even life-threatening, to humans, and current federal fire management policies emphasize that firefighter and public safety is the first priority; all Fire Management Plans must reflect this commitment (NIFC, 1998). Therefore, impacts to human health and safety are addressed in this EA.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966, as amended, provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Cultural resources at the park include prehistoric shell middens and mounds, prehistoric burial mounds, a Civil War salt works, historic cemeteries, two historic canals, and four historic buildings, including remnants of a circa 1900 waterway community named Eldora. Several sites are located immediately outside of the Seashore boundary on MINWR property. These cultural resources can be affected by fire itself and fire suppression activities, thus potential impacts to cultural resources are addressed in this EA.

1.5.3 Impact Topics Considered but Dropped from Further Analysis

NEPA and the CEQ Regulations direct agencies to “avoid useless bulk...and concentrate effort and attention on important issues” (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been judged to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are briefly described and listed in Table 1-1 below, along with the rationale provided for considering them but dropping them from further analysis.

Noise: Noise is defined as unwanted sound. Fuels reduction, prescribed fires, and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws and trucks. Chain saws, at close range, are quite loud (in excess of 100 decibels). The use of machines, such as chainsaws, would be infrequent in light of the limited thinning to be conducted on the park (on the order of hours, days, or at most weeks per year). This is not frequent enough to substantially interfere with human activities in the area or with wildlife behavior. Nor would such infrequent bursts of noise chronically impact the solitude and tranquility associated with the park. Therefore, this impact topic is eliminated from further analysis in this EA.

Waste Management: None of the FMP alternatives would generate noteworthy quantities of either hazardous or solid wastes that need to be disposed of in hazardous waste or general sanitary landfills. Therefore this impact topic is dropped from additional consideration.

Utilities: Generally speaking, some kinds of projects, especially those involving construction, may temporarily impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables, potentially disrupting service to customers. Other proposed actions may exert a substantial, long-term demand on telephone, electrical, natural gas, water, and sewage infrastructure, sources, and service, thereby compromising existing service levels or causing a need for new facilities to be constructed. None of the FMP alternatives would cause any of these effects to any extent, and therefore utilities are eliminated from any additional analysis.

Land Use: Visitor and administrative facilities occur within the park. Fire management activities would not affect land uses within the park or in areas adjacent to it; therefore, land use is not included for further analysis in this EA.

Socio-economics: NEPA requires an analysis of impacts to the “human environment” which includes economic, social and demographic elements in the affected area. Fire management activities may bring a short-term need for additional personnel in the park, but this addition would be minimal and would not affect the neighboring community’s overall population, income and employment base. Therefore, this impact topic is dismissed from further analysis.

Transportation: None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the park. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from smoke emanating from wildland fires or prescribed fires. Over the long term, such closures would not significantly impinge local traffic since they would be both very infrequent, and, in the case of prescribed fire, of short duration (on the magnitude of 1-2 hours). Therefore, this topic is not included for further analysis in this EA.

Environmental Justice/ Protection of Children: Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies and activities on minority and low-income populations. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency’s Environmental Justice Guidance, therefore, these topics are not further addressed in this EA.

Indian Trust Resources: Indian trust assets are owned by Native Americans but held in trust by the United States. Indian trust assets do not occur within Canaveral National Seashore and, therefore, are not evaluated further in this EA.

Prime and Unique Agricultural Lands: Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. There are no prime and unique agricultural lands within the boundaries of Canaveral National Seashore; therefore, this impact topic is not evaluated further in this EA.

Wilderness: According to National Park Service Management Policies (2001), proposals having the potential to impact wilderness resources must be evaluated in accordance with National Park Service procedures for implementing the National Environmental Policy Act. Since there are no proposed or designated wilderness areas within or adjacent to the park, wilderness impacts are not further evaluated in this EA.

Resource Conservation, Including Energy, and Pollution Prevention: The National Park Service’s *Guiding Principles of Sustainable Design* provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. Proposed project actions would not minimize or add to resource conservation or pollution prevention on the park and, therefore, this impact topic is not evaluated further in this EA.

Table 1-1 Impact Topics for Canaveral National Seashore Fire Management Plan EA

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Soils	Retained	NPS <i>Management Policies 2001</i>
Water Resources (including wetlands and floodplains)	Retained	Clean Water Act; Executive Order 12088; NPS <i>Management Policies</i> ; Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; DO 77-1; DO 77-2
Vegetation	Retained	NPS <i>Management Policies</i>
Wildlife	Retained	NPS <i>Management Policies</i> ; Endangered Species Act
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; NPS <i>Management Policies</i>
Visitor Use and Experience (including park operations)	Retained	NPS <i>Management Policies</i>
Human Health & Safety	Retained	NPS <i>Management Policies</i>
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; NPS <i>Management Policies</i>
Noise	Dismissed	NPS <i>Management Policies</i>
Waste Management	Dismissed	NPS <i>Management Policies</i>
Utilities	Dismissed	NPS <i>Management Policies</i>
Land Use	Dismissed	NPS <i>Management Policies</i>
Socioeconomics	Dismissed	40 CFR Regulations for Implementing NEPA; NPS <i>Management Policies</i>
Transportation	Dismissed	NPS <i>Management Policies</i>
Environmental Justice	Dismissed	Executive Order 12898
Indian Trust Resources	Dismissed	Department of the Interior Secretarial Orders No. 3206 and No. 3175
Prime and Unique Agricultural Lands	Dismissed	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Wilderness	Dismissed	The Wilderness Act; Director's Order #41; NPS <i>Management Policies</i>
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; NPS <i>Guiding Principles of Sustainable Design</i> ; NPS <i>Management Policies</i>

Figure 1-1 Canaveral National Seashore Vicinity

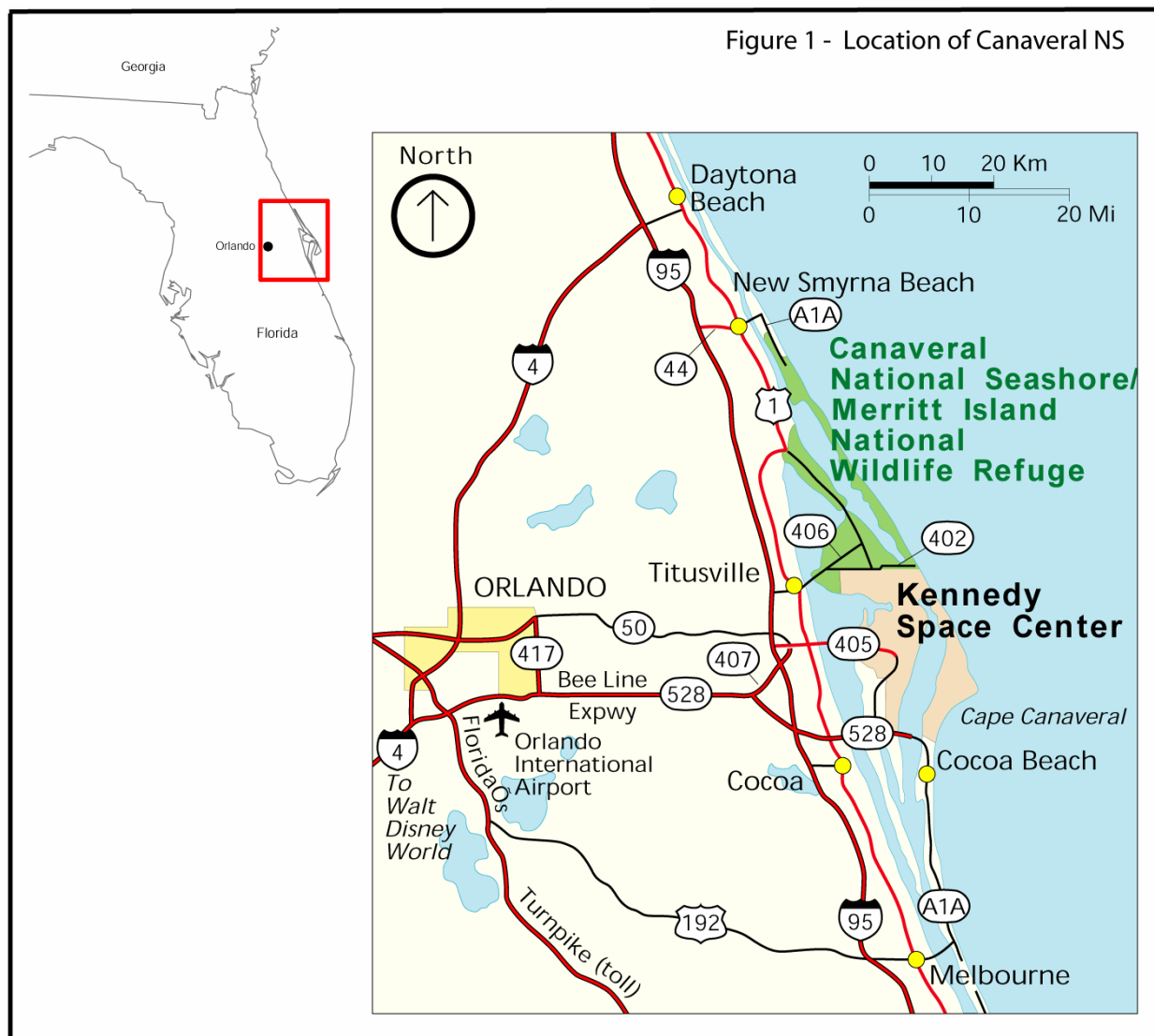


Figure 1-2 Canaveral National Seashore

Figure 2 - Canaveral National Seashore



Chapter 2 Issues and Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and the Interdisciplinary Team (IDT).

2.1 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER IN THIS EA

2.1.1 Fire Management Plan to include Wildland Fire Use

Wildland fire use involves the management of fires ignited by either human or natural means (usually lightning) that are permitted to burn under specific environmental conditions for natural resource benefits. In many cases, national parks and forests employ wildland fire use as a part of their fire management program to obtain natural resource benefits from wildfire. These parks and forests typically have large acreages and the areas identified for use contain few if any private residences and structures nearby (wildland urban interface). In such cases, wildland fire use is a critical component in meeting fire management objectives of federal agencies.

This alternative was considered but not analyzed further in this EA. The current authorized boundary of the Seashore (57,662 acres, of which 15,700 acres is the responsibility of the NPS for fire management) would not ensure fire containment within park boundaries. There are also staffing limitations, and the park is in close proximity to urban development. Park staff concluded that the potential risks to human health and safety and natural/cultural resources under this alternative outweigh any potential resource benefits that would be obtained from including wildland fire use in the Fire Management Plan.

2.2 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS EA

2.2.1 Alternative 1 (No Action Alternative) – Fire Management Plan to Include Wildland Fire Suppression, Limited Wildland Fire Use, Debris Burns, Prescribed Fire Use, and Manual/Mechanical Fuel Treatments

The No Action alternative, required by NEPA, assumes “no change” from current conditions or management, and provides a baseline for comparing the effects of action alternatives. Under this alternative, unwanted wildland fires would be suppressed, while allowing for the management and use of limited wildland fires, prescribed fires, debris burns, as well as manual/mechanical fuel treatments.

Currently the NPS-managed portion of the Seashore is divided into six Fire Management Units (FMUs) that fall into three categories. Two are full suppression zones. The remaining four provide for planned ignitions, with two of those units allowing management of unplanned fire under

specified conditions to accomplish resources management objectives. The types of individual units are as follows:

Full Suppression: All unplanned ignitions occurring within these units would be suppressed. Mechanical fuel manipulation may be used to reduce fuels and maintain natural conditions. Slash pile burns, which have been historically used to dispose of vegetation, are allowed.

- a. Apollo (includes Seminole Rest)
- b. Playalinda Beach

Planned Ignition/Suppression: The cause of all fires within these units would be determined. Unplanned fires would be suppressed. Planned ignition would be conducted in designated burn units and within specified weather and fuel moisture parameters.

- c. Max Hoeck
- d. Bill's Hill

Unplanned Ignition/Planned Ignition/Suppression: Natural (lightening-caused) fire as well as planned ignitions occurring within these units would be utilized to restore fire to its natural role. The cause of all fires would be determined. All human-caused fires would be suppressed.

- e. Mosquito Lagoon
- f. Klondike Beach

Suppression

Under this alternative, wildland fires in the park with the potential to harm park structures or cultural resources, or threaten the health and safety of park staff, visitors, or nearby residents would be suppressed immediately and in a manner that minimizes the negative environmental impacts of suppression activities. All wildfire suppression activities would adhere to Minimum Impact Suppression Tactics (MIST) guidelines as outlined in Section 2.3, *Mitigation Measures and Monitoring*.

Limited Wildland Fire Use (i.e. Unplanned Ignition)

Wildland fires of natural causes, such as lightening, would be allowed to burn in certain areas and under certain conditions to meet management objectives. For instance, there is a slight chance that the Mosquito Lagoon Islands could catch on fire during seasons of dry weather. The No Action Alternative would provide park staff with the option of letting an island wildfire burn if it happened to fall within an approved prescription. They would not be required to suppress the fire. Permitting wildland fires to burn under specific conditions and at specific locations would return the role of natural fires and create a random, natural mosaic. All unplanned human-caused fires would be suppressed.

Debris Burns

The Seashore has historically used debris burns to dispose of wildland fuels, such as slash piles generated from a variety of activities. As per the Wildland Fire Management Reference Manual 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, bone yard, gravel pit, etc.). All such activities and all new debris burning projects would 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 would meet all of the following conditions, then it may be conducted within the following debris disposal guidelines:

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

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

Prescribed Fire (i.e. Planned Ignition)

Prescribed fires would be conducted by park personnel to reduce fuel loadings, restore pre-settlement conditions, control exotic species, and enhance habitat for wildlife. Every fire prescription would include management action to minimize the production and accumulation of smoke. All planned ignitions would comply with state and local smoke management and air quality regulations.

Manual and Mechanical Fuels Treatment (i.e. Thinning)

Manual and mechanical thinning (*e.g.* chainsaws, brush hogs) would be utilized to reduce fuel loads around park structures to create or maintain a defensible space adjacent to park boundaries and cultural sites where prescribed fire is not an option.

2.2.2 Alternative 2 (Preferred Alternative) – Implement a New Fire Management Plan to Include Updated Fire Management Units, Wildland Fire Suppression, Prescribed Fire Use, Debris Burns, and Non-Fire Fuels Treatment.

Fire Management Units

Under this alternative, Canaveral National Seashore would be divided into seven Fire Management Units, or FMUs (see Figure 2-1), to facilitate the achievement of its fire management objectives (see Table 2-1).

Apollo Beach FMU #1 (see Figure 2-2)

This unit contains 1,455 acres and comprises the northern six miles of CANA's barrier island, including the developed areas of Eldora and Apollo Beach. It consists of a narrow isthmus between the Atlantic Ocean and Mosquito Lagoon, with the center bulging out into Mosquito Lagoon. It is bounded by the Seashore boundary along its northern side, the Klondike Beach FMU along its southern side, the Atlantic Ocean along its eastern side, and the Mosquito Lagoon FMU along its western side.

The unit is uniformly flat, rising from the Atlantic Ocean to only 20 feet above sea level at the highest elevation (with the exception of the prehistorically constructed Turtle Mound, which is 35 feet above sea level). The aforementioned bulge is covered by a hammock (Eldora Hammock) of mixed hardwood and cabbage palm. Bordering the Eldora Hammock to the east is an expanse of dense, continuous coastal scrub, with volatile fuels including saw palmetto, gallberry, wax myrtle, scrub oak, and cabbage palm.

Playalinda Beach FMU #2 (see Figure 2-3)

This narrow, linear unit, containing 144 acres, is located along the eastern edge of the southern six miles of CANA's barrier island. Adjoining the northeastern corner of the Max Hoeck FMU, the unit extends northward to the end of the paved road, which runs roughly north and south along the back side of the primary dune. The unit is bounded by the Klondike Beach FMU along its northern side, the Max Hoeck FMU along its southern side, the Atlantic Ocean along its eastern side, and the paved road along its western side. The property located to the west of the road lies within the area jointly managed by the NPS and the USFWS, in which MINWR is responsible for fire management. Vegetation consists primarily of dense stands of saw palmetto 6 to 10 feet high, interspersed with areas of grassy vegetation in the northern portion of the unit.

Max Hoeck FMU #3 (see Figure 2-4)

Located within the southeastern portion of the Seashore, this unit is approximately five miles long, three-quarters mile wide, and contains 1,075 acres. The unit is bounded by the beach access road (following an old mosquito control dike) along its northern and western sides, the NASA railway along its southern side, and the Atlantic Ocean along its eastern side.

This unit is a typical Florida coastal lowland environment in which seasonal flooding, perennially wet marshes, and swamps predominate. The western end of the unit is slightly elevated and contains cabbage palm, saw palmetto, scrub oak, and wax myrtle. Exotics such as Australian pine and Brazilian pepper occur on disturbed sites, but have been greatly reduced by recent exotic plant removal efforts.

Bill's Hill FMU #4 (see Figure 2-5)

This unit, containing 966 acres, is located on the mainland on the western side of Mosquito Lagoon, immediately south of the community of Oak Hill. It is bounded by the Seashore along its northern side, the Gomez-Grant Line (a 30-foot wide USFWS firebreak) along its southern side, Mosquito Lagoon along its eastern side, and Kennedy Parkway along most of its western side. The area south of the Gomez-Grant Line lies within the area jointly managed by the NPS and the USFWS, in which MINWR is responsible for fire management.

The unit is composed primarily of open slash pine flatwoods with a substory of live oak species, including *Quercus chapmanii*, *Q. geminate*, and *Q. myrtifolia*. Mesic flatwoods have runner oaks (*Quercus elliotii*) present. Pockets of marsh, grassy swale, swamp, and hammock also occur.

Mosquito Lagoon FMU #5 (see Figure 2-6)

This unit contains 11,603 acres (8,531 of which are water), comprises the northern end of Mosquito Lagoon and contains numerous small islands. The unit is bounded by the Seashore boundary along its northern side, open water along its southern side, the Apollo Beach FMU along its eastern side, and the Intracoastal Waterway along its western side. The terrestrial portion of this unit is composed primarily of oak hammock, red cedar, mixed mangrove, and high marsh.

Klondike Beach FMU #6 (see Figure 2-7)

This narrow, linear unit, containing 295 acres, comprises the eastern edge of the middle 12 miles of CANA's barrier island. The unit is bounded by the Apollo Beach FMU along its northern side, the Playalinda Beach FMU along its southern side, the Atlantic Ocean along its eastern side, and a sand/dike road, which runs roughly north and south along the western side of the primary dune. As with Playalinda Beach FMU, the area to the west of the road lies within the area jointly managed by NPS and the USFWS, in which MINWR is responsible for fire management. Vegetation within the unit is primarily coastal strand.

Seminole Rest FMU #7

Originally a portion of FMU #7, this small 20-acre unit is located along the western side of Mosquito Lagoon. It is comprised primarily of marsh vegetation and mowed grass, with scattered trees. Chances of intense fire in this unit are low due to the fact that the marsh vegetation is generally inundated, and the mowed grass should not support fire.

Table 2-1 Fire Management Objectives per FMU

FMU	Full suppression	Initial attack, within...	Maintain existing defensible space	# Prescribed burns over next 5 years
1	Yes	20 minutes	Yes	11 units
2	Yes	20 minutes	Yes	2 units
3	Yes	20 minutes	Yes	2 units
4	Yes	45 minutes	See Table 2-3	5 units
5	Yes	45 minutes	N/A	N/A
6	Yes	30 minutes	Yes	3 units
7	Yes	15 minutes	N/A	N/A

Suppression

Under this Alternative, all wildland fires, regardless of origin, would be suppressed. Wildland fire use for resource benefits would not occur. Suppression would occur in a cost-effective manner, consistent with resource objectives, considering firefighter and public safety (always the highest priority), and values to be protected.

The initial attack would be conducted within a given number of minutes of receipt of a wildland fire report, as noted in Table 2-1.

Prescribed Fire

Prescribed fire would be used to reduce hazard fuels accumulations and to promote ecosystem sustainability.

Management objectives in FMU #1, Apollo Beach, and FMU #2, Playalinda Beach, would be expanded to include the use of prescribed fire as a management tool. New management objectives for FMU #5, Mosquito Lagoon would not include the use of prescribed fires. Seminole Rest has been separated out from Apollo Beach and is now its own FMU (#7). Management objective for FMU #7 would not include prescribed fires.

Prescribed fires would be applied to designed burn units within specific weather and fuel moisture parameters, and would serve primarily to reduce hazard fuels accumulations and to promote ecosystem sustainability. The prescribed fire program would create and maintain a mosaic of burned and unburned areas that approximate natural conditions. The goal is to treat each burn unit on a 3- to 15-year cycle, depending on the vegetation type. Prescriptions may be adjusted as appropriate based upon monitoring results and information gained from research burns and further refinement of the prescribed fire program. Research burns may be conducted with the approval of the Seashore superintendent and would meet all requirements of any other prescribed fire application.

Five units would be prescribed burned over the next five years, primarily to reduce hazard fuels accumulations and to promote ecosystem sustainability. Table 2-2 and the following figures depict the burn unit sizes and locations.

Table 2-2 Five Year Prescribed Fire Schedule

Unit Name	Acres	Year(s) of treatment	Unit Description (General Fuel Types)
Apollo Beach #1	57.5	2007	Pine, hardwood
Apollo Beach #2	105.7	2008	Pine, hardwood
Apollo Beach #3	139.7	2009	Pine, cabbage palm
Apollo Beach #4	192.7	To be determined	Pine, cabbage palm
Apollo Beach #5	253.4	To be determined	Pine, cabbage palm
Apollo Beach #6	325.4	To be determined	hardwoods
Apollo Beach #7a	32.9	To be determined	Pine, hardwood
Apollo Beach #7b	33.9	To be determined	Pine, hardwood
Apollo Beach #8	32.3	To be determined	Pine, hardwood
Apollo Beach #9	21.9	To be determined	Pine, hardwood
Apollo Beach #10	27.3	To be determined	Pine, hardwood
Apollo Beach #11	46.5	To be determined	Pine, hardwood
Playalinda Beach #1	67.3	To be determined	Pine, hardwood
Playalinda Beach #2	56.2	To be determined	Pine, hardwood
Max Hoeck #1	396	2007	Pine, hardwoods, grass
Max Hoeck #2	670	To be determined	Pine, hardwoods, grass
Bill's Hill #1	114	2007	Pine, hardwoods, grass
Bill's Hill #2	126	2007	Pine, hardwoods, grass
Bill's Hill #3 and #4	500	2009	Pine, hardwoods, grass
Bill's Hill #5	256	2006, 2010	Pine, hardwoods, grass
Klondike Beach #1	50.7	To be determined	Pine, hardwood
Klondike Beach #2	136.3	To be determined	Pine, hardwood
Klondike Beach #3	100.2	To be determined	Pine, hardwood
Total Acres	3,741.9		

Debris Burns

The Seashore would continue debris burns to dispose of wildland fuels, such as slash piles generated from a variety of maintenance activities.

Non-fire Fuels Treatments

Non-fire fuels treatment at the park would include general grounds-care operations such as mowing and weedeating in open areas during the growing season; creating and/or maintaining defensible space around Seashore buildings and structures; maintaining existing firebreaks (including refurbishing existing holding lines around prescribed fire units prior to burning them); and creating and maintaining a hazard fuels break along a section of the Seashore's perimeter in the Bill's Hill FMU to help prevent the spread of fire to and from adjacent non-agency land.

Creation of a hazard fuels break (see Figure 2-8) would entail clearing a 20-foot wide corridor down to mineral soil for 7,435 linear feet (1.4 miles) along the perimeter itself, bordering the community of Oak Hill, and selectively thinning hazard fuels inside of that corridor, on the Seashore side, for a radius of 20 to 40 feet. Vegetation around the base of potential Bald Eagle nest trees would also be

thinned for a distance of 20 to 40 feet prior to prescribed burning. Hand burns would occur around such trees during prescribed burning operations. Fuels considered to be hazards would primarily be dead and down timber, ladder fuels, and timber/brush less than 4 inches diameter at breast height (dbh). Total area affected would be 8.5 acres (see Table 2-3).

Table 2-3 Five Year Mechanical Fuel Reduction Schedule

Mechanical Fuel Reduction Unit Name	Initial Treatment	Treatment Type	Unit Description (General Fuel Types)
Northern boundary, Bill's Hill FMU #4 (7,435 linear feet, 8.5 acres)	Initial, 2006; maintenance as needed thereafter	Combination or brush hogging and selective thinning (e.g. chainsaws)	Hardwoods, grass, pine

Figure 2-1 Canaveral National Seashore Fire Management Units

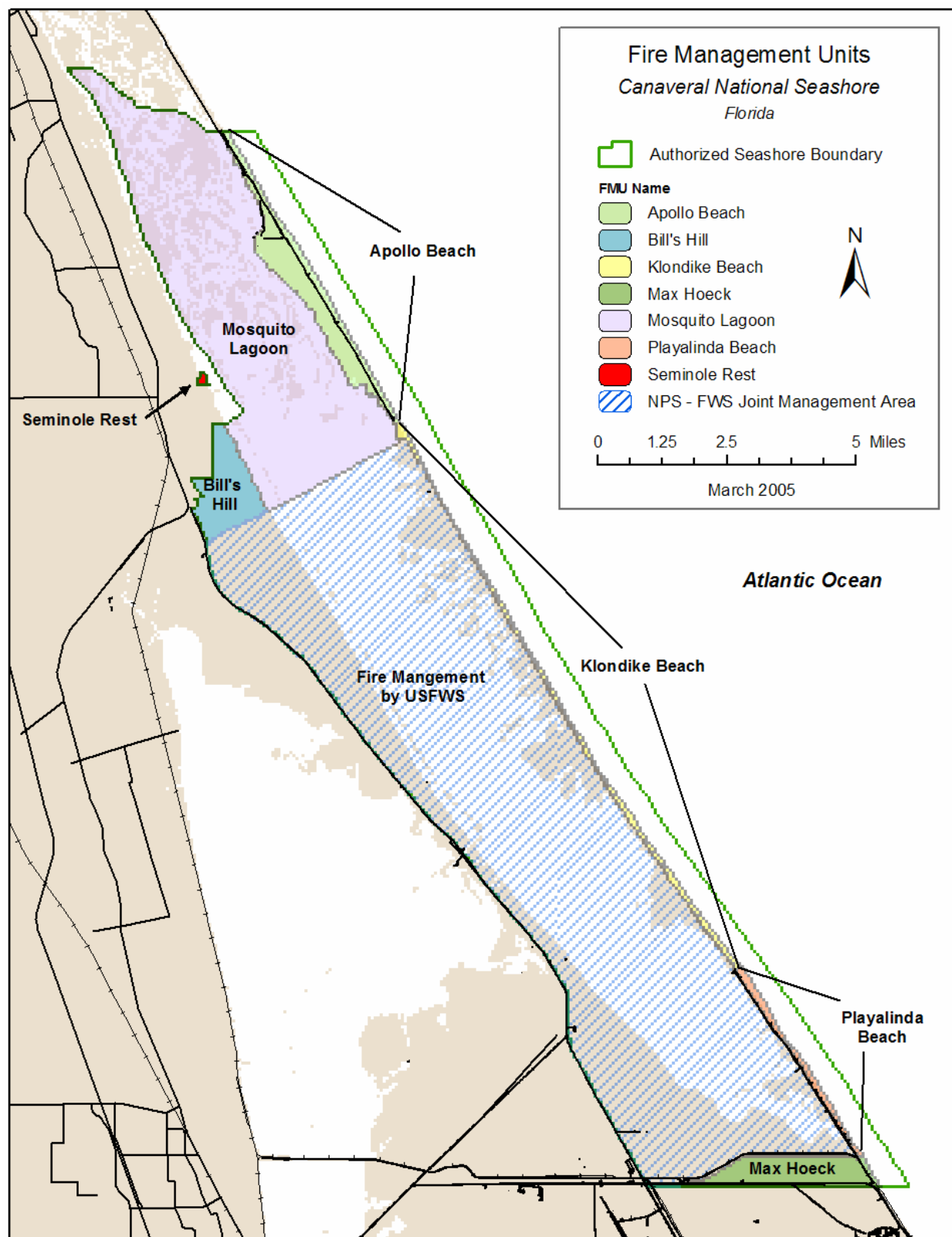


Figure 2-2 Apollo Beach Burn Units

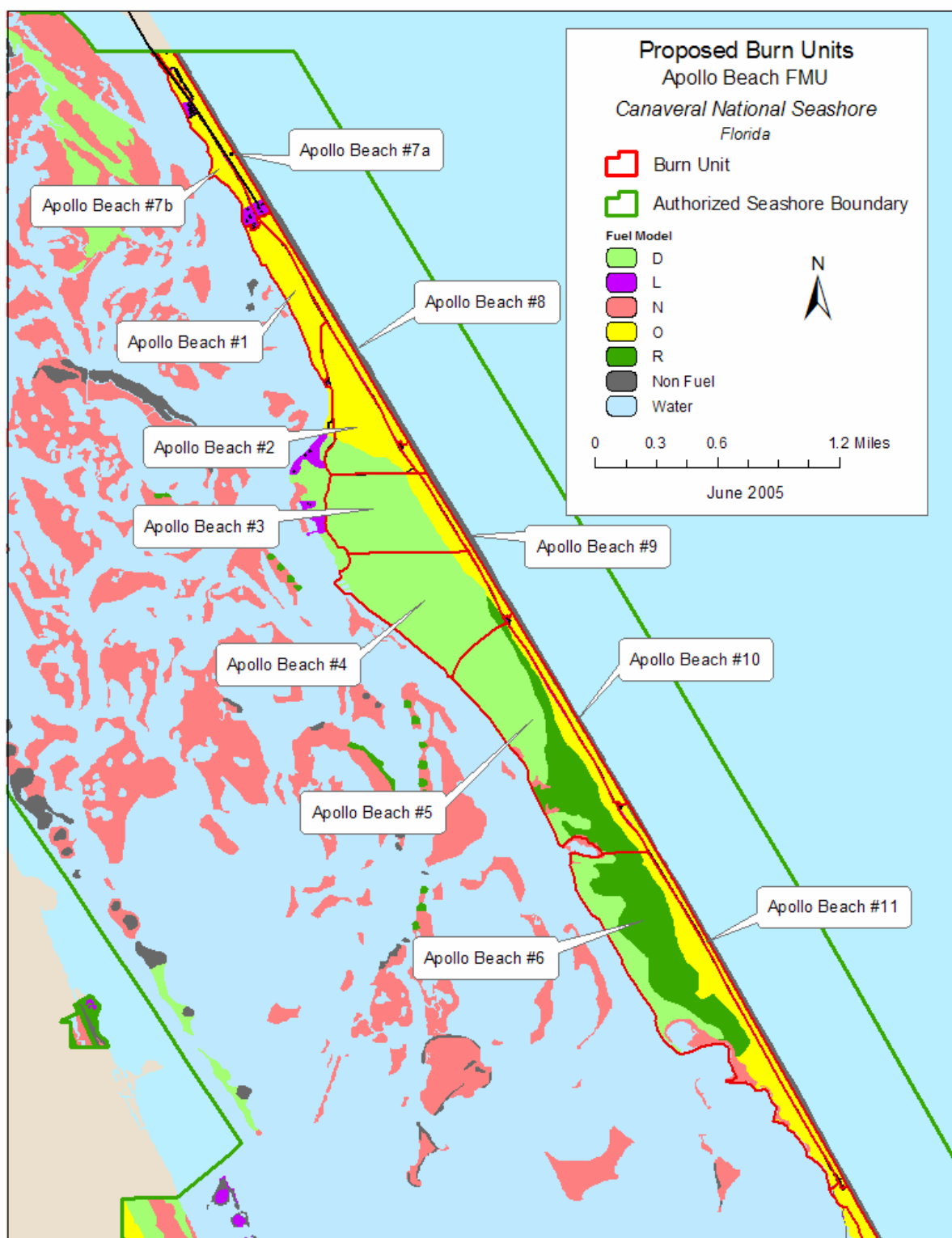


Figure 2-3 Playalinda Beach Burn Units

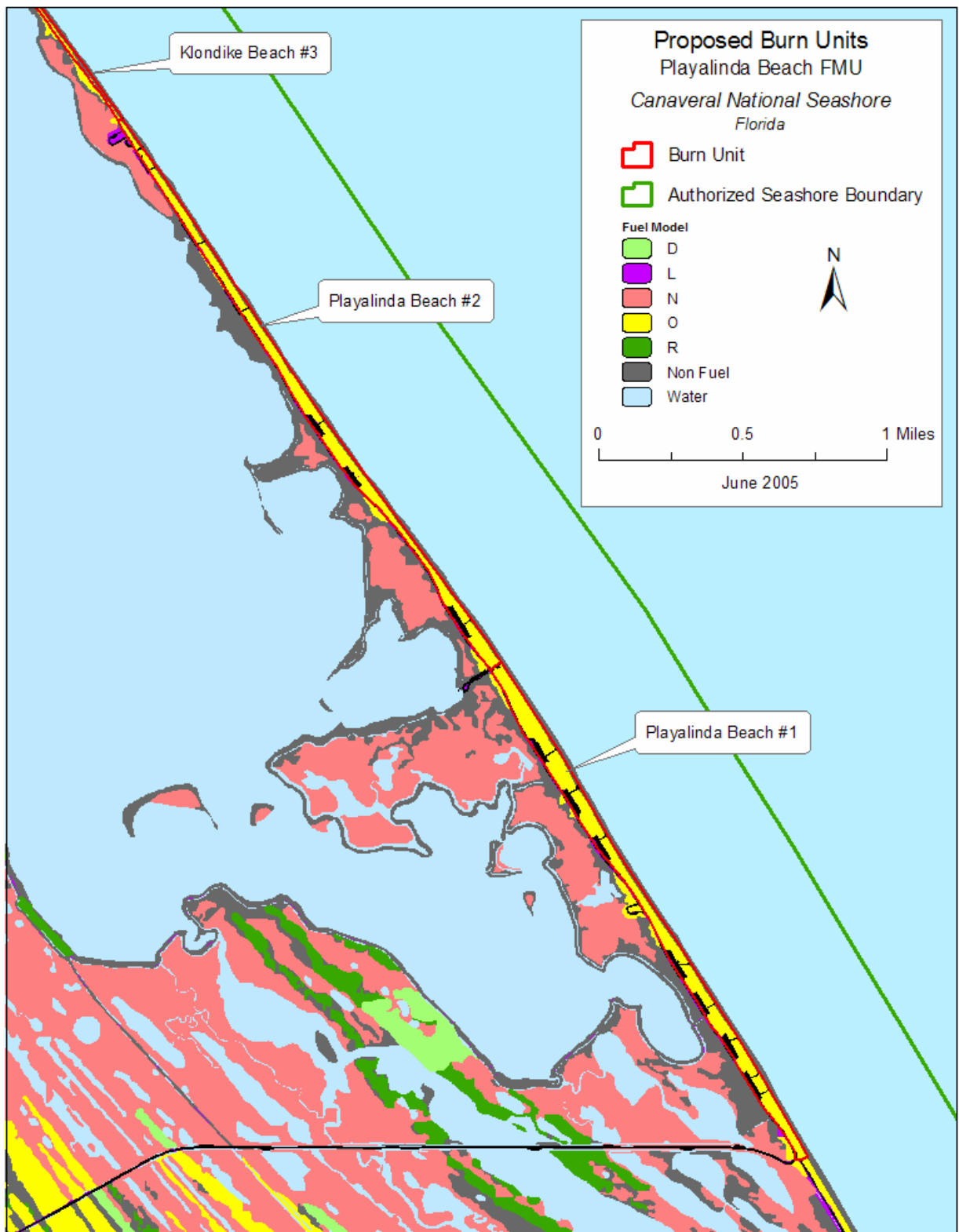


Figure 2-4 Max Hoeck Burn Units

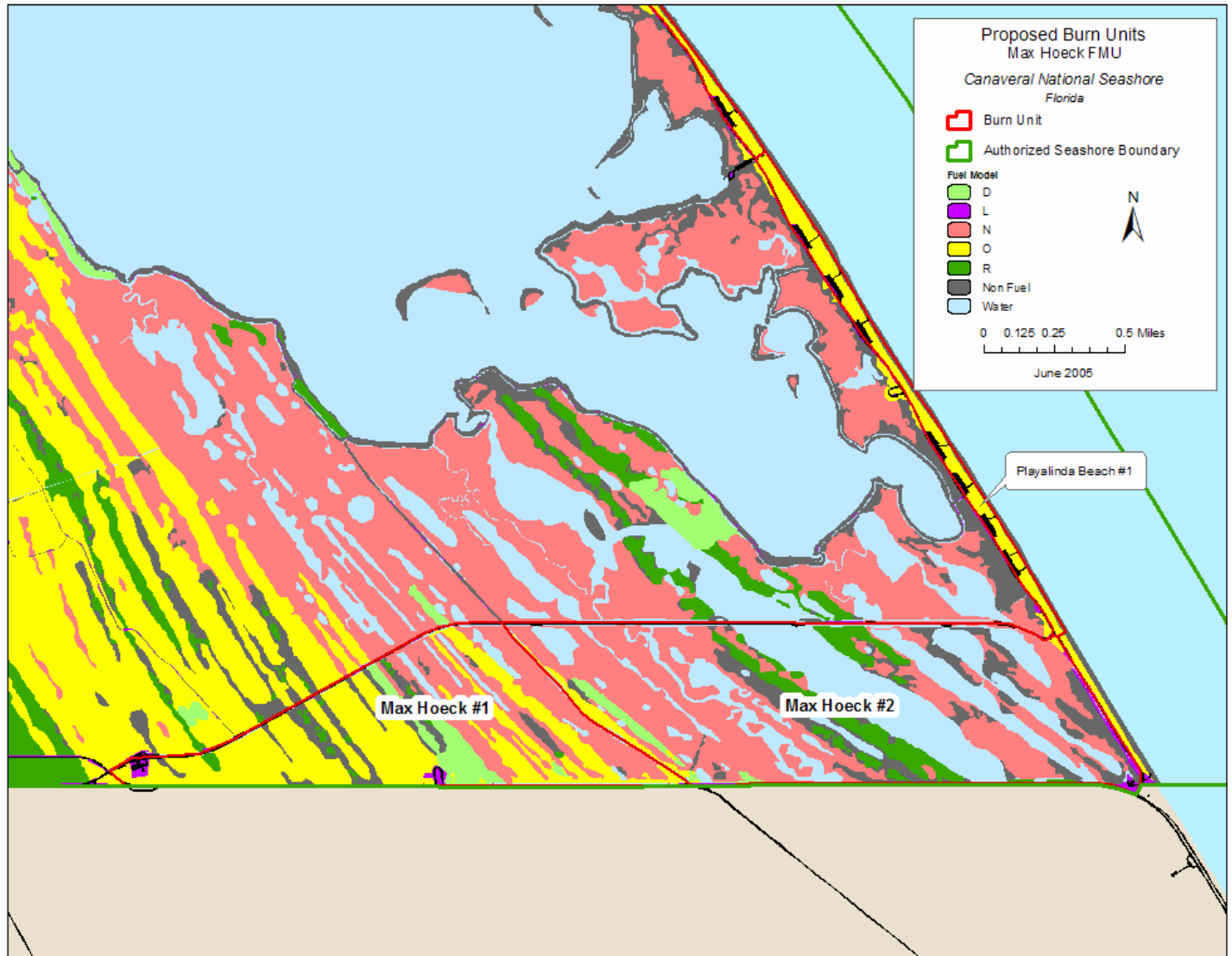


Figure 2-5 Bill's Hill Burn Units

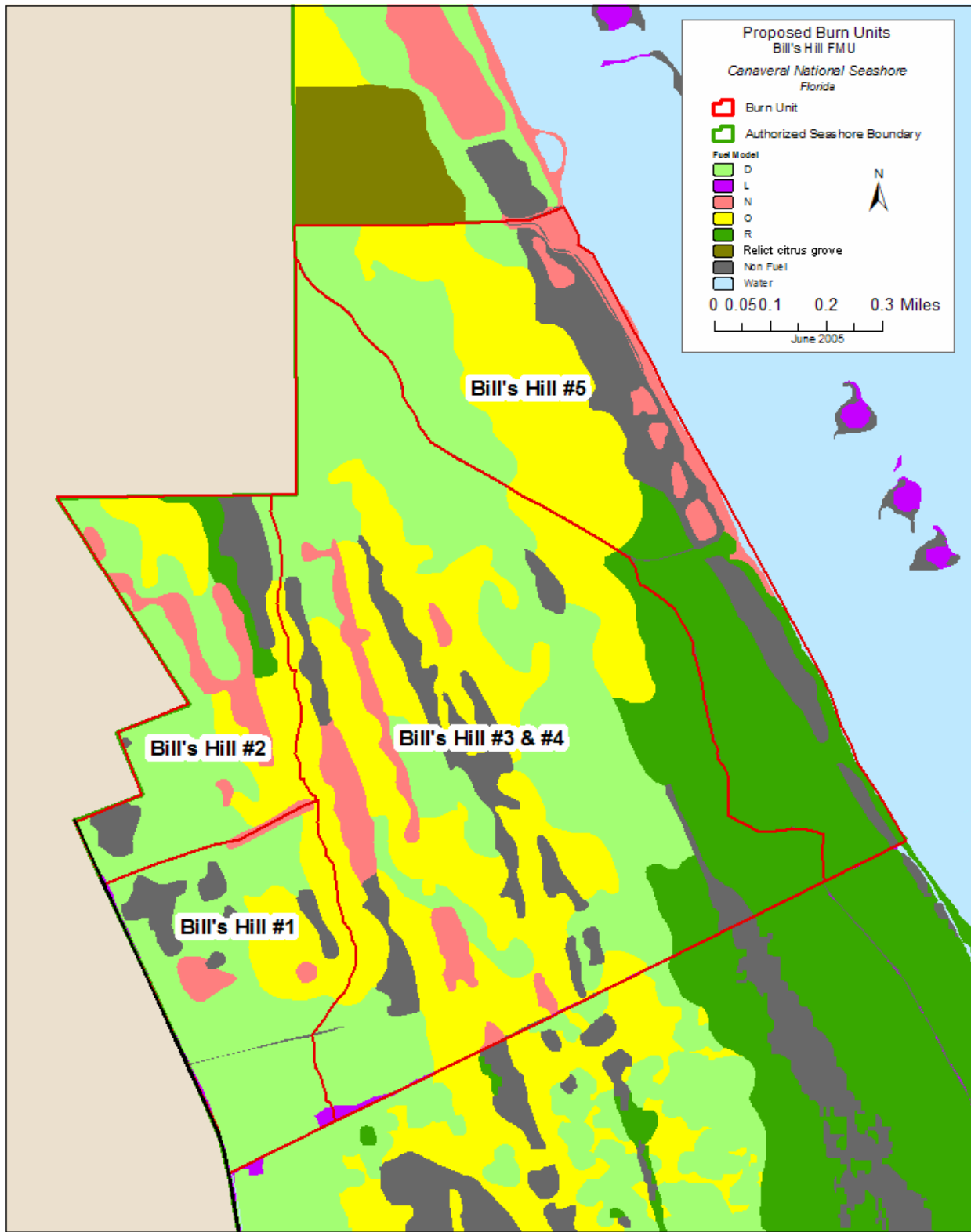


Figure 2-6 Mosquito Lagoon Burn Unit

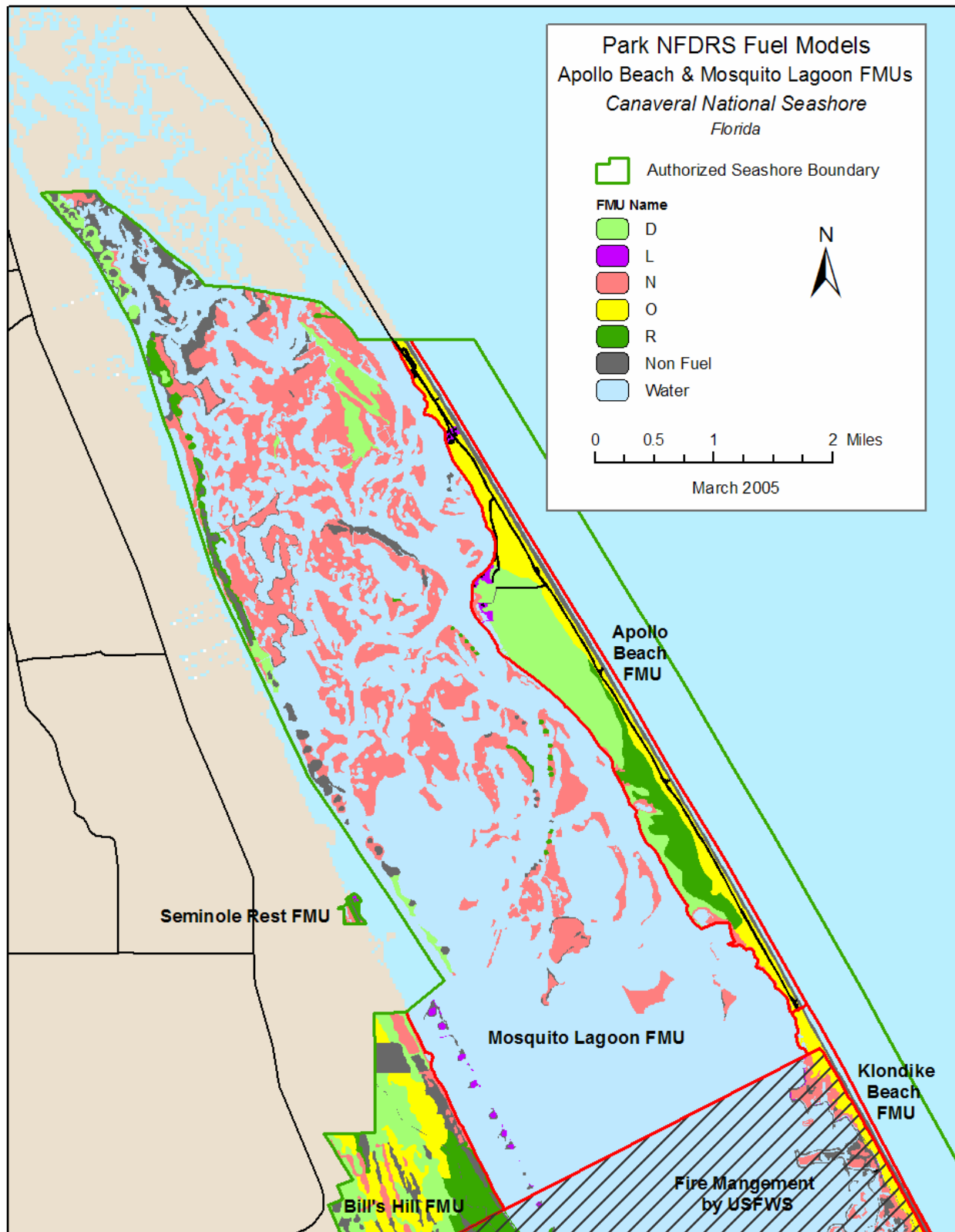


Figure 2-7 Klondike Beach Burn Units

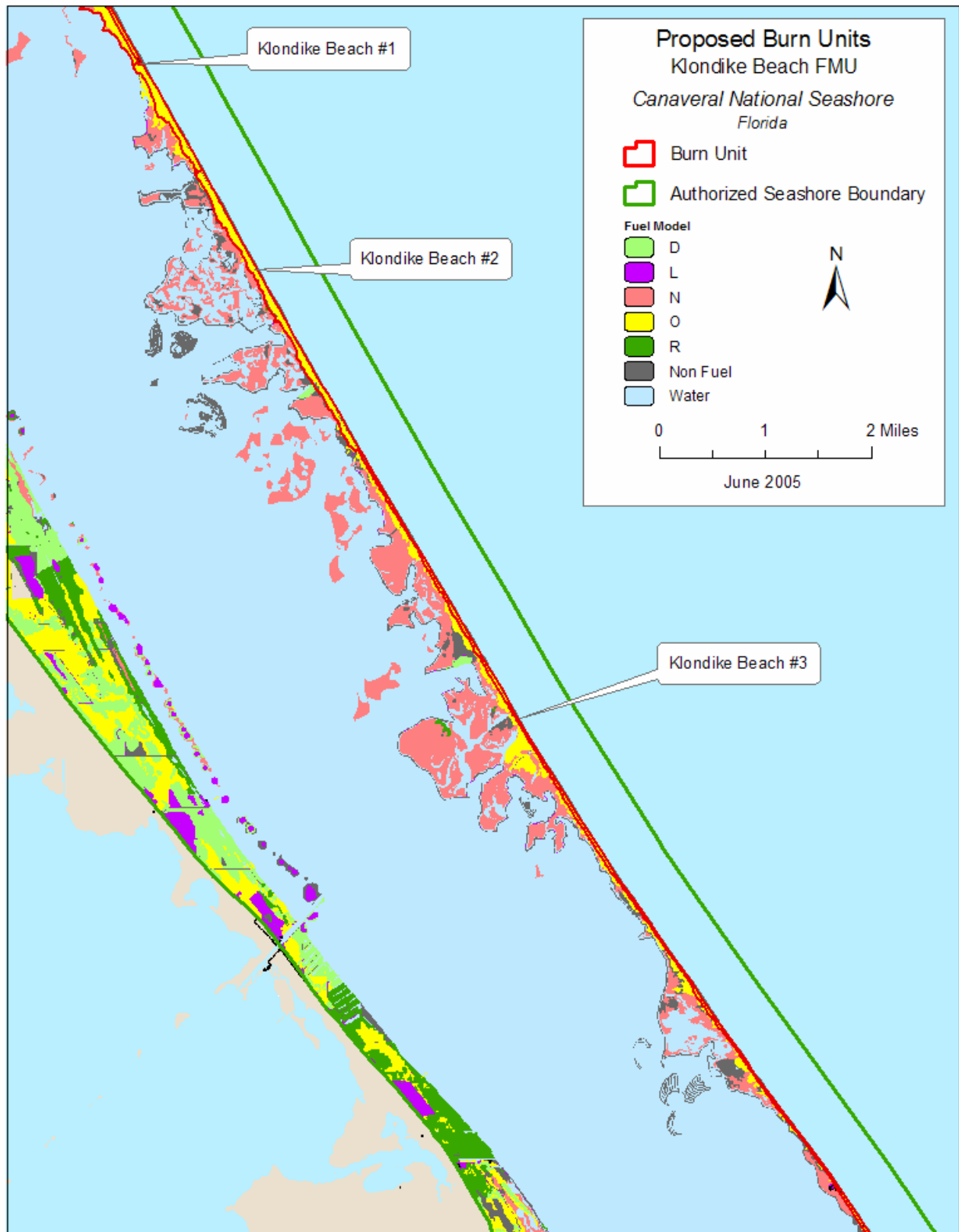
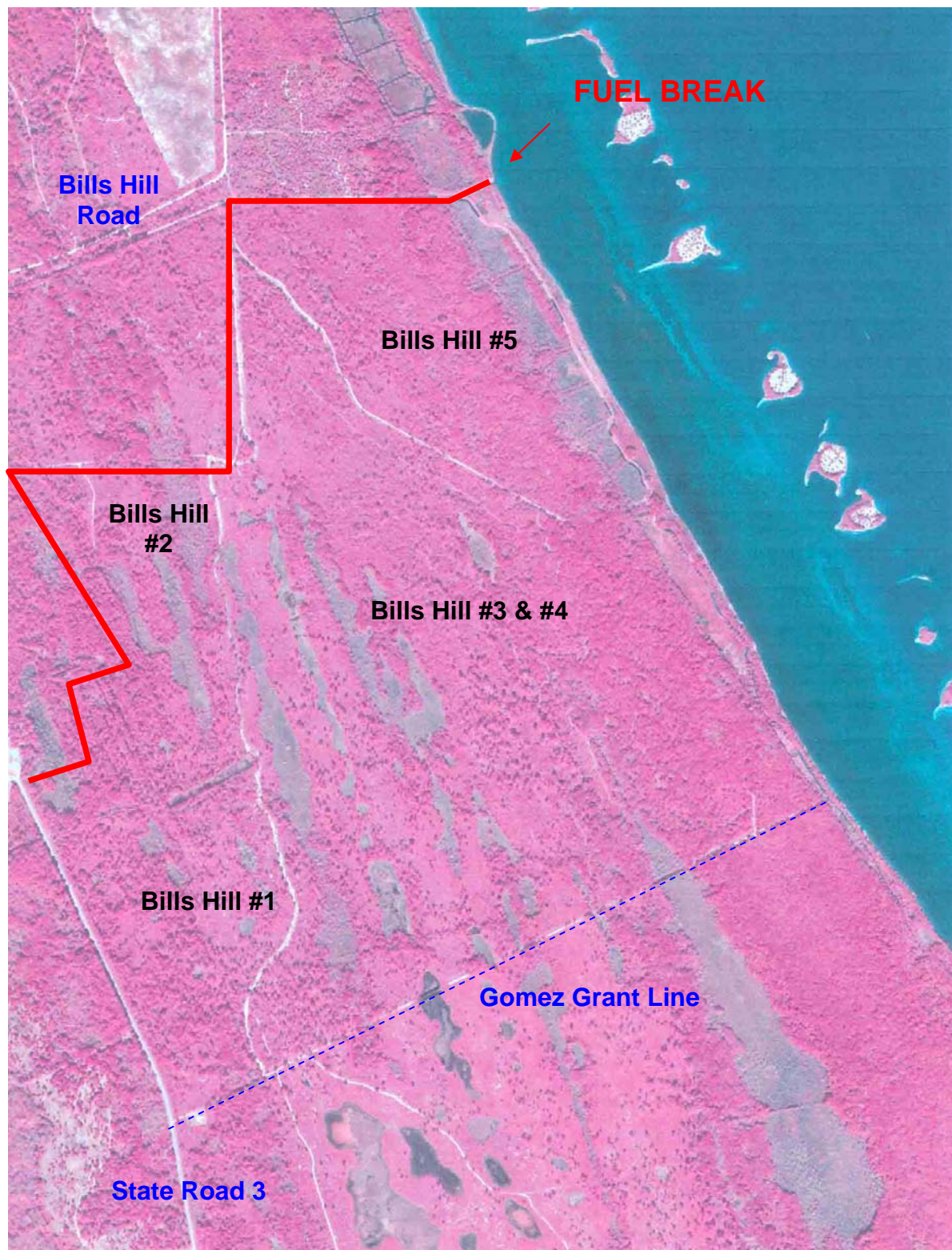


Figure 2-8 Perimeter Fuel Break for Bill's Hill



2.2.3 Environmentally Preferred Alternative

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects, which is the alternative that would promote the national environmental policy expressed in NEPA (Section 101 (b)). This includes alternatives that:

- 1) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- 2) Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- 3) Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- 4) Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- 5) Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
- 6) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

In essence, the environmentally preferred alternative would be the one(s) that, “causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (CEQ, 1978).

In this case, Alternative 2 is the environmentally preferred alternatives for Canaveral National Seashore since it best meets goals 1, 2, 3, and 4 described above. Fire management activities would restore and maintain native plant communities in the park, mimic the natural ecological processes, and help protect park resources and adjacent lands from the threat of wildfires. Finally, Alternative 2 best protects and helps preserve the historic, cultural, and natural resources in the park for current and future generations.

2.3 MITIGATION MEASURES AND MONITORING

Canaveral National Seashore would collect information on fuel reduction efforts, vegetative resources, and other objective dependant variables after a fire (wildfire or prescribed fire). During fire events (wildfire or prescribed fire), data would be collected regarding the current fire conditions consistent with the variables identified in a prescribed fire plan, such as fuel and vegetation type, anticipated fire behavior and fire spread, current and forecasted weather, smoke volume and dispersal, etc.

NPS Policy requires managers to monitor the effects of all wildland and prescribed fires. The Seashore would conduct its fire monitoring program in accordance with the *NPS Fire Monitoring Handbook* (2001), which outlines standardized methods to be used for monitoring fire effects.

The *NPS Fire Monitoring Handbook* provides recommended standards, divided into four monitoring levels, which constitutes the lowest level of fire monitoring to be conducted by NPS units. Table 2-4 illustrates how these monitoring levels correspond to the given management strategy.

Table 2-4 Monitoring Strategies and Recommended Standards (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 observations - Reconnaissance - Fire Conditions
Prescribed fire: Management uses intentionally set fires as a management tool to meet specific objectives.	1. Environmental 2. Fire observations - 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.

Wildland Fire Monitoring

Wildland fire suppression requires Level 1 and the first stage of Level 2 monitoring. Level 1 monitoring 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 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 Seashore resources, facilitate adjustments to suppression actions, and identify the need for a rehabilitation response. Monitoring to measure short- and long-term change to ecosystem structure and dynamics would also be implemented.

Prescribed Fire Monitoring

Prescribed fire use requires all four monitoring levels to determine changes/trends in fuel loading and vegetative composition over time. These changes, sometimes subtle, can be critical indicators whether the prescribed fire program is meeting specific objectives. At the Seashore, fire weather would be recorded by the burn boss or designee for 14 days, and preferably 30 days, prior to the ignition date. Fuel moisture sticks would also be placed in all characteristic fuel types.

Prescribed fire monitoring would be the same as that for wildland fire monitoring. Fire monitoring is critical during prescribed burning to monitor predetermined parameters as well as documenting the conditions in which the fire took place.

Short-term change monitoring would provide information on fuel reduction, vegetative change, and other objective-dependent variables. It would include the use of index plots and transects to be monitored prior to and after fire. Some of the variables to be measured include:

Long-term change monitoring would measure the influence of fire on ecosystem structure and dynamics, identify areas for future research, and validate the use of prescribed fire in perpetuating the Seashore ecosystems. The variable to be monitored would be the same as those for short-term change.

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire management activities. Mitigation measures are applicable to both alternatives

2.3.1 Fire Management Activities

- All suppression guidelines would follow Minimum Impact Suppression Tactics. These include:
 - Restricting the use of heavy equipment for constructing fireline. A bulldozer or plow may be used for fireline construction only in extreme situations to protect human life and property, and then only with the authorization of the Seashore superintendent or designee.
 - 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 and shallow as possible when it must be constructed.
 - Avoiding ground disturbance within known natural and archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it would involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
 - Using water or type A (biodegradable) foam in lieu of fire retardant. If retardant must be used, using a non-fugitive type, and avoiding bodies of water.
 - 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.

2.3.2 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) personnel would be assigned fire management duties (unless assigned as trainees, in which case they would be closely supervised by an individual fully qualified for the given position).
- No fire management operation would be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions (Lookouts, Communications, Escape Routes, and Safety Zones, or LCES), current fire season conditions, and current and predicted fire weather and behavior. Hazards specific to the Seashore include:
 - Snags and dead trees with weak root systems.
 - Stinging/biting insects, scorpions, ticks, and poisonous snakes.
 - Dehydration, heat exhaustion and heat stroke.
- Wildland fire incident commanders and prescribed fire bosses would 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.
- Prescribed burning would not be conducted when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. Federal and state air quality standards would be the basis for this decision.
- Seashore neighbors, visitors and local residents would be notified of all planned and unplanned fire management events that have the potential to impact them.
- The CANA superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public. In the case of prescribed fire, areas needing to be closed for visitor protection would be closed prior to the initiation of prescribed burning.
- Smoke on roadways would be monitored and traffic control provisions taken to ensure motorist safety during fire events at the Seashore. The following procedures would be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event would determine visibility levels):
 - Posting of “Smoke on Road” signs on either side of the affected area.
 - 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.

2.3.3 Property

- To the greatest extent feasible and appropriate, Seashore infrastructure, any other development, and adjacent non-agency land (including private residences) would be protected during all fire management activities.
- All buildings would be protected from wildland fire via the creation and/or maintenance of defensible space around each (a minimum of 30 feet). A hazard fuels break would be created and maintained along the Seashore perimeter bordering the community of Oak Hill unless vegetation has very low probability of burning, such as mangroves.

2.3.4 Natural and Cultural Resources

- Natural and cultural resources would be protected from the adverse effects of unwanted fire as well as the adverse effects of fire management activities. During all fire management activities, the minimum impact tactics policy would be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation.
- The park would incorporate archaeological/cultural/historic resources protection into fire management in a variety of ways. For example:
 - The CANA resource management specialist would continue coordination with the Southeast Archaeological Center to ensure that CANA has the most current data regarding archaeological resources within its boundaries. S/he would provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and would coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.
 - The CANA resource management specialist would be consulted prior to any fire management activities that would involve ground disturbance. S/he would provide the incident commander or burn boss with maps showing the location of archaeological/cultural/historic resource locations, and would serve as a cultural resource advisor during suppression or prescribed fire events.
 - When fire management activities must be conducted in the proximity of cultural resource locations, special flagging would be used to delineate these areas to the greatest extent feasible (it may not be possible during some suppression events). The CANA resource management specialist or an archeologist would accompany firefighters whenever feasible to provide mitigation recommendations during suppression events.
 - A photographic record would be maintained of archaeological materials exposed during fire management and rehabilitation activities.
 - Any use of heavy equipment would be monitored by the CANA resource management specialist to avoid unnecessary damage to archaeological sites.
 - Historic buildings would be protected from wildland fire via the creation and/or maintenance of defensible space around each (minimum of 30 feet, or otherwise determined to maximize retention of the site's character, materials, features, spaces, and spatial relationships).
 - There are no designated cultural landscapes especially vulnerable to wild fires within the Seashore. If any are designated in the future, they will be considered.
 - During all suppression activities, the minimum impact suppression tactics policy would be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of archaeological/cultural/historic resources include:
 - Restricting the use of heavy equipment for constructing fireline. A bulldozer or plow may be used for fireline construction only in extreme situations to protect human life and property, and then only with the authorization of the Seashore superintendent or designee.
 - Not using fireline explosives.
 - Using existing firebreaks and 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 archaeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations, it would 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 actions
- MINWR conducts prescribed burns within the jointly managed portion of the Seashore. As CANA is responsible for cultural resource management in this area, MINWR consults with CANA whenever activities involving ground disturbance are being considered. If cultural landscapes are designated in any portion of CANA in the future, prescribed fire management actions will be conducted in a manner to protect those landscapes.

2.3.5 Natural Resources

The Seashore would incorporate natural resource protection into fire management activities in a variety of ways, including minimum impact suppression tactics in protecting cultural resources with additional tactics include:

- Avoiding ground disturbance within known natural (e.g. T&E species) resource locations. When fireline construction is necessary in proximity to these resource locations, it would involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.
- Using water or type A (biodegradable) foam instead of fire retardant. If retardant must be used, using a non-fugitive type, avoiding bodies of water.
- Minimize 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.

2.3.6 Air and Water Quality

- The Seashore would 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 would consider air quality standards.
 - Fire weather forecasts would be used to correlate prescribed fire ignitions with periods of optimal combustion and smoke dispersal. Any smoke situation that arises and threatens any smoke-sensitive areas would entail immediate suppression action.
 - During fire suppression, water would be used in lieu of fire retardant whenever possible. If retardant must be used, a non-fugitive type would be chosen, and bodies of water avoided.
 - Because prescribed fire would not be applied under extreme conditions, the probability of denuding the soil would be limited, thereby limiting the possibility of extreme erosion. (The primary threat to water quality is sediments and nutrients resulting from uncontrolled erosion.)

2.4 IMPACT DEFINITIONS

Table 2-5 depicts the impact definitions used in this Environmental Assessment. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and federal laws, and compliance with existing Canaveral National Seashore planning documents.

Table 2-5 Impact Definitions

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Soils	The effects to soils would be detectable, but likely short-term. Damage to or loss of the litter/humus layers that causes slight localized increases in soil loss from erosion; effects to soil productivity or fertility would be small, as would the area affected; short-term and localized compaction of soils that does not prohibit re-vegetation; If mitigation were needed to offset adverse effects, it would be relatively simple to implement and likely successful.	The effect on soil productivity or fertility would be readily apparent, long term, and result in a change to the soil character over a relatively wide area; fire severe enough to cause a noticeable change in soil community; intermittent areas of surface sterilization of soils that may cause some long term loss of soil productivity that may alter a portion of the vegetation community; short-to long-term and localized compaction of soils that may prohibit some re-vegetation; Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The effect on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the park. Damage to or loss of the litter/ humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to cause substantial damage to the soil community; substantial surface sterilization of soils that may cause long term loss of soil productivity and that may alter or destroy the vegetation community over most of the burned area; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation; Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.	<u>Short Term</u> Recovers in less than 3 years <u>Long Term</u> Takes more than 3 years to recover
Water Resources (Including Wetlands and Floodplains)	Changes in water quality would be measurable, although small, likely short-term, and localized; localized and indirect riparian impacts that do not substantively increase stream temperatures or affect stream habitats; no alteration of natural hydrology of wetlands; A U.S. Army Corps of Engineers 404 permit would not be required; no filling or disconnecting of the floodplain; short-term impacts that do not affect the functionality of the floodplain No mitigation measure associated with water quality would be necessary.	Changes in water quality would be measurable and long-term but would be relatively local; localized and indirect riparian impacts that may slightly increase stream temperatures or affect stream habitats; alteration of natural hydrology of wetlands would be apparent such that an U.S. Army Corps of Engineers 404 permit could be required; alteration of the floodplain apparent; Wetland or floodplain functions would not be affected in the long-term; Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.	Changes in water quality would be readily measurable, would have substantial consequences, and would be noticed on a regional scale; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats; effects to wetlands or floodplains would be observable over a relatively large area and would be long-term, and would require a U.S. Army Corps of Engineers 404 permit; filling or disconnecting of the floodplain; long-term impacts that affect the functionality of the floodplain; Mitigation measures would be necessary and their success would not be guaranteed.	<u>Short Term</u> Recovers in less than 1 year <u>Long Term</u> Takes more than 1 year to recover

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Vegetation	Temporarily affect some individual native plants and would also affect a relatively small portion of that species’ population; short-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; increase in invasive species in limited locations; occasional death of a canopy tree; mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.	The effect on some individual native plants along with a sizeable segment of the species’ population in the long-term and over a relatively large area; long-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; widespread increase in invasive species that does not jeopardize native plant communities; repeated death of a canopy tree; mitigation to offset adverse effects could be extensive, but would likely be successful; some species of special concern could also be affected.	Considerable long-term effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the park; violation of the Endangered Species Act of 1973; widespread increase in invasive species that jeopardizes native plant communities; mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.	<p><u>Short Term</u> Recovers in less than 3 years</p> <p><u>Long Term</u> Takes more than 3 years to recover</p>
Wildlife	Temporary displacement of a few localized individuals or groups of animals; mortality of individuals of species not afforded special protection by state and/or federal law; mortality of individuals that would not impact population trends; mitigation measures, if needed to offset adverse effects, would be simple and successful.	Effects to wildlife would be readily detectable, long-term and localized, with consequences affecting the population level(s) of specie(s); Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.	Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region; violation of the Endangered Species Act of 1973; mortality of a number of individuals that subsequently jeopardizes the viability of the resident population; extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.	<p><u>Short Term</u> Recovers in less than 1 year</p> <p><u>Long Term</u> Takes more than 1 year to recover</p>
Air Quality	Changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized; temporary and limited smoke exposure to sensitive resources; No air quality mitigation measures would be necessary.	Changes in air quality would be measurable, would have consequences, although the effect would be relatively local; all air quality standards still met; short-term exposure to sensitive resources; Air quality mitigation measures would be necessary and the measures would likely be successful.	Changes in air quality would be measurable, would have substantial consequences, and be noticed regionally; violation of state and federal air quality standards; violation of Class II air quality standards; prolonged smoke exposure to sensitive receptors; Air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.	<p><u>Short Term</u> Recovers in 7 days or less</p> <p><u>Long Term</u> Takes more than 7 days to recover</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Visitor Use & Experience	Temporary displacement of recreationists or closure of trails, and recreation areas during off-peak recreation use; temporary or short-term alteration of the vista, or temporary presence of equipment in localized area; smoke accumulation during off-peak recreation use; The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.	Permanent closure of trails and recreation areas; conflict with peak recreation use; long-term change in scenic integrity of the vista; substantive smoke accumulation during peak recreation use; The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	<p><u>Short Term</u> Occurs only during the treatment effect</p> <p><u>Long Term</u> Occurs after the treatment effect</p>
Human Health & Safety	The effect would be detectable and short-term, but would not have an appreciable effect on public health and safety; potential for small injuries to any worker or visitor (e.g. scrapes or bruises); limited exposure to hazardous compounds or smoke particulates at concentrations below health-based levels; If mitigation were needed, it would be relatively simple and likely successful.	The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a local scale; non-life threatening injuries to any worker or visitor; limited exposure to hazardous compounds or smoke particulates at concentrations at or slightly above health-based levels; Mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent and long-term, and would result in substantial noticeable effects to public health and safety on a regional scale; Serious life-threatening injuries to any worker or member of the public; limited or prolonged exposure to hazardous compounds or smoke particulates at concentrations well above health-based levels; Extensive mitigation measures would be needed, and their success would not be guaranteed.	<p><u>Short Term</u> Occurs only during the treatment effect</p> <p><u>Long Term</u> Occurs after the treatment effect</p>
Cultural Resources	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community’s cultural identity Temporary, non-adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties; no affect to the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape.	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community’s cultural identity; temporary adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties, but would not diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized.	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community’s cultural identity; long-term adverse impacts to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties that would diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized.	<p><u>Short term</u> Treatment effects on the natural elements of a cultural landscape (e.g., three to five years until new vegetation returns)</p> <p><u>Long term</u> Because most cultural resources are non-renewable, any effects would be long term</p>

Key Resources	“Minor” Impact	“Moderate” Impact	“Major” Impact	Duration
Park Operations	The effect would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations; short Term suspension of non-critical park operations; negligible impact to park buildings and structures If mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.	The effects would be readily apparent, be long-term, and would result in a substantial change in park operations in a manner noticeable to staff and the public; long term suspension of all park operations (1 to 2 days); detectable adverse impacts to park buildings and structures; mitigation measures would probably be necessary to offset adverse effects and would likely be successful	The effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations; prolonged suspension of all park operations; substantial adverse impacts to park buildings and structures; mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.	<p>Short term- Effects lasting for the duration of the treatment action</p> <p>Long term- Effects lasting longer than the duration of the treatment action.</p>

2.5 COMPARISON OF ALTERNATIVES

Table 2-6 briefly summarizes the environmental effects of the various alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives, important issues and impact topics. Chapter 3 discusses the environmental consequences of the proposed alternatives in detail.

Table 2-6 Comparison of Alternatives

Impact Topics	Alternative 1 - No Action Alternative	Alternative 2 – Suppress Wildland Fires, Employ Prescribed Fire, Debris Burning, and Non-Fire Fuel Treatments
Geology and Soils	Very minor, localized, short-term soil compaction and erosion impacts resulting from thinning and fire suppression activities; benefits to soil development and soil nitrification with prescribed fire use	Very minor, localized, short-term soil compaction and erosion impacts resulting from fuels reduction and fire suppression activities; benefits to soil development and soil nitrification with prescribed fire use; benefits would not occur in areas that previously allowed wildland fires
Water Resources (including floodplains)	Minor, localized impacts from soil erosion; short and long-term impacts if fire retardants or foams are misapplied or mishandled	Minor, localized impacts from soil erosion; short and long-term impacts if fire retardants or foams are misapplied or mishandled; prescribed fires would have no direct general impact
Vegetation	Minor, short-term, adverse impacts to plants due to suppression and maintenance activities; wildland fire use may result in long-term impacts if fuel loads are high; fuel loadings reduced; fire management activities resulting in ground disturbance could result in the spread of invasive exotic plants; plant habitat and diversity improved in long-term with prescribed fire use	Minor, short-term, adverse impacts to plants due to suppression and maintenance activities; fuel loadings reduced; fire management activities resulting in ground disturbance could result in the spread of invasive exotic plants; plant habitat and diversity improved in long-term with prescribed fire use; long-term beneficial impacts due to fuels break

cs	Alternative 1 - No Action Alternative	Alternative 2 – Suppress Wildland Fires, Employ Prescribed Fire, Debris Burning, and Non-Fire Fuel Treatments
Wildlife	Suppression, debris burns, fuels treatment, wildland fire use, and prescribed burn activities would temporarily displace and result in minor adverse impacts to some wildlife species; individual mortality of some species likely; long-term beneficial impact on federal T&E species	Suppression, debris burns, fuels treatment, creation of fire break, and prescribed burn activities would temporarily displace and result in minor adverse impacts to some wildlife species; individual mortality of some species likely; long-term beneficial impact on federal T&E species
Air Quality	Very minor and temporary impacts due to managed natural fire and prescribed fire; minor smoke impacts on sensitive receptors (e.g. private residences)	Very minor and temporary impacts due to managed natural fire and prescribed fire; minor smoke impacts on sensitive receptors (e.g. private residences); fewer emissions from wildland fire use
Visitor Use and Experience (including Park Operations)	Minor, temporary, and short-term impacts on visual resources and visitor use and experience during prescribed burn activities (e.g. trail or road closures, presence of work crews in the vista); temporary effect on park operations	Minor, temporary, and short-term impacts on visual resources and visitor use and experience during fuels treatments and prescribed burn activities (e.g. trail or road closures, presence of work crews in the vista); temporary effect on park operations
Human Health & Safety	Potential for injury to workers conducting suppression, fuels reduction, and prescribed burn activities; very minor exposure to smoke by workers and the public during wildland fires and prescribed burns	Potential for injury to workers conducting suppression, fuels reduction, and prescribed burn activities; very minor exposure to smoke by workers and the public during wildland fires and prescribed burns; more suppression may result in fewer impacts from smoke
Cultural Resources	No impact to known cultural resources	No direct impact to known cultural resources; cultural landscape benefited from vegetation maintenance

Chapter 3 Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action and No-Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided. Descriptions of the Affected Environments for the various impact topics were taken from the Seashore's 1997 Resource Management Plan and other relevant documents.

3.1 SOILS AND GEOLOGY

3.1.1 Affected Environment

The 24-mile stretch of Canaveral National Seashore oceanfront comprises the greatest stretch of unaltered beach on Florida's east coast. The beach itself averages about 40 feet wide on the south end and 65 feet wide on the north. The single barrier dune ridge has an average height of 12 feet.

The parent material for most of the park's soils is unconsolidated, marine deposited sediments consisting mostly of pure quartz sand. Sandy loams, clays formed through the process of weathering, and tidal marsh organic soils are also present.

The seven soil associations that occur at Canaveral National Seashore include:

- **Paola-Pomello-Astatula:** Nearly level to strongly sloping, excessively to moderately drained, and sandy throughout the profile. These soils are found on long, narrow ridges usually less than 3 miles wide between the Indian River and Mosquito Lagoon.
- **Canaveral-Palm Beach-Welaka:** Nearly level to gently sloping with moderately well drained to excessively drained soils and are sandy throughout. This complex makes up the dune ridges in Brevard County and corresponds to the Palm Beach-Paola-Canaveral Complex in Volusia County
- **Myakka-Eau Gallie-Immokalee:** Nearly level, poorly drained soils, sandy throughout to a depth of 40 inches and loamy below.
- **Tidal Marsh-Tidal Swamp:** Nearly level, poorly drained, and saline to brackish soils of variable textures. They occur along the margins of Mosquito Lagoon in Brevard County and correspond to the Hydroquents-Turnbull complex of the lagoon edges and mangrove islands in the Volusia County portion of Canaveral National Seashore.
- **Palm Beach-Paola-Canaveral:** Long, narrow coastal dune ridges, predominantly excessively drained to somewhat poorly drained, grayish and brownish shelly and sandy soils. They comprise the barrier island of Canaveral National Seashore within Volusia County.

- **Daytona-Paola-Astatula:** Mostly, long, narrow sand ridges of moderately well drained, grayish sandy soils with organic stained subsoil and excessively drained grayish and brownish sandy soils interspersed with area of poor and very poorly drained soils. These soils occur along the western side of Mosquito Lagoon in Volusia County and supports hammock, oak scrub, or slash pine-saw palmetto communities.
- **Hydroquents-Turnbull:** Are located in mangrove swamps and salt marshes subject to tidal flooding.

3.1.2 Environmental Consequences

Soil impacts were qualitatively assessed using soil characteristics, literature reviews, and in light of mitigation measures.

3.1.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact soils include building fire lines, excessive use of water during wildland fire suppression activities, thinning activities, maintenance of defensible spaces around park structures, and prescribed burning. Very minor and localized soil compaction would occur from wildfire suppression and thinning activities, and vehicle use would be restricted to existing roads. Fire line construction during wildland fire suppression would result in soil disturbance and could lead to increased erosion. During all suppression activities, the minimum impact suppression tactics policy would be incorporated to the greatest extent feasible and appropriate, employing methods least damaging to park resources for the given situation. For example, to minimize potential soil impacts, hand lines would be located outside of highly erosive areas, and other sensitive areas, and would use natural barriers (*e.g.* trails, roads) to the greatest extent possible. Following fire suppression activities, fire lines would be re-contoured, water barred, and possibly seeded with native plant species.

Manual and mechanical thinning (*e.g.* chainsaws, brush hogs) would be utilized to reduce fuel loads around park structures to create or maintain a defensible space adjacent to park boundaries and cultural sites where prescribed fire is not an option. Mechanical thinning efforts would also include mowing of open spaces. This limited amount of manual and mechanical thinning proposed by the park would result in only minor and localized soil compaction and soil erosion.

Prescribed fire would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrition for vegetation in the area. The blackened, burned areas following prescribed fires would also raise the soil temperature by several degrees, particularly in the spring, and would increase fungal, bacterial, and algal activity, which in turn would increase available nitrogen. The increased microorganism activity would also help to increase soil temperature while aiding in nutrient cycling (Vogl, 1979).

3.1.2.2 Alternative 2 (Preferred Alternative)

General soil impacts would be similar to those described under the “No Action” Alternative, except the benefits accruing to soils would not occur in areas that previously allowed for fire management using wildland fires.

Conclusion

Both alternatives would have very minor, localized, and short-term soil compaction and erosion impacts resulting from suppression, mechanical thinning, fuels reduction, and/or prescribed fire activities. Soil benefits would not occur in areas in Alternative 2 that previously allowed for wildland fire use.

The implementation of either alternative would not impair geologic and soil resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park’s general management plan or other Park Service planning documents.

3.2 WATER RESOURCES (INCLUDING WETLANDS AND FLOODPLAINS)

3.2.1 Affected Environment

The majority of Canaveral National Seashore acreage consists of Mosquito Lagoon, the northernmost water body of the Indian River Lagoon. This estuary system contains one of the highest species diversities of any estuary in North America (Provancha et al., 1992). In 1990, the U.S. Environmental Protection Agency designated Mosquito Lagoon, along with the rest of the Indian River Lagoon complex, as an Estuary of National Significance.

The State of Florida has designated Mosquito Lagoon as an Aquatic Preserve through the Florida Aquatic Preserve Act of 1975 and an Outstanding Florida Water (Rule 62-302.700(9) F. A.C). This is a state designation under the Clean Water Act, intended to afford the highest level of protection to existing high quality waters. Designated waters are to be preserved in a non-degraded state and protected in perpetuity for the benefit of the public. As a result, no degradation of water quality, other than that allowed in Rule 62-4.232(2) and (3) F.A.C., is to be permitted in Canaveral National Seashore’s surface waters. The last day of the baseline year for defining the existing ambient water quality at CANA was March 1, 1979. The State has also designated most of Mosquito Lagoon (from the Kennedy Space Center north to Edgewater) as Class II (Shellfish Propagation and Harvesting), classified according to instructions in the Federal Water Pollution Control Act (Section 303) (NPS, 2006).

Over the last 25 years, a large quantity of water quality data have been collected in Mosquito Lagoon by a variety of federal, state, and local agencies. Throughout this time, the Lagoon’s outstanding water quality has been deteriorating from septic tank effluent and stormwater runoff

from adjacent developed areas. Recent events have been more positive, such as the installation of a sewer system in Bethune Beach and the upgrading of the Edgewater wastewater treatment plant (NPS, 1997).

Wetlands and Floodplains

CANA is within the transition zone of two types of salt water wetland. Salt marshes in the northern part of the park contain cord grass and other non-woody salt tolerant plants. They occur as both low marsh areas below mean high tide, and in high marsh areas that are periodically flooded. The salt marshes mix with mangrove forests in the southern part of the park. Mangrove forests are tropical and require some salinity. They are protected in the state of Florida because of their importance to endangered and threatened species and species of special concern. Both salt marshes and mangrove forests converge near the North District Visitor Center and along the shoreline of Mosquito Lagoon just south of Turtle Mound.

All of the Seashore occurs within 10 miles of the Atlantic Ocean and along the Mosquito Lagoon and Indian River. Therefore, the park is within the 100-year floodplain.

3.2.2 Environmental Consequences

Water resource impacts were qualitatively assessed using presence/absence of surface water resources and floodplains, literature reviews, and in light of mitigation measures.

3.2.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact water resources include building fire lines, employing fire retardants or foams, and thinning. However, in light of the mitigation measures employed during fire management activities (e.g. no fire line construction in highly sloped areas; no fire retardant use within 100 feet of surface water resources), there would be little, if any, direct impacts on surface water resources, on the park. The potential for an increase in turbidity and sediment delivery in the water bodies such as Mosquito Lagoon as a result of soil erosion following suppression activities exists. However, the degree of soil erosion would be minor, short-term and localized.

The use of fire retardants or foams could potentially cause short and long-term impacts to water resources, if misapplied or mishandled. Retardants contain ammonia and phosphate or sulfate ions, which can change the chemistry of a water body, thus making it lethal to fish and other aquatic organisms. Foams contain detergents that can interfere with the ability of fish gills to absorb oxygen. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. For example, if an 800-gallon drop is made into a fast flowing river, it is likely that the lethal effects to aquatic resources would be short-lived as dilution below the toxic level is quickly achieved. On the other hand, a 3,000-gallon drop in a stagnant pond would likely cause toxic levels to persist for some time (USDA, 2001). Flushing is extremely limited in Mosquito Lagoon since the only water movement is wind driven. This can increase and prolong the impact of water pollution.

Manual and mechanical thinning and suppression activities would not affect the classified uses of Mosquito Lagoon and would not jeopardize its current classification for fishing and propagation of game and fish, shellfish, and other aquatic life.

Wetlands and Floodplain

Proposed activities with the potential to impact wetlands and floodplains include building fire lines, employing fire retardants or foams, and thinning. Impacts would be similar to those in other areas of the park.

The use of fire retardants or foam may impact the water quality of wetlands. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body, and the volume of flow in the stream or river. Wetland areas where flushing of water is wind driven, such as in high marshes, may be impacted more severely than wetlands that are more saturated. Of course, fires in the presence of water (i.e. that may occur in salt marshes or in mangrove forests) would likely be less fierce than fires elsewhere. During fire suppression, water will be used in lieu of fire retardant whenever possible. If retardant must be used, a non-fugitive type will be chosen, and bodies of water avoided. Mitigation measures would be employed during fire management activities (e.g. no fire line construction in highly sloped areas; no fire retardant use within 100 feet of surface water resources).

A U.S. Army Corps of Engineers 404 permit would be obtained prior to alterations that may alter natural hydrology of wetlands and thus require consultation. Moreover, the proposed activities would not involve the filling or disconnection of the floodplain, and would not affect the functionality of the floodplain. There would be minor and short-term, if any, direct impacts on wetlands or floodplains in the park.

3.2.2.2 Alternative 2 (Preferred Alternative)

Proposed activities with the potential to impact water resources include building fire lines, employing fire retardants or foams, prescribed fire use, and hazardous fuels reduction. General water resources impacts with regards to building fire lines, employing fire retardants or foams, and thinning would be the same as in the “No Action” Alternative. Prescribed fire use impacts on surface water resources within Bill’s Hill portion of park would be reduced to the proximity of the Edgewater treatment plant (see Fig. 1-2).

The potential for an increase in turbidity and sediment delivery in the Lagoon as a result of soil erosion exists, however, the degree of soil erosion would be minor and localized, and thus any increase in turbidity and sedimentation would also be minor.

Wetlands and Floodplain

General impacts to water resources and floodplains would be similar to those described under the “No Action” Alternative.

Conclusion

Among the alternatives, the general impacts to water resources, including wetlands and floodplains, would be similar in nature and very minor. The implementation of any of the alternatives would not impair water resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other Park Service planning documents.

3.3 VEGETATION

3.3.1 Affected Environment

Canaveral National Seashore is located along a "frost line." The Seashore is the southernmost extension of several northern species of plants and the northernmost extension of many tropical species. This unique combination of temperate and subtropical plants has resulted in a vegetative diversity found nowhere else in the Western Hemisphere except central coastal Florida. Signs of this unusual mixture include the palm hammocks, which contain an overstory dominated by temperate species and an understory comprised of subtropical plants. Another sign is the significant shift in vegetation along the edge of the lagoon from salt marsh cordgrass (*Spartina alterniflora*), which predominates in coastal areas north of the park, to mangrove species, which predominate to the south.

Over 1,000 species of both temperate and subtropical plants have been recorded in the park and surrounding area. They are represented in seven distinct plant communities:

- **Coastal Dune:** Occupies the primary dune and features sea oats (*Uniola paniculata*), beach grass (*Panicum amarum*), railroad vine (*Ipomea pes-caprae*) and other shrubs and herbs.
- **Coastal Strand:** Occurs behind the primary dune and is dominated by a dense growth of saw palmetto (*Serenoa repens*), sea grape (*Coccoloba uvifera*), myrsine (*Myrsine guianensis*) and a variety of other shrubs.
- **Oak Scrub:** Occurs on well-drained inland sites on old dune topography. Common species include several live oak species (*Quercus myrtifolia*, *Q. chapmanii*, *Q. geminata*), fetterbush (*Lyonia spp*) and blueberry (*Vaccinium myrsinites*).
- **Slash Pine Flatwoods:** Occurs primarily west of Mosquito Lagoon. Vegetation includes slash pine (*Pinus elliotii*) overstory and live oak, saw palmetto, and fetterbush understory.
- **Hardwood and Palm Hammocks:** Islands of tall closed forest communities scattered throughout the park dominated by live oak (*Quercus virginiana*) or cabbage palm (*Sabal palmetto*) overstory with other woody species such as nakedwood (*Myrcianthes fragrans*), red bay (*Persea borbonia*), and hackberry (*Celtis laevigata*).

- **Mangrove Swamps:** Located around the fringe of Mosquito Lagoon, in some impoundments, and along the shoreline of islands in the north end of the lagoon. They are composed mostly of white (*Laguncularia racemosa*), black (*Avicennia germinans*), and red (*Rhizophora mangle*) mangroves plus buttonwood (*Conocarpus erecta*).
- **Marsh:** This community occurs throughout CANA, especially within the southern portion of Mosquito Lagoon. Brackish areas are dominated by smooth cordgrass (*Spartina alternifolia*), saltgrass (*Distichlis spicata*), and Seashore paspalum (*Paspalum vaginatum*). Freshwater areas contain cattail (*Typha spp.*), sand cordgrass (*Spartina bakeri*), sawgrass (*Cladium jamaicense*), and arrowhead (*Sagittaria lancifolia*). Bladderwort (*Utricularia spp.*), water lily (*Nymphaea odorata*), spatterdock (*Nuphar luteum*), and duckweed (*Lemna minor*) occur in standing water.

A plant survey of the park was completed in May 2005 as part of the NPS inventory and monitoring initiative. That plus coordination with the U.S. Fish and Wildlife Service has revealed that no federally-listed threatened or endangered plant species occur within park boundaries.

One of the greatest threats to native vegetation at the Seashore is Brazilian pepper (*Schinus terebinthifolius*). Brazilian pepper has spread throughout virtually all of the disturbed areas of the Seashore, particularly along roadways and the dikes that encircle much of Mosquito Lagoon. To date, over 75 percent of the Seashore has been treated to combat this species; dead plants are left standing, and re-vegetation is occurring through natural recruitment.

Other exotic species include Australian pine (*Casuarina equisetifolia* and *C. glauca*) and cogon grass (*Imperata cylindrica*). Lines of the exotic Australian pine were planted in order to protect a grove of relic citrus trees to the west of Mosquito Lagoon from winds and cold. Australian pines grew to dominate the landscape; however, most have been eradicated during the last three years as part of an exotic plant reduction program. Cogon grass is a more recent invasive.

Plant species recorded near the Seashore and expected to invade park boundaries soon include melaleuca (*Melaleuca quinquenervia*). CANA and MINWR are working together to combat exotic species.

3.3.2 Environmental Consequences

Vegetation impacts were qualitatively assessed using professional judgment based on presence/absence of plant species, literature reviews, and by determining the number of acres impacted.

3.3.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact vegetation within the park include wildland fire suppression, limited wildland fire use, debris burns, prescribed fire use, and manual/mechanical fuel treatments.

Wildland fire suppression activities would occur in all of the six fire management zones. Suppression activities, such as digging of firelines and the removal of vegetation, would result in the mortality of plants and trees in the areas where suppression has taken place. These adverse impacts are expected to be minor because the loss of individual members of a given plant species would not jeopardize the viability of the populations on and adjacent to the park and would be limited to the area of treatment only. These impacts would also be short-term, as native vegetation is expected to recolonize after wildland fire events have occurred.

Fire suppression activities that result in soil disturbance (e.g. thinning, building of firelines, or inadvertently denuding the soil of vegetation) would make those disturbed areas more susceptible to invasive and exotic plant infestations. Disturbed areas would be monitored to guard against such infestations and may be planted with native vegetation. Coupled with mitigation measures aimed at reducing soil damage, fire suppression activities that result in soil disturbance would also help reduce the extent of existing native and exotic infestations in the park.

In units that allow unplanned ignition, there is danger that the wildland fire could pose more risks than benefits due to staffing limitations and the close proximity of urban development to the park. When fuel concentrations are very high, even fire-adapted species are likely to be killed by an intense wildfire. Exotic species, urban expansion, nutrient enrichment, changed fire frequency or intensity, and water table or hydroperiod modification are all agents of vegetative change. Both the likelihood that one of these “threats” would occur over an extensive area of a vegetative type and the severity of impact are ranked by vegetative type. Changes in one factor can produce changes in another, often resulting in a synergistic effect (Wade et al., 1980).

Introducing prescribed fire would have long-term beneficial impacts to the vegetation found within each fire management unit, as indicated in Table 3-1. Prescribed fires would serve to restore proper ecosystem function because fire plays an essential role in maintaining serial stages of succession. Generally, fire controls plant species and communities by triggering the release of seeds; altering seedbeds; temporarily eliminating or reducing competition for moisture, nutrients, heat and light; stimulating vegetative reproduction of top-killed plants; stimulating the flowering and fruiting of many shrubs and herbs; selectively eliminating invasive and exotic components of a plant community; and influencing community composition and successional stage through its frequency and/or intensity (Wade et al., 1980). Since lack of fire favors fire-intolerant species over fire-dependent ones, plant habitat and diversity would be improved. Fuel loadings would be reduced. After the initial prescribed burn, the area would be monitored for the return exotic species, which, if spotted, would be removed.

Maintaining defensible space around buildings, park boundaries, and cultural sites via regular mowing, thinning, and subsequent debris burns would have minor impacts to the vegetation that is currently there.

3.3.2.2 Alternative 2 (Preferred Alternative)

Proposed activities with the potential to affect vegetation include the addition of one FMU, wildland fire suppression, prescribed fire, debris burns, and non-fire fuels treatment. Under this alternative, there would be no use of unplanned ignition.

Minor, short-term, adverse impacts from wildland fire suppression, debris burns, prescribed fire use, and fuels treatment would be similar to those described under the “No Action” alternative.

Prescribed fire would occur on the number of acres listed in Table 3-1 per FMU:

Table 3-1 Key Vegetative Openings Provided by Prescribed Burning per FMU

FMU	Provide key openings for:	Acreage
1	Glandularia maritime Tephrosia augustissima var. curtissii Other state-listed species	1269.2
2	Glandularia maritime Tephrosia augustissima var. curtissii Other state-listed species	123.5
3	Lechea divaricata Pteroglossaspis ecristata Other state-listed species	1066
4	Lechea divaricata Pteroglossaspis ecristata Other state-listed species	966
5	N/A	N/A
6	Glandularia maritime Tephrosia augustissima var. curtissii Other state-listed species	28.7
7	N/A	N/A

The addition of FMU #7 would have little impact on vegetation. FMU #7 was separated from FMU #1 because the chances of intense fire are low in that area, which mainly consists of marshland and mowed grass. The area warrants a different management regime.

Although all wildland fire would be suppressed under this alternative, natural fire cycles would be maintained through prescribed burning. Natural fire cycles for CANA's vegetation types are approximately 2-4 years for marshes, 3-5 years for pine flatwoods, 5-10 years for more mesic oak scrub and 8-12 years for drier oak scrub. Hammock areas do not have a regular fire cycle; fire would only carry through them under extremely dry conditions. Vegetation sprouts rapidly after fire in Florida, particularly saw palmetto which has a very thick rhizome (root) system to provide energy for rapid regrowth. A year or so after a fire of normal intensity, the average visitor would not even realize an area has burned.

There would be no adverse impacts due to the elimination of limited wildland fire use, since prescribed burns would continue to occur.

The creation and maintenance of a fuels break along a section of the Seashore's perimeter in the Bill's Hill FMU would help prevent the spread of fire to and from adjacent non-agency land. While it would result in moderate adverse impacts on vegetation within the fuels break corridor in the short-term, the allowance of fire in the northern section of the park would be beneficial to vegetation in the long-term.

Conclusion

There are risks associated with limited wildland fire use, as permitted in the "No Action" alternative. Alternative 2 (Preferred) would attain the widest range of beneficial uses without environmental degradation, risk of human health or safety, or other unintended consequences.

The implementation of either alternative would not impair vegetation resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the preserve, (2) key to the natural or cultural integrity of the preserve or opportunities for enjoyment of the preserve, and (3) identified as a goal in the preserve's General Management Plan or other NPS planning documents.

3.4 WILDLIFE

3.4.1 Affected Environment

Mosquito Lagoon in Canaveral National Seashore is part of the most diverse and productive estuary in North America and adjoins the Merritt Island National Wildlife Refuge. The Seashore provides a unique environment for numerous wildlife species. At current estimates, there are 27 species of mammals, 60 species of reptiles and amphibians, 310 species of birds, 788 species of fish and around 100 species of butterflies. Common mammals include opossum (*Didelphis marsupialis*), Atlantic bottlenosed dolphin (*Tursiops truncatus*), and bobcat (*Lynx rufus*). Common reptiles are American alligator (*Alligator mississippiensis*), gopher tortoise (*Gopherus polyphemus*), and brown anole (*Anolis sagrei*). Amphibians include the two-toed amphiuma (*Amphiuma means*), greater siren (*Sirene lacertian*), peninsula newt (*Notophthalmus viridescens*), Florida chorus frog (*Pseudacris nigrita*), and oak toad (*Bufo quercicus*). In addition, several hundred thousand ducks, coots, and numerous varieties of migrating and wintering shorebirds visit on a regular basis.

Several exotic animal species also are impacting park resources including the coyote (*Canis latrans*) and the feral hog (*Sus scrofa*). Feral hogs are impacting native vegetation.

Endangered Species

Coordination with the U.S. Fish and Wildlife Service (FWS) revealed that although no federally listed plant species are documented on CANA property, the following federally-listed threatened or endangered animal species, listed in Table 3-2, could potentially occur within park boundaries:

Table 3-2 Federally Endangered and Threatened Species

Reptiles		Habitat	Status
Loggerhead sea turtle ¹	<i>Caretta caretta</i>	Mostly Aquatic, beaches used for nesting	Threatened
Green sea turtle ¹	<i>Chelonia mydas</i>	Mostly Aquatic, beaches used for nesting	Endangered
Leather back sea turtle ¹	<i>Dermochelys coriacea</i>	Mostly Aquatic, beaches used for nesting	Endangered
Kemp's ridley sea turtle ¹	<i>Lepidochelys kempii</i>	Mostly Aquatic, beaches used for nesting	Endangered
Hawksbill sea turtle ¹	<i>Eretmochelys imbricata</i>	Mostly Aquatic, beaches used for nesting	Endangered
Eastern indigo snake	<i>Drymarchon coraisi couperi</i>	Shrub Habitat	Threatened
Atlantic salt marsh snake	<i>Nerodia clarkii taeniata</i>	Coastal salt marshes and mangrove swamps	Threatened
Birds		Habitat	
Bald eagle	<i>Haliaeetus leucocephalus leucocephalus</i>	Coastal	Threatened
Wood stork	<i>Mycteria americana</i>	Coastal salt marshes and mangrove swamps	Endangered
Florida scrub jay	<i>Aphelocoma coerulescens</i>	Open oak scrub	Endangered
Mammals		Habitat	
West Indian Manatee ¹	<i>Trichechus manatus</i>	Aquatic	Endangered
Southeastern beach mouse	<i>Peromyscus polionotus niveiventris</i>	Shrub Habitat/Dunes	Threatened
Right whale ¹	<i>Balaena glacialis</i>	Aquatic	Endangered
¹ Habitat utilized by these species would not be affected by fire management activities and therefore would not be analyzed further.			

Based on FWS consultation, all five listed species of sea turtles, the West Indian manatees, and the Right whale have been dismissed from further analysis. Any action pertaining to fire management activities would occur on land, and thus would not significantly affect the aquatic habitats required by these species. FWS concurs that marsh species (the Wood stork and the Atlantic salt marsh snake) may be dismissed for similar reasons.

The proposed action may affect the Southeastern beach mouse, the Bald eagle, the Florida scrub-jay, and the Eastern indigo snake.

The Southeastern beach mouse (*Peromyscus polionotus niveiventris*) suffers when the scrub habitats become overgrown. It lives on and behind dunes in the coastal environment and relies heavily on sea oats for food.



The Bald eagle (*Haliaeetus leucocephalus leucocephalus*) prefers the tallest pine flatwoods in a clump of trees for nesting. Without periodic fire, the pines are crowded out by other plant seedlings. When the understory is unnaturally thick, as the case has been with fire suppression during the past 40 years, fire can burn so hot that it scorches the overstory trees and may kill them.

Florida scrub jays (*Aphelocoma coerulescens*) live in areas of oak scrub where a main source of food is acorns. They bury the acorns in open, sandy spots for later retrieval. Sandy patches are a natural symptom of low oak trees constrained by periodic fires, where both undergrowth and the accumulation of leaf litter are naturally controlled. Without regular burning, low oak shrubs grow into trees, leaving the birds exposed to hawks and other predators. Even the production of acorns and insects for the jays to eat is regulated in part by natural fire cycles. Healthy scrub needs to burn at least every eight to 15 years. Scrub jay populations have declined in portions of CANA due to decade of fire suppression and the resultant growth of denser and taller vegetation.



Many species, including the Eastern indigo snake (*Drymarchon coraisi couperi*), are dependent on burrows of the Gopher tortoise (*Gopherus polyphemus*) for protection. Eastern indigo snake hatchlings do not typically use such burrows for shelter, and thus may be susceptible to fire mortality. Adults that use burrows may be able to escape fires. If the undergrowth becomes too high, gopher tortoises cannot dig burrows, and the Eastern indigo snake suffers. The Eastern indigo snake is also a victim of the pet trade and vehicle traffic.



Exotic species are a threat to park resources. They include the feral hog (*Sus scrofa*), which has become established in the southern half of CANA. Feral hogs seriously disrupt native vegetation and can harm endangered species of snakes and sea turtle nests. The raccoon, although not an exotic species, can be a problem depredating sea turtle nests. Feral cats (*Felis catus*) threaten the federally protected Southeastern beach mouse within CANA.

3.4.2 Environmental Consequences

The effects of the alternatives on wildlife were qualitatively assessed using professional judgment based on literature reviews, general knowledge, and research specific to the area.

3.4.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact wildlife within the park include wildland fire suppression, limited wildland fire use, debris burns, prescribed fire use, and manual/mechanical fuel treatments.

All wildland fire suppression, debris burns, and manual/mechanical fuels treatments, such as defensible space maintenance activities, could result in the temporary displacement of wildlife or individual mortality of wildlife species. These adverse impacts would not jeopardize the viability of the populations on and adjacent to the Seashore, and thus would be minor. Generally, fire determines wildlife habitat patterns and populations by increasing the amount, availability, and palatability of foods for herbivores; regulating yields of nut and berry-producing plants; regulating insect populations which are important food sources for many birds; and by controlling the scale of the total vegetative mosaic through fire size, intensity, and frequency (Wade et al., 1980).

Prescribed fire use would have many long-term beneficial impacts for species that depend on the open, post-fire conditions to survive, including more than 300 species that depend on the Gopher tortoise's burrow (USFWS, 1990).

Limited wildland fire due to natural causes, such as lightening, may have the potential to strike various species or their habitat. However, proper monitoring and mitigation would likely thwart adverse effects during unplanned fire events.

Endangered Species

Impacts on federally endangered or threatened species or species of special concern due to the No Action Alternative would be similar to impacts on other wildlife.

As stated in the National Park System's 2001 Management Policies, if a federally- or state-listed species were to be documented within the park boundaries, active management programs would be undertaken to inventory, monitor, restore, and maintain the listed species' habitats, control detrimental non-native species, control detrimental visitor access, and re-establish extirpated populations as necessary to maintain the species and habitats upon which they depend. The Park would also manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for the recovery of threatened and endangered species. Measures taken to protect those species, or their required habitat, would supersede other management activities in the event any of those management activities would negatively impact the listed species.

Prescribed fire use would have many long-term beneficial impacts for species that depend on the open, post-fire conditions to survive, including the federally-listed threatened and endangered Southeastern beach mouse, Bald eagle, Florida scrub jay, and Eastern indigo snake that depend on the Gopher tortoise's burrow (USFWS, 1990).

Wildland fire due to natural causes, such as lightening, may have the potential to strike critical habitat for threatened and endangered species. However, proper monitoring and mitigation would likely thwart adverse effects on species during unplanned fire events.

3.4.2.2 Alternative 2 (Preferred Alternative)

Proposed activities with the potential to affect vegetation include the addition of one FMU, wildland fire suppression, prescribed fire, debris burns, and non-fire fuels treatment. Under this alternative, there would be no use of unplanned ignition.

Impacts of wildland fire suppression, prescribed fire, debris burns would be similar to impacts in the No Action Alternative.

The addition of one FMU would allow for more controlled management of fire units. In all units, natural fire cycles that are beneficial to wildlife habitat would be maintained as much as possible through prescribed burning. All wildland fire would be suppressed under this alternative.

Non-fire fuels treatment would include creating and maintaining a hazard fuels break along a section of the Seashore's perimeter in the Bill's Hill FMU to help prevent the spread of fire to and from adjacent non-agency land. This would involve the permanent removal of and/or relocation of wildlife species that occur within the perimeter and/or their habitat. These adverse impacts would not jeopardize the viability of the populations on and adjacent to the Seashore, and thus would be minor.

Endangered Species

The U.S. Fish and Wildlife Service (FWS) reviewed the proposed Fire Management Plan implementation on February 3, 2006. The consultation letter can be found in Appendix A. The FWS provided determinations of species in the park, as listed above. According to FWS, the FMP includes Section 7(a)(1) conservation efforts to improve and maintain habitats for threatened and endangered species and other wildlife resources at the park, and thus complies with Section 7 of the Endangered Species Act.

General impacts to endangered or threatened animal species or species of concern resulting from wildland fire suppression, debris burns, and prescribed fire would be the same as in the "No Action" alternative. Adverse impacts may jeopardize the viability of the populations on and adjacent to the Seashore, and thus could be moderate to major and long-term. However, with close monitoring as required by the National Park System's 2001 Management Policies (as described in the No Action alternative), impacts would be minor.

The species potentially benefiting from the updated prescribed fire management regime are listed per FMU in Table 3-3:

Table 3-3 Key Wildlife Species Protected by Prescribed Fires per FMU

FMU	Species:
1	Southeastern beach mouse Gopher tortoise Eastern indigo snake habitat
2	Southeastern beach mouse Gopher tortoise Eastern indigo snake habitat
3	Florida scrub jay Gopher tortoise Eastern indigo snake habitat
4	Potential bald eagle nest sites Florida scrub jay Gopher tortoise Eastern indigo snake habitat
5	N/A
6	Southeastern beach mouse Gopher tortoise Eastern indigo snake habitat
7	N/A

Creation of a hazard fuels break would entail selectively thinning hazard fuels for a radius of 20 to 40 feet around the bases of potential bald eagle nest trees prior to prescribed burning. Hand burns would occur around such trees during prescribed burning operations. Such measures taken to protect species or their required habitat would supersede other management activities in the event that any management activities would negatively impact the listed species.

Conclusion

Habitat conditions for many wildlife species would improve with the restoration of the historic high frequency, low intensity fire regime characteristic. The implementation of either alternative would not impair wildlife resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the Seashore, (2) key to the natural or cultural integrity of the Seashore or opportunities for enjoyment of the Seashore, and (3) identified as a goal in the Seashore's General Management Plan or other Park Service planning documents.

3.5 AIR QUALITY

3.5.1 Affected Environment

Under the terms of the 1990 Clean Air Act amendments, Canaveral National Seashore is designated as a Class II quality area. By definition, Class II areas of the country are set aside for protection under the Clean Air Act. Protection is somewhat less stringent than in Class I areas. The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA, 2000a). Under Class II, modest increases in air pollution are allowed beyond baseline levels for particulate matter, sulfur dioxide, nitrogen, and nitrogen dioxide; provided the NAAQS are not exceeded.

Canaveral National Seashore's air quality is generally good because it is remote from major sources of pollution. It is periodically affected by NASA operations, heavy traffic by personnel at the Kennedy Space Center, and offsite emissions sources. Central Florida, including the Seashore vicinity, has one of the lowest incidents of air stagnation in the United States (Stern, 1976). Prevailing winds disperse pollutants, and topographical barriers that prevent dispersion are rare. Air quality impacts are typically of short duration, with pollutants readily dispersed.

3.5.2 Environmental Consequences

Air quality impacts were qualitatively assessed upon review of National Park Service best management practices to reduce air emissions, State of Florida prescribed fire permit specifications and requirements, and the extent of proposed prescribed fire activities under all the alternatives.

3.5.2.1 Alternative 1 (No Action)

The use of prescribed fires and debris burns has the potential to impact air quality. Smoke consists of dispersed airborne solids and liquid particles, called particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple burnings within an airshed over a period of time too short to allow for dispersion.

The Florida Department of Environmental Protection (DEP) has overall air quality regulatory authority within the state, and has transferred smoke management regulation and permitting to the Florida Division of Forestry (DOF). The DOF manages smoke according to the requirements set forth in the Florida Administrative Code 5I-2.06, which covers agricultural and silvicultural fires. The code requires, among other things, that all prescribed fires have a permit and pass through a smoke screening process.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality effect. They include:

1. **Avoidance:** This strategy relies on monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions.
2. **Dilution:** This strategy ensures proper smoke dispersion in smoke-sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems carry smoke away from the area, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground.
3. **Emission Reduction:** This strategy utilizes techniques to minimize the smoke output per unit area treated. Smoke emission is affected by the number of acres burned at one time, pre-burn fuel loadings, fuel consumption, and the emission factor. Reducing the number of acres that are burned at one time would reduce the amount of emissions generated by that burn. Reducing the fuel beforehand, e.g. removing firewood, reduces the amount of fuel available. Prescribed burning when fuel moistures are high can reduce fuel consumption. Emission factors can be reduced by pile burning or using certain firing techniques such as mass ignition.

The Seashore would manage smoke in compliance with federal, state, and local requirements, so as to minimize its effects on Seashore visitors, firefighters, adjoining lands and neighbors, natural and cultural resources, and roads and highways. The Seashore would inform the DOF of all fire management activities, as follows:

- A copy of CANA's annual prescribed fire program would be sent to the DOF prior to the burning season, and DOF personnel invited to observe prescribed burns.
- A burning permit would be obtained from the DOF for each prescribed burn; the Seashore would comply with all limitations stated within the permit.
- Notification would be given to the DOF within 24 hours of the scheduled burn and when the burn is declared out.

Each burn plan would include smoke trajectory maps and identify smoke-sensitive areas. Mitigation measures would be defined in the plan and arrangements made prior to ignition to ensure that designated resources are available if needed to implement the mitigation measures. Fire weather forecasts would be used to correlate prescribed fire ignitions with periods of optimal combustion and smoke dispersal. Prescribed fire would not be implemented when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. Any smoke situation that arises and threatens any smoke-sensitive areas would entail immediate suppression action.

If weather conditions change unexpectedly during a prescribed fire, and there is potential for violating air quality standards. For adverse smoke impacts on these sensitive receptors, the park would implement a contingency plan, which includes the option for immediate suppression. Considering the relatively small number of acres that would be affected by prescribed fire over a period of several years (approximately 3,740 acres), and in light of current air quality in the

areas and approval of the burn permits by DOF, prescribed burning would not violate daily national or state emission standards and would cause very minor and temporary air quality impacts. The greatest threat to air quality would be smoke impacts on sensitive receptors (e.g. residences, schools); however, smoke may be minimized and/or eliminated if the burn plan is strictly adhered to, and if smoke minimization efforts are followed.

Overall, impacts to air quality are expected to be minor with potential to become moderate, and short-term.

3.5.2.2 Alternative 2 (Preferred Alternative)

Under Alternative 2, air quality impacts would be similar to those described under the No Action alternative. Air quality impacts from wildfires would be reduced from suppression efforts. Impacts to air quality are expected to be minor with potential to become moderate, and short-term.

Conclusion

The implementation of either alternative would not significantly impact, nor impair, air quality resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the Seashore; (2) key to the natural or cultural integrity of the Seashore or opportunities for enjoyment of the Seashore; and (3) identified as a goal in the Seashore's General Management Plan or other National Park Service planning documents.

3.6 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)

3.6.1 Affected Environment

Canaveral National Seashore is visited by about 1 million visitors per year. Visitors typically engage in activities such as fishing, swimming, surfing, boating, sunbathing, photography, hiking, horseback riding, and backcountry camping.

Mosquito Lagoon is one of the most productive inshore fisheries in Florida. It contains one of the last significant populations of shellfish (oysters, clams, shrimp, and crabs) on the East Coast that has not been depleted by over-harvesting or pollution. The Lagoon has tremendous economic value to east central Florida. Commercial shellfishing is extremely important to the local economy. Recreational fishing and shrimping in the Lagoon support a multi-million dollar tourist industry.

The Seashore contains several developed visitor areas. In the North District, there is an Information Center with a handicap accessible restroom, drinking water and an Eastern National book sales area. The Eldora State House includes exhibits on the people who lived in Eldora from 1877-1914 and beyond. Facilities at the Eldora State House include a sand trail about 1/8 mile long leading to the Eldora State House and Fishing Dock. Accessible restrooms are located at the Parking Area with one available at the State House. Other North District visitor facilities

include five parking areas along the ocean with restrooms and boardwalks to access the beach; two boat ramps, and trails to the Turtle Mound and Castle Windy archaeological sites and through the Eldora Hammock. Park operation facilities include a maintenance complex, ranger station, fee booth, four support garages, and two buildings operated by a university and community college.

In the South District, visitor facilities include 13 parking areas along six miles of beach. Park operation facilities include a ranger station, fee booth, curatorial building, and two support structures.

Excluding the beach and southern entrance, much of the southern two-thirds of CANA is managed through a cooperative agreement between the NPS and FWS where FWS is responsible for all natural resource management, including fire management, while NPS is responsible for archeological site monitoring and protection. The NPS has sole responsibility along the beach and northern one-third of CANA.

3.6.2 Environmental Consequences

Recreation impacts were qualitatively assessed in light of the intensity and duration of fire management activities as they related to visitor use and experience. Visual resource impacts in this environmental assessment were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape.

3.6.2.1 Alternative 1 (No Action)

There would be some short-term reduction in visitor use and experience during and immediately following any thinning, wildfire suppression and/or prescribed fire activities from the presence of engines and thinning or fire crews. Impacts would be minor because: 1) fire management activities would likely involve only short-term presence of vehicles and people, 2) the thinning treatments would involve only limited and selective removal of trees and shrubs, and 3) smoke accumulations would be temporary since prescribed fires would be ignited under favorable conditions for smoke dispersion.

Thinning treatments would not disrupt or prevent visitor use of the auto tour road within the park, and may result in temporary visitor off-road access restrictions to certain areas of the park where thinning treatments were being conducted.

Seashore operations would not be affected under this alternative with the aid of fire management personnel from Merritt Island National Wildlife Refuge, National Aeronautics and Space Association, and local area fire departments. In the event of a wildfire within or adjacent to the park, Seashore operations may be temporarily affected depending on the severity of the fire and situation at hand.

3.6.2.2 Alternative 2 (Preferred Alternative)

General impacts to visitor use and experience would be similar to those described under the “No Action” alternative.

Any prescribed fires would likely produce minor short-term smoke accumulations that impact local visibility. Minimizing smoke emissions through best management practices would reduce short-term impacts. In Bill’s Hill, fires would be conducted during the fall and winter, but in other sections of the park they would occur at other times of the year. Prescribed fire activities may result in short term road closures (a half to two days) when operations occur along beach areas.

Hazardous fuels reduction activities would result in the short-term presence of work crews and equipment within the park, which may impact visitor experience. These activities would also result in temporary visitor off-road access restrictions to certain areas of the park where hazardous fuels reduction treatments were being conducted.

Conclusion

Negative impacts to the park, under either alternative, would be very minor and temporary during thinning, suppression, and/or prescribed burning activities (e.g. road closures, trail closures or limited access to certain areas, presence of work crews in the vista). However, the implementation of any of the alternatives would not significantly impact the visitor use and experience (1) necessary to fulfill specific purposes identified in the enabling legislation of the Seashore; (2) key to the natural or cultural integrity of the Seashore or opportunities for enjoyment of the Seashore; and (3) identified as a goal in the Seashore’s General Management Plan or other National Park Service planning documents.

3.7 HUMAN HEALTH AND SAFETY

3.7.1 Affected Environment

Prior to the ignition of any prescribed fire in the park, all the burn parameters of the existing and approved prescribed fire burn plan must be met to ensure a safe and effective prescribed fire. In addition, staff would prepare brochures and press releases for the public and adjacent landowners that advise them of the time and extent of the proposed prescribed fire. In the event of potentially hazardous wildfires within the park, the Park Superintendent and Chief of Operations would coordinate public notification efforts within and outside the park. The extent of public notice would depend on the specific fire situation. In every case, assuring visitor and park staff safety would take priority over other activities. In summary:

- 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 would be assigned to fire management duties (unless assigned as trainees, in which case they would be closely supervised by an individual fully qualified for the given position).

- All personnel (including emergency hire firefighters) engaged in fireline operation 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. (Exceptions to this are area fire departments, whose members adhere to state-determined standards during the first operational period of a wildland fire.)
- Fires or camping in the backcountry may be prohibited if the fire danger is high.
- Press releases would be sent to local media and visitors would be contacted to create an awareness of fire danger.
- When a wildland fire is ongoing, information concerning the fire such as location, expected dangers, areas to avoid, and precautions to be taken would be posted at visitor contact stations and on Seashore bulletin boards.
- Every prescribed fire plan would outline safety measures.
- Trails, campsites, and day-use areas that have been recently burned would remain closed until all hazard trees can be removed.

Human safety would take priority over all other fire management considerations. A qualified wildland fire safety officer would be assigned to all large wildland fires and prescribed fires. Employees responsible for any wildland fire management activities would never subordinate human lives to other values. Consistent, accurate evaluation of fire behavior at the Seashore would provide the basis for plans and actions to ensure public and firefighter safety.

Public safety considerations at the Seashore are as follows:

- There is only one two-lane road leading into the Seashore in each district, dead-ending about six miles into the Seashore on either end. Therefore, evacuating traffic and suppression resources entering the Seashore would have to utilize the same route.
- The city waterline only extends about two miles into the North district. A small water line extends to the Eldora State House, but has insufficient pressure to extinguish a fire. Therefore, sufficient water to fight a fire would have to be trucked in, flown in, or pumped out of Mosquito Lagoon.
- The vast majority of visitation at the Seashore is concentrated on the beach. The second largest area of visitor usage is Mosquito Lagoon. In both areas, people face little danger of being overrun by fire. The greatest danger would be in evacuating them from the Seashore if the road were blocked by fire.

3.7.2 Environmental Consequences

Human health & safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions, and in light of mitigation measures and best management practices.

3.7.2.1 Alternative 1 (No Action)

Factors most likely to adversely impact firefighter health and safety include activities associated with wildland fire suppression efforts (accidental spills, injuries from the use of fire-fighting

equipment, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from wildland fires.

Accidental spills of fire retardants and foams are the most likely to adversely impact human health and safety. Fire retardants used in controlling or extinguishing fires contain about 85% water, 10% fertilizer, and 5% minor ingredients such as corrosion inhibitors and bactericides. Fire suppressant foams are more than 99% water. The remaining 1% contains surfactants, foaming agents, corrosion inhibitors, and dispersants. These qualified and approved wildland fire chemicals have been tested and meet specific requirements with regard to mammalian toxicity as determined by acute oral and dermal toxicity testing as well as skin and eye irritation tests (USDA, 1999). However, they are strong detergents, and can be extremely drying to skin. All currently approved foam concentrates are irritating to the eyes as well. Application of a topical cream or lotion can alleviate the effects of a retardant, and protective goggles can prevent any injury to the eyes when using foams.

Fuel break construction can pose safety threats to firefighters. Injuries can occur from the use of equipment as well as from traveling overland to targeted areas for firefighting efforts during suppression activities. While each of the crew is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents.

Smoke inhalation can also pose a threat to human health and safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM_{2.5}), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000b). Operations are only conducted when conditions favor smoke dispersion away from populated areas, unlike the situation with wildfires.

Use restrictions applied to areas of wildland fires or prescribed fires would minimize or eliminate public human health and safety concerns resulting from smoke exposure or fire injuries. When using prescribed fire, mitigation measures, such as construction of fire lines, the presence of fire engines, and strict adherence to prescribed burn plans, would minimize the potential for an out-of-prescription burn or escape. Elements of the prescribed burn plan that related to ensuring a safe burn include such measures as fuel moisture, wind speed, rate of fire spread, and estimated flame lengths. While the potential for a fire escape would always exist when conducting prescribed fires, that potential is extremely small. Recent statistics summarized by the National Interagency Fire Center report that approximately 1% of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires jumped a control line and suppression tactics were successfully used to control them. Out of the 1% of prescribed fires that required suppression, 90% were controlled without

incident. Statistically, this result leaves about 0.1% of prescribed fires that required major suppression actions (Stephens, 2000).

The use of prescribed fire would indirectly benefit human health and safety by increasing burned areas, consequently reducing fuel accumulation in some areas, thus potentially decreasing the risk of a catastrophic or stand replacement fire. Impacts would be minor.

3.7.2.2 Alternative 2 (Preferred Alternative)

The general impacts to human health and safety under Alternative 2 would be similar to those described under the No Action Alternative. The extended suppression of all wildland fires, regardless of origin, could increase the potential for adverse impacts to firefighter health and safety as a result of increased suppression activities. However, impacts to the public from smoke inhalation and injuries from wildland fires would decrease as a result of suppression of all wildland fires. Impacts would be minor.

Conclusion

Under either alternative, there is the potential for injury to workers from suppressing wildfires, conducting mechanical thinning, and carrying out prescribed fire activities. However, the implementation of any of these alternatives would not significantly impact human health and safety resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the Seashore, (2) key to the natural or cultural integrity of the Seashore or opportunities for enjoyment of the Seashore, and (3) identified as a goal in the Seashore's General Management Plan or other National Park Service planning documents.

Overall, public safety would be enhanced since it is not a matter of if CANA's vegetation would burn, but when. Fire can occur under carefully controlled conditions (prescribed burn) ensuring maximum safety or can occur under unpredictable and often dangerous conditions as a wildfire.

3.8 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation, a reasonable opportunity to review and comment on these actions. The consultation process with the Florida Division of Historical Resources was initiated in 2005.

3.8.1 Affected Environment

Canaveral National Seashore contains a number of significant archeological resources. At present, approximately 130 sites within Seashore boundaries are listed in the Archaeological Sites Management Information System (ASMIS) (NPS, 2006). These sites include prehistoric shell middens and mounds, prehistoric burial mounds, a Civil War salt works, historic cemeteries, two historic canals, and four historic buildings, including remnants of a circa 1900 waterway community named Eldora. A number of shipwrecks lie within Seashore waters,

dating back to the 1700s and possibly as far back as the 1500s. Several additional cultural sites are located immediately outside of the Seashore boundary on MINWR property. These include Fort Ann (a Seminole War site), several prehistoric burial mounds, and the Sugar Mills Ruins. Other sites extend across both areas, such as the Old and New Haulover Canals, and the Dummett Homestead.

Cultural resources at the Seashore that are listed on the National Register of Historic Places (NRHP) include Seminole Rest (two historic buildings and several prehistoric shell middens), Turtle Mound, Old Haulover Canal, Ross Hammock Mounds and Midden, The Eldora State House, and the Confederate Salt Works. Several cultural resources at the Seashore, including the Armstrong Site, Castle Windy, Bill's Hill burial mound, and the Max Hoeck burial mound, lack only submission for inclusion in the NRHP (NPS, 1997).

3.8.2 Environmental Consequences

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during wildfire suppression, thinning, and prescribed fire activities.

3.8.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact known and unknown cultural resources include constructing fuel breaks, thinning, and prescribed fire. The Seashore would protect cultural resources by implementing the following fire management practices:

- The CANA resource management specialist would continue coordination with the Southeast Archaeological Center to ensure that CANA has the most current data regarding archaeological resources within its boundaries. S/he would provide recommendations on how to mitigate adverse effects to these resources during fire management activities, and would coordinate compliance with Section 106 of the National Historic Preservation Act, as appropriate.
- The CANA resource management specialist would be consulted prior to any fire management activities that would involve ground disturbance. S/he would provide the incident commander or burn boss with maps showing the location of archaeological/cultural/historic resource locations, and would serve as a cultural resource advisor during suppression or prescribed fire events.
- When fire management activities must be conducted in the proximity of cultural resource locations, special flagging would be used to delineate these areas to the greatest extent feasible (it may not be possible during some suppression events). The CANA resource management specialist or an archeologist would accompany firefighters whenever feasible to provide mitigation recommendations during suppression events.
- A photographic record would be maintained of archaeological materials exposed during fire management and rehabilitation activities.
- Any use of heavy equipment would be monitored by the CANA resource management specialist to avoid unnecessary damage to archaeological sites.

- Historic buildings would be protected from wildland fire via the creation and/or maintenance of defensible space around each (minimum of 30 feet).
- During all suppression activities, the minimum impact suppression tactics policy would be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of archaeological/cultural/historic resources include:
 - Restricting the use of heavy equipment for constructing fireline. A bulldozer or plow may be used for fireline construction only in extreme situations to protect human life and property, and then only with the authorization of the Seashore superintendent or designee.
 - Not using fireline explosives.
 - Using existing firebreaks and 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 archaeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations, it would 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 actions
- MINWR conducts prescribed burns within the jointly managed portion of the Seashore. As CANA is responsible for cultural resource management in this area, MINWR consults with CANA whenever activities involving ground disturbance are being considered.

With the use of these fire management practices, there would be no effects to known cultural resource sites from fire management activities. There would be potential for fire management activities to affect unrecorded cultural resources within the Seashore.

3.8.2.2 Alternative 2 (Preferred Alternative)

On December 21, 2005, the Florida Department of State, Division of Historical Resources, determined that the FMP adequately addresses the concern for prehistoric and historic resources located within the Canaveral National Seashore and the potential impacts from fire and fire management activities. The consultation response can be found in Appendix A.

General impacts to cultural resource sites under Alternative 2 would be similar to those described under the “No Action” Alternative.

Conclusion

The implementation of either alternative would not impair cultural resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the Seashore, (2) key to the natural or cultural integrity of the Seashore or opportunities for enjoyment of the Seashore, and (3) identified as a goal in the Seashore’s General Management Plan or other Park Service planning documents.

3.9 CUMULATIVE IMPACTS

The cumulative impacts analysis for the Fire Management Plan EA considers the past, present, and reasonably foreseeable future actions that could add to (intensify) or offset (compensate for) the effects from the fire Management Plan alternatives. Cumulative impacts vary by resource and the geographic areas considered here are generally the park and areas adjacent to the park. In some instances, activities may result in both negative and positive impacts, depending on the duration of the effect. As a result, some resource categories in Table 3-4 show both positive and negative impacts resulting from a particular activity. The information provided in Table 3-4 is the basis for the cumulative impacts described in Table 3-5.

Table 3-4 Affected Impact Topics and Activities/Land Uses Contributing to Fire Management Plan Cumulative Impacts

DIRECT/INDIRECT EFFECTS KEY: (+) Positive/beneficial; (-) Negative/detrimental; (Blank) Neutral/no effect

	Soils	Water Resources	Vegetation	Wildlife	Air Quality	Visitor Use & Experience	Human Health & Safety	Cultural Resources
Septic tank effluent and stormwater runoff from adjacent properties	-	-	-	-		-	-	
Installation of sewer system in Bethune Beach	+	+						
Upgrading of wastewater treatment plant in Edgewater	+	+						
NASA operations; traffic by NASA personnel; offsite emissions		-	-	-	-	+ -	-	
Hurricanes; drought conditions (wind, high temperatures, and dry weather)			-	-	-	-	-	
Festivals and activities at nearby recreational locations						+		
Temporary closures of facilities for improvements	+	+	- +	+		- +	+	+
Building of fire cache in North District for small engine and fire supplies	- +	- +	- +	- +	+	-	+	+

Table 3-5 Cumulative Impacts

Resource	Impacts from Past and Present Activities/ Land Uses	Impacts from Future Activities/ Land Uses	Impacts from Proposed Actions (No Action, Alternative 2)	Cumulative Impacts from Proposed Actions
Soils	Negative impacts from septic tank effluent and stormwater from adjacent properties; improvement to soil quality due to improved sewer system and wastewater treatment plant	Facility closures and building of fire cache may cause temporary adverse soil impacts (soil erosion or loss)	Very minor, localized, short-term soil compaction and erosion impacts resulting from fuels reduction and fire suppression activities; benefits to soil development and soil nitrification with prescribed fire use; benefits would not occur in areas that previously allowed wildland fires	Fire Management Plan would not result in significant cumulative impacts; soils inside of the park would improve over time with soil development and nitrification from prescribed fires
Water Resources	Septic tank effluent and stormwater from adjacent properties can harm water quality; improved sewer system and wastewater treatment plant can improve water quality	Facility closures and building of fire cache may cause temporary adverse soil impacts (soil erosion or loss); offsite emissions may harm water quality	Minor, localized impacts from soil erosion; prescribed fires would have no direct general impact	FMP would not result in significant cumulative impacts; water resources would be indirectly affected by quality would improve over time
Vegetation	Septic tank effluent and stormwater runoff can harm soils and water resources and plants and animals that depend on them; offsite emissions can damage plants	Hurricanes or drought conditions may damage vegetation and/or result in wildland fires; facility improvements and/or construction may damage plants in short-term but be useful for plants in long-term	Minor, short-term, adverse impacts to plants due to suppression and maintenance activities; wildland fire use may result in long-term impacts if fuel loads are high; fuel loadings reduced; fire management activities resulting in ground disturbance could result in the spread of invasive exotic plants; plant habitat and diversity improved in long-term with prescribed fire use; long-term beneficial impacts due to fuels break	FMP would not result in significant cumulative impacts; invasive exotic plant species would continue to decline, while native species would thrive with restored natural fire cycles

Resource	Impacts from Past and Present Activities/ Land Uses	Impacts from Future Activities/ Land Uses	Impacts from Proposed Actions (No Action, Alternative 2)	Cumulative Impacts from Proposed Actions
Wildlife	Septic tank effluent and stormwater runoff can harm soils and water resources and plants and animals that depend on them; offsite emissions can harm sensitive wildlife habitats	Hurricanes or drought conditions may damage wildlife and/or result in wildland fires; facility improvements and/or construction may damage animals in short-term but help animals in long-term	Suppression, debris burns, fuels treatment, creation of fire break, and prescribed burn activities would temporarily displace and result in minor adverse impacts to some wildlife species; individual mortality of some species likely; long-term beneficial impact on federal T&E species	FMP would not result in significant cumulative impacts; wildlife habitat would improve, especial for T&E species, and diversity would increase
Air Quality	Offsite emissions can pollute air in park	Hurricanes or drought conditions may cause poor air quality; building a fire cache may improve response to fires, thereby reducing smoke	Very minor and temporary impacts due to managed natural fire and prescribed fire; minor smoke impacts on sensitive receptors (e.g. private residences); fewer emissions from wildland fire use	FMP would not result in significant cumulative impacts; Class II air quality standards would not be violated
Visitor Use and Experience (including Park Operations)	Septic tank effluent and stormwater runoff can harm plants or animals that visitors enjoy	NASA operations may improve or compromise visitor experience; hurricanes or drought would discourage visits; festivals and activities would offer additional recreational opportunities to visitors; facility closures and/or construction would be a short-term inconvenience but may improve visitor use in the long-term	Minor, temporary, and short-term impacts on visual resources and visitor use and experience during fuels treatments and prescribed burn activities (e.g. trail or road closures, presence of work crews in the vista); temporary effect on park operations	FMP would not result in significant cumulative impacts; long-term enhancement of recreation resources and opportunities would offset short-term recreation inconveniences from fire management activities

Human Health & Safety	Effluent, runoff and offsite emissions can cause harm to human health and safety	Hurricane or drought conditions may cause harm to human health and safety; facility improvements would improve human safety in the long-run	Potential for injury to workers conducting suppression, fuels reduction, and prescribed burn activities; very minor exposure to smoke by workers and the public during wildland fires and prescribed burns; more suppression may result in fewer impacts from smoke	FMP would not result in significant cumulative impacts; Fire Management activities would improve human health and safety in the event of wildfire
Cultural Resources	Facility improvements have preserved cultural resources	Facility improvements would preserve cultural resources in the long-run	No direct impact to known cultural resources; cultural landscape benefited from vegetation maintenance	FMP would not result in significant cumulative impacts; cultural and component landscapes continue to be preserved and enhanced

Chapter 4 Consultation and Coordination

4.1 LIST OF PREPARERS

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Rebecca Whitney, Project Manager, Mangi Environmental Group
Jessica Butts, Project Analyst, Mangi Environmental Group
Mark Blevins, Geographic Information Systems (GIS) Analyst, Mangi Environmental Group

4.2 PERSONS, ORGANIZATIONS, AND AGENCIES CONSULTED

Guy Prentice, Southeast Archaeological Center
Paul Schmalzer, Dynamac Corporation
Laura Kammerer, Florida Office of Cultural and Historical Programs
Dawn Zattau, U.S. Fish and Wildlife Service
John Stiner, Canaveral National Seashore, National Park Service.
Jami Hammond, Southeast Regional Office, National Park Service
Chuck Schuler, Southeast Regional Office, National Park Service
Robin Toole, Southeast Regional Office, National Park Service
Fred Adrian, Merritt Island National Wildlife Refuge
Glen Stratton, Merritt Island National Wildlife Refuge

4.3 PERSONS, ORGANIZATIONS, AND AGENCIES WHO RECEIVED THIS EA

Virginia Barker, Brevard County Office of Natural Resource Management
Bill Belleville, The Orlando Sentinel
Robert Bendick, Vice President, The Nature Conservancy (Florida Field Office)
Anne Birch, IRL Program Director, The Nature Conservancy
Mario Busacca, NASA Environmental Management
Kenneth S. Chamber, Chief, Seminole Nation of Oklahoma
Billy Cypress, Chairman of General Council, Miccosukee Tribe
Kenneth Haddad, Executive Director, Florida Fish and Wildlife Conservation Commission
Florida Audubon Headquarters
Mike Thompson, Mayor, City of Oak Hill
Spaceport Florida Authority
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Steve Miller, St. Johns River Water Management District (Division of Land Management)
Steve Kinter, Director, Volusia County Environmental Management
Ron Hight, Refuge Manager, Merritt Island National Wildlife Refuge
John Koehler, Orlando District Manager, Florida Division of Forestry
Michael Thomas, Mayor, City of Edgewater
Ronald Swank, Mayor, City of Titusville
James Vandergriff, Mayor, City of New Smyrna Beach

4.4 SCOPING

Details of the scoping process and the issues that arose from it are described in Chapter 1, Section 1.5 – *Scoping Issues and Impact Topics*.

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APPENDIX A

**CONSULTATIONS WITH
U.S. FISH AND WILDLIFE SERVICE
and
FLORIDA DEPARTMENT OF STATE:
DIVISION OF HISTORICAL RESOURCES**



United States Department of the Interior

FISH AND WILDLIFE SERVICE

6620 Southpoint Drive, South
Suite 310
Jacksonville, Florida 32216-0912

IN REPLY REFER TO:

FWS-41910-2006-I-0279

February 3, 2006

Ms. Carol A. Clark, Superintendent
National Park Service
Southeast Regional Office
Atlanta Federal Center, 1924 Building
100 Alabama Street, S.W.
Atlanta, Georgia 30303

RE: Section 7 Initial Consultation for Implementation of the Canaveral National
Seashore Fire Management Plan

Dear Ms. Clark:

Thank you for providing the U.S. Fish and Wildlife Service (Service) with the 2005 Fire Management Plan (Plan) for the Canaveral National Seashore (CANA) for review under Section 7 of the Endangered Species Act, as amended (Act) (16 U.S.C. 1531 *et seq.*). The Plan affords measures for suppressing wildland fires on the park, part of which includes the use of prescribed burns to reduce fuels and return ecosystems in the park back to a more natural state. The Plan further states that 13 federally listed animal species are documented to occur within the CANA boundaries, and that one of the roles that prescribed fire will serve is to improve and/or maintain habitat for the Florida scrub-jay, bald eagle, southeastern beach mouse, and eastern indigo snake. There are no federally listed plant species presently documented on CANA property. The National Park Service (NPS) has determined that implementation of the Plan will have no adverse effects on listed species and asks for concurrence in this determination.

The U.S. Fish and Wildlife Service (Service) has reviewed the Plan and provides the following comments and determinations by species:

Mammals:

- Right whale (*Balaena glacialis*) – under NMI'S authority but there will be no effect
- Southeastern beach mouse (*Peromyscus polionotus niveiventris*) – may affect not likely to adversely affect (long-term beneficial effect)
- West Indian manatee (*Trichechus manatus latirostris*) – concur with no effect

Birds:

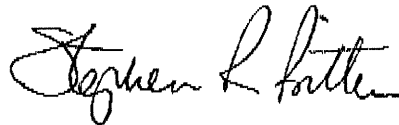
- Bald eagle (*Haliaeetus leucocephalus*) – may affect not likely to adversely affect if burning and resultant smoke is avoided at a nest site during the nesting season
- Florida scrub-jay (*Aphelocoma coerulescens*) – may affect not likely to adversely affect (long-term beneficial effect)
- Wood stork (*Mycteria americana*) – concur with no effect

Reptiles:

- Atlantic salt marsh snake (*Nerodia clarkia taeniata*) – concur with no effect
- Eastern indigo snake (*Drymarchon corais couperi*) – may affect, not likely to adversely affect (long-term beneficial effect)
- Green sea turtle (*Chelonia mydas*) – concur with no effect
- Hawksbill sea turtle (*Eretmochelys imbricate*) – concur with no effect
- Kemp's Ridley sea turtle (*Lepidochelys kempii*) – concur with no effect
- Leatherback sea turtle (*Dermochelys coriacea*) – concur with no effect
- Loggerhead sea turtle (*Caretta caretta*) – concur with no effect

Thank you for the opportunity to comment on the NPS's Fire Management Plan for CANA, and for your Section 7(a)(1) conservation efforts to improve and maintain habitats for threatened and endangered species and other wildlife resources at the park. Although this letter does not represent a biological opinion, it does satisfy the requirements of Section 7 in the Act. If additional information becomes available that reveal effects to listed species not considered herein, please reinitiate consultation with this office. Should you have any questions, contact Rob Bittner of this office at 904-232-2580, ext. 120.

Sincerely,



for David L. Hankla
Field Supervisor



FLORIDA DEPARTMENT OF STATE

David E. Mann

Secretary of State

DIVISION OF HISTORICAL RESOURCES

Ms. Carol A. Clark
National Park Service - Southeast Regional Office
Atlanta Federal Center - 1924 Building
100 Alabama Street, SW
Atlanta, Georgia 30303

December 21, 2005

RE: DHR Project File Number: 2005-11905
Received by DHR November 29, 2005
Canaveral National Seashore Fire Management Plan
Brevard County

Dear Ms. Clark:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise Federal agencies as they identify historic properties (listed or eligible for listing, in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

It is the opinion of this office that the *Fire Management Plan* adequately addresses the concern for prehistoric and historic resources located within the Canaveral National Seashore, and the potential impacts from fire and fire management activities.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail sewards@doh.state.fl.us, or at 850-245-6333 or 800-847-7278.

Sincerely,

A handwritten signature in black ink, reading "Frederick P. Gaske".

Frederick P. Gaske, Director, and
State Historic Preservation Officer

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